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Early phonological acquisition in multi-accent contexts

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Many children acquire the sound system of their language(s) in multi-accent environments. Yet, the variation and inconsistencies that exist in the linguistic input to these children and the effects of variable input on early phonological development remain relatively underexplored and underrepresented in the field of language acquisition. This chapter provides an overview of the growing body of work that examines early phonological acquisition in diverse contexts. It first describes the monolingual and bilingual contexts in which the phonetic and phonological properties of adult input can be particularly variable, followed by the different types of input variability. The implications of variable input on phonological development in children are then discussed, before some recommendations for researching early phonological acquisition.

Input variability and phonological acquisition

The emergence of phonology relies on linguistic input, from which the child extracts language-specific information that is requisite for the building of phonological and phonetic representations (Lust, 2006). While some speech features in child-directed speech may be relatively more canonical than in adult-directed speech (e.g. Dilley et al., 2014; Kuhl et al., 1997), the phonetic input that a child receives is rarely invariant. Variability in speech can arise from linguistic and physiological factors (Mücke et al., 2017) such as phonetic and prosodic contexts, lexical factors, speaking rate, vocal effort, fatigue, and anatomical differences, which means that no two tokens of a speech sound produced by caregivers are acoustically identical. The primary focus of this chapter is on another type of input variability, and that is variation arising from sociolinguistic and experiential factors that involves differences in manners of pronunciation, as in accents. Consider the allophones of English coda /l/ in the overall input that ethnically Malay, English-Malay bilingual

preschoolers in Singapore are exposed to: Sim (2021) found that in casual caregiver-child interactions, the English coda laterals of Malay caregivers were typically as clear as onset laterals ([l]; a Malay-derived ethnic marker [Sim, 2022]), but their preconsonantal coda laterals are prone to l-vocalisation [w, u]. In more formal contexts that involved teaching and learning, Malay mothers but not fathers adopted a less ethnically distinct style, by producing velarised coda laterals [ɫ] and/or by vocalising their coda laterals more frequently. Malay children are also exposed to different distributions of English coda laterals in the wider English-Malay bilingual community depending on the language dominance of the speaker: Malay-dominant speakers typically use coda clear [l], whereas English-dominant speakers use coda dark [ɫ], if these coda laterals are not vocalised (Sim, 2019). Moreover, being in a multicultural society, these preschoolers are increasingly exposed to the coda laterals of peers and other significant adults belonging to the Chinese ethnic majority in extra-familial contexts, which are typically vocalised [w, u], if not velarised [ɫ] (Tan, 2005). These local /l/ norms are in further competition with extraneous /l/ models the pre-schoolers are exposed to through mass media and the speech of non-local significant others, such as live-in helpers from the Philippines and Indonesia.

Variation of this kind is much more common than represented by existing child production studies, which have mainly focused on linguistically less diverse populations, or have assumed that input is relatively homogeneous (Johnson, 2018; Kehoe, 2015), but this is far from the reality. Many monolingual children are raised by caregivers who speak different regional dialects, or by caregivers who speak the same language variety but who are bi-dialectal/bi-lectal (e.g. Durrant et al., 2015; Foulkes et al., 2005; Grohmann et al., 2016; Kartushina et al., 2021; Levy et al., 2019). There is even more variability in the input to children in multilingual communities due to effects of individual bilingualism (Fish et al., 2017; Khattab, 2011; Ramon-Casas et al., 2021; Stoehr et al., 2019) and long-term language contact (e.g. Buschfeld, 2020; Mayr & Siddika, 2018; Sim & Post, 2021). A growing body of work that takes on a more environmentalist or social-interactionist position on early language acquisition has begun to foreground variation in input quality and its effects on language learning (Hoff, 2020; Snow, 2014). The bulk of these studies, however, has primarily focused on outcomes in the domains of word learning or lexical processing, grammar, and morpho-syntax (Cristià et al., 2012; Durrant et al., 2015; Hoff et al., 2019; Kartushina et al., 2021; Place & Hoff, 2011; Unsworth, 2016); less attention is paid to how variation in specific phonetic and phonological properties of the input can impact phonological development and outcomes.

This chapter provides an overview of emerging research on phonological acquisition in multi-accent contexts. It first describes some sociolinguistic contexts in which the phonetic or phonological properties of input to young children can be variable, followed by the different types of input variability. The implications of variable input on early phonological

development are then discussed, before we conclude with some recommendations for researching phonological acquisition in children.

Sociolinguistic contexts in which input properties can be variable

Language variation in adult speech communities is well documented, but child language acquisition studies that are situated in these contexts are scarce. We highlight some of these in this section. They may or may not have directly examined the effects of phonetic, allophonic or phonological variability on phonological acquisition.

Multi-varietal monolingual contexts

There is increasing recognition that it is inaccurate to consider monolinguals as a broad, homogeneous category in the description of infants' language input. It is not uncommon for monolingual infants to be raised in multi-accent environments, for example, by caregivers who speak different regional accents of one language, or caregivers who speak one variety that differs from the one spoken by the wider community. Thomas & Scobbie (2015), for instance, investigated the vowels of Scottish children living in Scotland who were raised by a parent who spoke Scottish English and another who spoke Southern British English. Likewise, Floccia et al. (2012) and Durrant et al. (2015) examined the English lexical representations in infants born and raised in the South West of England whose caregivers spoke different regional accents. Similar word-recognition/production studies have also been done on Dutch-learning (van der Feest et al., 2022), Norwegian-learning (Kartushina et al., 2021; Kartushina & Mayor, 2023; Selås & Neteland, 2019), and German-learning children (Levy et al., 2019) raised in multi-accent environments. Children may also be exposed to a new regional accent or dialect due to relocation, especially through peers (e.g. Kerswill & Williams, 2000; see Nycz, 2015). Multi-accent exposure is not always due to caregivers or peers speaking different regiolects. Habib (2017), for instance, reported that fathers in the small village of Oyoun Al-Wadi in Syria used higher percentages of the local/rural form of a variable, whereas mothers used more of the supralocal/urban form. Stanford (2008) described differences along clan lines in Sui villages in rural parts of Guizhou Province, Southwest China. In any one village, married Sui women often spoke different clanlects of the Sui language (i.e. varieties with distinct dialect features including phonological and lexical differences associated with particular clans in the region) from their husbands because of exogamous customs. Sui children were therefore exposed to dialect norms belonging to one group that consisted of the father, male adults, older siblings and older children in the local village, and the norms belonging to the other group, which consisted of the mother and other women who have in-migrated.

Moreover, many monolingual caregivers are themselves bi-dialectal. By combining methods from variationist sociolinguistics and first language acquisition, researchers have observed stylistic variation in child-directed speech, often between standard and vernacular/local phonetic forms, that is conditioned by social factors such as communicative intent, and the age and gender of the child (Foulkes et al., 2005; Roberts, 2013; Smith et al., 2007, 2013). The distribution of the use of different dialects and accents can also be pervasive, as in the context of a diglossia, in which two (dia)lects are in strict complementary distribution in the wider community, such as in Greek-speaking Cyprus (e.g. Grohmann et al., 2016) and Arabic-speaking countries (e.g. Saiegh-Haddad & Haj, 2018). The exposure to more than one language variety has been argued by some to be analogous to the acquisition of two languages, in that there are two distinct phonological systems that are being acquired (Albareda-Castellot et al., 2011), and the mechanisms of bi-lectal/diglossic lexical access are similar to those of bilinguals (Kirk et al., 2022; Vorweg et al., 2019).

Bi-/multilingual contexts

Bilingual input is ‘noisy’ (Byers-Heinlein & Fennell, 2014, p. 276). The bilingual child regularly encounters two languages, potentially from the same person, in the same environment, and within one utterance if the caregiver codeswitches. The phonetic input of each language can also be variable; because bilinguals (or multilinguals) are not equally bilingual, there is considerable between- and within-speaker variability in the speech of adult bilinguals, even if they speak the same languages. Butler (2012, p. 112) describes several dimensions along which bilinguals (and indeed even bi-dialectal monolinguals) may differ that include language dominance (e.g. in terms of amount of use and proficiency), functional ability (receptive and productive), age of acquisition (simultaneous, sequential, and late), language status and learning environments (elective and circumstantial), L2 learning and L1 retention (additive and subtractive bilinguals), and cultural identity (L1 monocultural, L2 accultural, and deculturated bilinguals). Bilinguals also belong to communities of various sizes and types (Romaine, 2012), which are characterised by different contact dynamics and varying degrees of contact. Some of the bilingual contexts in which input can be variable are highlighted below.

Late-L2 bilingual caregivers and L1 attriters

Phonetic input from caregivers who acquired their L2 later on in life and/or those who have not achieved proficiency, such as those in bi-national families, may be variable and inconsistent. Late-L2 bilingual caregivers are likely to exhibit phonetic characteristics that differ from their monolingual peers as a result of their interacting phonological systems (Bosch & Ramon-Casas, 2011; Fish et al., 2017; Flege et al., 2003; Fowler et al., 2008; Khattab, 2011), such that some are perceived to have a ‘foreign’ accent (e.g. Flege et al.,

1997; Guion et al., 2000; Mayr et al., 2020; Yeni-Komshian et al., 2000). The degree of foreign accentedness can further differ between L2 speakers depending on factors such as age of learning and amount of continued L1 use (see Piske et al., 2001). In addition, owing to the plasticity of the phonetic and phonological systems of bilinguals, the L1 of bilingual caregivers can also be influenced by their L2 (albeit to a lesser degree) in the form of backward transfer, which is modulated by similar factors that also modulate the influence of L1 on L2 (Kartushina et al., 2016; Stoehr et al., 2019).

Ethnic minorities / heritage speakers

L2-speaking caregivers can belong to large, dense, trans-national, and multi-generational bilingual communities, such as minority ethnic communities in superdiverse cities that are formed from continuous immigration. In these contexts, children of early generation migrants often acquire the family/heritage language as their L1, before acquiring the host/dominant language as an L2 at a later stage, normally in schools. One prime example is work that has been done on the adult input models (in both the heritage language and the host language) and variation in the production of children and adolescents belonging to British South Asian communities (Khattab, 2002, 2011; Kirkham, 2017; Sharma, 2011; Sharma & Sankaran, 2011), and especially on bilingual phonological acquisition in Sylheti-English bilingual children in the United Kingdom raised by speakers from different generations (Kirkham & McCarthy, 2021; McCarthy et al., 2013, 2014) and across generations (Mayr & Siddika, 2018). In such bilingual communities, phonological features that once emerged from L2 acquisition by earlier generations may be transmitted vertically to early L2/L1-speaking children of later generations, to form stabilised, hybrid accents that are increasingly associated with the particular ethnic groups. These features may be assigned new social meanings, and used variably as part of their ethnolinguistic repertoire (e.g. Gnevsheva, 2020; Sharma, 2011). Children raised in these contexts are thus exposed to multi-accent input of the majority language from late-L2 speakers, later generation L1 speakers who may speak the majority language with ethnically distinctive accents, and the majority accent of the wider community. They may also be exposed to heritage language input from second-generation or even first-generation immigrants who have undergone L1 attrition (Kupisch & Rothman, 2018; Stoehr et al., 2019; Yılmaz & Schmid, 2018; see Paradis, 2023, for other factors that influence the development in the L2 and heritage language).

Multilingual societies and long-term language contact

Children raised in societies characterised by widespread individual bilingualism and societal multilingualism may receive input that could be even more variable. In the case of immigrant families in largely monolingual communities, variability in the input may arise through the idiolect of caregivers, but children are exposed to relatively more homogenous input from monolingual majority language speakers in the wider community. By contrast, in societies in

which individual bilingualism is the norm, there is considerable inter- and intra-speaker variation across *all* speakers along the many dimensions described above that individual bilinguals or their sociolinguistic contexts can differ (Amengual & Chamorro, 2015; Bosch & Ramon-Casas, 2011; Butler, 2012; Sim, 2019; Simonet, 2010), so much so that it is not uncommon for children who speak the same two languages to have different phonological outcomes (En et al., 2014; Law & So, 2006; Lleó & Cortés, 2013; Mayr et al., 2015; Ramon-Casas et al., 2021; Sim & Post, 2021, 2023; Sim, 2023).

Moreover, new language varieties may emerge from prolonged language contact in ways similar to the formation of new/hybrid accents in ethnic minority settings, except that they are spoken by entire speech communities (e.g. Colantoni & Gurlekian, 2004; Mayr et al., 2017; Morris, 2017; Schneider, 2007). Contact-induced accent changes in multilingual, multicultural contexts may also be less homogenous due to the influence of different languages that are spoken. Bilinguals who speak New Englishes (or post-colonial/multilingual contact varieties; Schneider, 2014) in Singapore and Malaysia, for instance, share mainstream speech features that are distinctive of their contact varieties, but they may remain ethnically differentiated through the (variable) use of ethnic markers that are likely derived from their respective ethnic ‘mother tongues’ (Leimgruber, 2012; Phoon et al., 2013; Sim, 2019, 2022; Starr & Balasubramaniam, 2019).

There are also important differences in the contact dynamics between ethnic minorities in pluralistic societies and ethnic groups in multicultural societies that may lead to differential phonological outcomes in children. In pluralistic societies that are organised around the languages and culture of the dominant groups that have historically constituted them, there may be social pressure for ethnic minorities to integrate and undergo acculturation. In these contexts, it is not uncommon for the children of first or later generation migrants to behave much like their monolingual peers in the local majority language (Khattab, 2011; Mayr & Siddika, 2018; McCarthy et al., 2014). By contrast, the multiculturalism model accentuates ethnic differences, is characterised by widespread appreciation and valuing of diversity, and involves political ideologies of separatism and non-assimilation as well as policies and practices to support and accommodate ethnic differences (Mack, 1994). Individuals in multicultural societies are perhaps more likely to be part of ethnic social networks and be bi- or multicultural in their orientations, and thus, multiculturalism as a social force could slow the dissolution of ethnic-specific markers because of the important social functions they play.

Types of variability

Evidently, variability in the phonetic and phonological properties of input to children differs across sociolinguistic contexts, and in myriad ways, that cannot possibly be summarised here.

This section focusses on the input properties of late-L2 bilingual caregivers and L1 attriters, and variation in child-directed speech that is structured and contextually dependent.

Differential features in late-L2 bilingual caregivers and L1 attriters

There is general consensus that the speech of bilinguals (both L1-plus-L2, and 2L1) typically differs from their monolingual counterparts because of the bi-directional interaction between their phonological systems. L1 and L2 phonetic categories that are perceived as equivalent may assimilate into a merged category (Flege et al., 2003), and the phonetics of one language may be employed to produce the phonemes of another (e.g. Bosch & Ramon-Casas, 2011). Cross-linguistic interactions may result in the phonemic overlap in speech sounds of the two languages, resulting in the same acoustic signals representing different phonemes in each language, or different signals representing the same phoneme depending on the context (Fish et al., 2017).

Khattab (2011) reported that Lebanese-born English-Arabic bilingual caregivers living in Yorkshire, England, produced Arabic-influenced clear coda English laterals predominantly. Mayr & Siddika (2018) also found Sylheti influences in the English stop consonants of first-generation Bangladeshi migrant mothers living in Cardiff, South Wales, who produced dentalised English /d/ and /t/, and prevoiced /b d g/ stops more often than monolinguals. The acoustic-phonetic enhancements caregivers make in their child-directed speech, which could facilitate language learning (e.g. Kirchhoff & Schimmel, 2005; Kuhl et al., 1997), may also differ between L2 and monolingual caregivers. Fish et al. (2017) examined the stop voicing contrasts of late-L2 Spanish-English bilinguals in the United States by measuring the voice onset time (VOT) of their word-initial plosives. General American English employs a two-way contrast between lenis /b d g/ (short +VOT) and fortis /p t k/ stops (long +VOT), whereas Spanish /b d g/ stops are prevoiced (-VOT) and /p t k/ stops are unaspirated (short +VOT). They found that the bilingual caregivers produced English /p, t/ with shorter +VOT than monolinguals in both adult-directed speech (ADS) and infant-directed speech (IDS). Even with the exaggeration of VOT in IDS, bilingual caregivers' overall VOT for English /p, t/ in IDS was shorter than monolinguals' overall VOT for the same plosives in monolingual ADS. Moreover, while monolinguals produced significantly longer +VOT for English /p, t/ than /b, d/ in IDS, which may help enhance infants' perception of voicing contrast, the effect was not observed in the bilingual caregivers, who increased the VOT of all stops to similar extents.

In addition to differential speech patterns in their L2, caregivers may experience 'backward' transfer from their L2, leading to phonetic changes in their L1 (Kartushina et al., 2016). L1 attrition, for instance, may occur to caregivers who have moved into an environment in which their L1 is not (widely) used. Stoehr et al. (2017, 2019) analysed the VOT of L1 German-speaking mothers who moved from Germany to the Netherlands and

spoke Dutch as an L2. They showed differential productions in Dutch as well as German when compared to their monolingual peers; not only did they not produce consistent prevoicing in their L2 Dutch voiced plosives, but they also produced shorter VOT for their aspirated German voiceless plosives.

Moreover, even adult bilinguals who acquired their two languages early may exhibit variable production. Bosch & Ramon-Casas (2011), for instance, examined the production of /e/-/ɛ/ contrastive vowels in Catalan (which are not found in Spanish) by 16 early Catalan-Spanish adult bilinguals, half of them were raised in Catalan-speaking homes, while the others were raised in bilingual Spanish-Catalan homes or Spanish-speaking homes. All the participants were fluent and frequent speakers of Catalan. The authors found that while both groups produced separate /e/ and /ɛ/ categories at the acoustic-phonetic level, those who were not raised in Catalan-dominant homes were less stable in the phonological representation in their lexicon, and more error-prone in producing /e/ in words involving the /ɛ/ vowel.

Structured and socially-conditioned variation

Variation in the input can also be structured and determined probabilistically by linguistic and social factors. Of particular interest is socially-conditioned variation, which involves the presentation of alternative phonetic forms in the same linguistic environment that does not change the semantic meaning of the utterance but encodes some form of socio-indexical meaning. The following describes structured variation that may occur in the direct and indirect input from an individual (i.e. intra-speaker variation), and also between the significant people in the child's immediate environment (i.e. inter-speaker variation).

Intra-speaker variation

Structured variation can occur in the speech of an individual. Bi-lectal speakers in Greek-speaking Cyprus, for example, use the local vernacular, Cypriot Greek, in informal settings and everyday casual interactions. This low variety is used alongside the high variety, Standard Modern Greek, which is reserved for formal and literary contexts (Grohmann et al., 2016). Modifications in CDS can also surface as stylistic variation involving sociolinguistic variables, such as between STANDARD–NONSTANDARD or LOCAL–SUPRALOCAL forms that differ in their social meanings and evaluation (Foulkes & Hay, 2015; Nardy et al., 2013; Roberts, 2013).

Foulkes et al. (2005) examined the use of standard versus other less prestigious and stigmatised local variants of (t) by mothers of children aged 2;0–4;0 living in Tyneside, England. They found that not only did mothers in general use more standard [t] in CDS than in ADS, but more standard [t] was also used by mothers of girls and with younger children. That boys heard more local variants than girls was argued to be a way by which mothers tailor their speech to the developing gender of their child, in line with the gendered

differences in the community. In their studies on the use of sociolinguistic variables in Buckie, Scotland, in both mothers and their children aged 2;6–4;2, Smith and colleagues (Smith et al., 2007, 2013) also showed that, for some variables, vernacular Scots forms were used more frequently in contexts of play and routine than in those that involved education and discipline, such as the use of monophthong [u:] instead of diphthong [ʌʊ] in the MOUTH lexical set of words like *down* and *out*. There was also a higher rate of use of local variants with older children, but only for some variables. They observed that some variables mirrored community norms very quickly while others remained variable in the early stages of language acquisition, which led the authors to conclude that variables have different ‘sociolinguistic value’ in CDS. Foulkes et al. (2005) pointed out that choices of alternative forms in CDS must be ‘viewed with one eye on the social-indexical values of the alternatives’ (p. 198); caregivers use a range of phonetic forms ‘to introduce children to socially structured linguistic alternatives’ (p. 199), and this was argued to be important in helping children develop their sociolinguistic competence.

While bilingual caregivers can also orientate towards STANDARD–NONSTANDARD or LOCAL–SUPRALOCAL forms in their CDS in either language, the linguistic choices of those in certain multilingual contexts can also vary along an ETHNIC–MAINSTREAM dimension. Differential features that emerge from language contact and acquisition can become ‘enregistered’ (Agha, 2007), which refers to ‘processes and practices whereby performable signs become recognised (and regrouped) as belonging to distinct, differentially valorised semiotic registers by a population’ (p. 81). These features can be transmitted to and retained by later generations to become associated with particular socio-demographic groups, and further become reallocated with social functions or accrue social meanings over time (Gnevsheva, 2020; Sharma & Sankaran, 2011; Sim, 2022), to be used creatively as part of an ethnolinguistic repertoire (Benor, 2010; Eckert, 2008). Sharma (2011) examined the variation in the use of ethnically-marked variants in the production of /t/, coda /l/, and the FACE and GOAT vowels in four second generation British-born Asians (younger and older males and females) towards different interlocutors. She found that some of the speakers were more strategic and differentiated in their use of the different variants; they were generally more ‘ethnic’ in their use of variants with Asian speakers and with their direct family members, and more ‘mainstream’ with Anglo interlocutors.

Maternal and paternal CDS patterns may also be qualitatively different across societies and cultures. Studies have found that fathers generally do not modify acoustic properties in their CDS to the same extent as mothers, they accommodate less, and they use more complex speech than mothers (Broesch & Bryant, 2018; Pancsofar & Vernon-Feagans, 2006). Modifications in CDS that involve sociolinguistic variables may also differ between fathers and mothers (e.g. Foulkes et al., 2005). In his analysis of the English /l/ in the CDS of early English-Malay bilingual Singaporean caregivers towards their preschoolers, Sim (2021) found that, in caregiver-child interactions that involved casual play, caregivers’ English coda

laterals were as clear as onset laterals (a Malay-derived ethnic marker), unless vocalised. In more formal contexts that involved teaching and learning, mothers adopted a style that was less ethnically distinct by either producing darker coda laterals (exonormative norm) and/or more vocalised coda laterals (mainstream norm). Contrastingly, there was no observable stylistic variation in the CDS of fathers, who had retained the use of coda clear [l]. Sim (2021) suggested that avoidance of stigmatised clear [l] and the increase in use of dark [ɫ] (which is associated with standard speech and indexes formality and educational attainment in Singapore [Sim, 2022]) in the CDS of mothers in literary contexts could be attributed to clearly defined gender roles and cultural expectations of mothers' dominant role in child-rearing, and may also be a result of and enabled by Malay women's potentially more complex repertoire range than that of Malay men.

Socially-conditioned allophonic variation in the input that has been described above not only reveals to the child the variable rules, i.e., the linguistic context in which variability is permitted (Roberts, 2013), but also, through the child's experience with its use in context, helps create form-meaning connections as the child associates the alternative phonetic forms with the particular contexts and social variables in which they occur (Foulkes & Hay, 2015).

Inter-speaker variation

Systematic differences can also exist in the input *between* significant people in the child's social environment; as described above, caregivers can speak different regiolects or sociolects of a language, they may be bi-/multinational and bi-/multilingual speakers of different languages, and/or the variety spoken at home can be different from the dominant variety of the wider community. Laver (1994) describes four ways by which segmental features can differ between accents: systemic (overall inventory of sounds), structural (phonotactics), selectional (different distribution of phonemes across words), and realisational (the way phonemes are pronounced). Inter-caregiver differences can also occur at the suprasegmental or even the sub-phonemic level. Cristià (2011), for instance, reported that some caregivers exhibited greater acoustic separation between /s/ and /ʃ/ by producing /s/ with more intense energy peak. Sim & Post (2021) found that some Singaporean mothers were more likely to audibly release their English coda /p t k/ stops in their CDS than others.

One source of inter-speaker variation that can greatly influence language outcomes is the wider community, particularly the significant adults and peers in extra-familial contexts with whom the child has frequent, direct contact. Attendance at a preschool, nursery or day-care, for example, necessarily exposes a child to accents or accent features that can qualitatively differ from the input received at home (see, for example, Mayr & Montanari [2015]). Children in ethnic minority contexts or multicultural contexts are also constantly faced with competing alternatives between mainstream and ethnic norms. Arabic-English bilingual children in Khattab (2011), for example, were exposed to Arabic-influenced clear coda [l] in the speech of their Lebanese-born caregivers and dark laterals [ɫ] of their

monolingual peers speaking the Yorkshire dialect of English. Similarly, ethnically Malay, English-Malay bilingual preschoolers in Singapore are exposed to three allophones of English coda laterals (dark, clear, vocalised) from their caregivers, the wider Malay community, and the ethnic Chinese majority (Sim & Post, 2023).

Implications of variable input on early phonological development

Depending on the type of variation, variable input can impact early phonological development in different ways, some of which are described in this section.

Regularisation

Unstructured and insignificant variation in the input, such as the inconsistencies found in late learners, may be regularised by children. In statistical learning experiments that involved learning of artificial languages that exhibited unpredictable variation, young children were less likely than adults to reproduce the inconsistencies in the input veridically. Instead, they imposed consistency by choosing a more regular form than one that is less frequent (Hudson Kam & Newport, 2005, 2009). Regularisation also occurs in children's acquisition of natural language (Singleton & Newport, 2004; Smith et al., 2007). Habib (2017), for instance, found that older boys in the village of Oyoun Al-Wadi in Syria began to approach men's local linguistic behaviour by using more rural form [q] than girls and their mothers, but this was not observed in boys aged six to eight, who were categorical users of the urban [ʔ] that most mothers used. Habib explained that the lack of gendered variation in the younger children was less likely to be due to the replication of input patterns of their caregivers, since there was great linguistic difference between fathers and mothers. Instead, Habib (2017) posited that the findings could be best explained by the process of regularisation, in which these children used the form that was predominant in their overall input, i.e., [ʔ] used by their mothers. Similarly, Sim & Post, (2022, 2023) explored how ethnically Malay, English-Malay bilingual preschoolers in Singapore negotiated the allophonic (i.e. three variants of coda /l/) and phonological (i.e. differences in linguistic constraints that modulate l-vocalisation) variability in their overall input. They found that children who were mainly exposed to input from ethnically Malay caregivers and close peers showed an overarching preference for clear [l] (a Malay-derived ethnic marker) in their /l/ production for both Malay and English and in all syllable positions. Sim & Post (2022) proposed that the children could have regularised their input by opting for the most frequent variant (i.e. clear [l]) but not the two other variants (dark [ɫ] and vocalised [w, u]).

Delayed category formation / unstable phonemic categories

In acquiring the sounds of their two (or more) languages, or language varieties, a child not only has to develop sensitivity to *phonological distinctiveness* to be able to recognise contrastive sounds in their languages, but also *phonological constancy*, that is, the ability to recognise a word's identity across natural phonetic variations, such as those found in multi-accent contexts (Best et al., 2009). Some evidence suggests that the phonological representations of infants who are exposed to multiple accents from birth may be less well specified, or contain phonetically more relaxed categorical boundaries. Durrant et al. (2015), for instance, found that compared to infants exposed to consistent (mono-dialectal) input, multi-dialectal 20-month-old infants were not as able to detect mispronunciations in familiar British English words. Similarly, van Heugten & Johnson (2017) found that mono-dialectal infants readily recognised familiar word forms in Canadian English by 12.5-month, but multi-dialectal infants failed to show a reliable preference for words over non-words until 18 months of age. Ramon-Casas et al. (2021) investigated the perception and production of the Catalan mid-vowel /e/-/ɛ/ contrast by 4- to 5-year-old early bilinguals who differed in their language dominance (L1 Catalan or Spanish), and found that Spanish-dominant bilinguals were more error-prone in their production of the /e/-/ɛ/ contrast and also showed a relatively smaller, albeit unmerged, acoustic distinction between the two vowels. The authors postulated that the variable performance of the Spanish-dominant bilinguals could be attributed to the Spanish-accented Catalan input that was extensively used at home and in their social environment, i.e., the kind of variable input described in Bosch & Ramon-Casas (2011) mentioned above. That multi-accent exposure may be associated with more relaxed phonemic categories in perception as well as production has also been observed in adults (Chen et al., 2017; Kirk et al., 2018), which suggests that effects of early multi-accent exposure may be long-lasting.

Relaxed phonological representations for words, however, have been proposed to facilitate word recognition and comprehension across accents; that is, children in multi-accent contexts 'are developing in a manner that is adaptive for their [language] environment' (van der Feest et al., 2022, p. 10). Levy et al. (2019), for instance, found that more exposure to regional accents was associated with an advantage in processing unfamiliar regional German accents in children (average age: 9;10). Kartushina et al. (2021) also reported that 28-month-old toddlers exposed to two dialects at home learned Norwegian words better in multi-accent input than toddlers raised in mono-accent households.

Input effects and differential production in children

Children are sensitive to sub-phonemic information in the input, and fine-grained variation in the input has been shown to be reflected in child production. Coda stops in Singapore English tend to be unreleased, but this varies among Singaporeans. Sim & Post (2021) set out to

investigate inter-caregiver variation in coda stop release in Singaporean mothers and whether this variation was also reflected in their preschoolers' production. They found that mothers who released coda stops to a lesser degree also had children who tended to not release their stops, and the same was true for mothers who released their stops to a higher degree. Other studies have shown that the differential production in bilingual children is not always due to cross-linguistic influence or transfer, and can in fact be due to properties of the input. Stoehr et al. (2019) examined whether the differential production in the VOT of German-Dutch mothers as described above was reflected in the VOT production of their Dutch-German bilingual preschoolers. These children acquired German as a heritage language predominantly from their mothers who spoke German as an L1. They acquired the majority language, Dutch, from their fathers who were L1 speakers of Dutch, and also from their mothers who were L2 speakers. They found that individual variation in the VOT production of these child bilinguals was associated with individual variation of VOT in their mothers' L2 speech in Dutch and their mothers' attrited speech in the heritage language German (see also Sim [2023]). Likewise, Sim & Post (2023) observed that, likely due to the very frequent use of the Malay-derived clear coda [l] in the English CDS of Malay caregivers in Singapore, their English-Malay bilingual preschoolers also produced very clear English coda [l], regardless of their language dominance. Mayr & Montanari (2015) also reported that even though the two English-Italian-Spanish simultaneous trilingual sisters in their study heard Italian from birth on a regular basis from their native-speaking mother and other native and heritage speakers, not all their Italian stops were target-like; instead, their Italian production showed effects of cross-linguistic influence from English, but the authors attributed to the regular exposure to English-accented Italian from their English-dominant peers.

Acquisition of socially-conditioned variation

Despite their tendencies to regularise, young children are able to learn socially conditioned variation through stochastic or probabilistic learning (Samara et al., 2017), and variation that is conditioned by sociolinguistic cues such as age, social class, gender, and context has been shown to be reflected in children's production from an early age. Many of these studies have been extensively reviewed in Foulkes & Hay (2015), Nardy et al. (2013), and Smith & Durham, (2019), and they will not be reviewed in this chapter. Key driving issues in this area of research are outlined by Chevrot & Foulkes (2013, pp. 252–253):

1. *The appearance of adult-like sociolinguistic patterns during development* (e.g., at what age and order do they appear; are social constraints in place before or after the linguistic constraints; how do the patterns evolve with age?)

2. *The relationship between the linguistic environment – family, peers, teacher – and the acquisition of sociolinguistic variation* (e.g., what input counts and at what age? How do multiple influences combine?)
3. *The motor for acquisition* (e.g., is acquisition guided by the awareness of social issues, or is it based on the statistical learning of implicit patterns encountered in the environment?)
4. *The cognitive nature of the mechanisms responsible for the acquisition of variation* (e.g., is the child acquiring variable rules including social constraints, or do they construct schemas that combine social and linguistic information through exemplar-based learning?)

Influence of peer and community norms

Many studies have shown that, when a child is faced with competing alternatives, the speech model of peers or the dominant community norms often supersede caregiver norms. Kerswill & Williams (2000), in their investigation of koineization (the development of a new variety as a result of dialect contact) in the Milton Keynes New Town, for instance, found that while the 4-year-old children's production patterns of the (ou) variable (the fronting and unrounding of the offset of the diphthong /əʊ/) correlated with their caregivers' production, the production of this vowel by 8- and 12-year-olds oriented towards the variants of the New Town koine and was less affected by their caregivers' pronunciation. The authors noted that '[s]tarting from a parent-centred orientation, young children expand their range of social contacts to other, often older children, eventually forming distinctive teenage peer-groups, with their attachment to youth culture and opposition to adult norms.' (p. 68); their changing social orientation and the concomitant preference for norms conveyed by their peers were argued to be part of their maturing sociolinguistic competence. Specific speech features of bilingual children raised in ethnic minority settings have also been found to converge to mainstream or monolingual norms after accumulated experience with the host language (e.g. Khattab, 2011; Mayr & Siddika, 2018; McCarthy et al., 2014; Sharma & Sankaran, 2011), although depending on their ethnic affiliation, they may use ethnically-marked features more frequently, rather than adhere to mainstream norms (e.g. Kirkham, 2017; Sharma, 2011; Sim, 2019).

Stanford (2008), however, pointed out that the parent/peer distinction should be viewed as a 'culture-dependent instantiation of a more general pattern of child dialect acquisition' (p. 568), one that involves 'learn[ing] and construct[ing] dialect identity as a process of distinction between several groups' (p. 567). In his study of the Sui people as described above, Sui children had to choose between the dialect norms belonging to one group that consisted of the father, male adults, older siblings and older children in the local village, and the norms belonging to the other group, which consisted of the mother and other women who in-migrated to the local village as a result of exogamous customs, and other children who use

the dialect features of those women. Instead of orientating towards either parental or peer norms, Sui children from as young as three were found to construct their linguistic identity along clan lines, by eventually choosing their father's clan dialect features (i.e. the former group) over the features associated with their mother's clan, which they had first acquired from their mother.

Conclusion and some recommendations for researching child language

Accent-related phonetic and phonological variation in the input is ubiquitous. We join many others (Cristià, 2011; Johnson, 2018; Johnson et al., 2022; Kirk et al., 2022; Mayr et al., 2021; McLeod et al., 2022; Sim, 2021, 2023; Sim & Post, 2021, 2023; Thomas & Scobbie, 2015; van Heugten & Johnson, 2017) in imploring researchers to not only be cautious to assume homogeneity in the input by virtue of the caregivers being classified as monolinguals or L1 speakers, but also to consider the potential differences in specific input properties in research designs, at the very least in studies that seek to explain differential language outcomes. We could also more accurately quantify the individual variability in the sociolinguistic experience of children by considering multi-faceted measures that are more sensitive to their linguistic and social diversity (Birdsong et al., 2012; De Cat et al., 2023; Wigdorowitz et al., 2020). In addition, given that input plays a significant role in moderating language outcomes, an accurate depiction of child production cannot be achieved by averaging group behaviours. Especially in diverse contexts, it appears insufficient to describe phonological acquisition merely in terms of the learning of discrete, invariant phonological categories or phonemic contrasts of their varieties of language(s), or in terms of the extent to which a developing child conforms to normative expectations, especially that of monolinguals (see Leivada et al., 2023 and Rothman et al., 2022). We argue that due attention has to be paid to the individualities in their phonological knowledge and (socio)linguistic repertoire that arise from the exposure to highly variable input and also from the negotiation of the individual's personal, complex social world that is constantly evolving.

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