

**Patterns in the second language acquisition of *s*-initial clusters:
Is learning a subset grammar as hard as it seems?**

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Across languages, word-initial consonant clusters are typically limited to two different types: *s*-initial clusters (e.g. *span*, *slim*) and obstruent-initial clusters (e.g. *plan*, *trim*). These clusters differ principally on the sonority dimension. The optimal obstruent-initial cluster rises in sonority, exhibited by *pl* and *tr*; sonority plateaus (e.g. *pt*) are disfavoured across languages (e.g. Clements 1990). By contrast, *s*-initial clusters get worse as the sonority of the consonant following *s* increases: no language with *s*-initial clusters forbids *s*+stop (e.g. *sp*), even though this cluster shows a sonority plateau (Goad 2011).

This difference in sonority suggests that obstruent-initial and *s*-initial clusters are formally of two different types. It follows that there should be some languages with obstruent-initial clusters but no *s*-initial clusters (as well as languages with the inverse profile). There should also be languages that permit both types of clusters. These predictions hold true:

Word-initial clusters:	Spanish, Brazilian Portuguese (BP):	✓obstruent-initial, ✗ <i>s</i> -initial
	English, French:	✓obstruent-initial, ✓ <i>s</i> -initial

When learning a superset language, positive evidence is available. For example, Spanish/BP-speaking learners of English/French can discover that *s*-initial clusters (*sC*) are well-formed from exposure to words like *sport* and *stage*. Accordingly, acquisition of the target grammar should be relatively straightforward, whether learners are classroom-instructed or immersed naturalistically in the L2 environment.

When learning a subset language, positive evidence is often not available, indicating that learners must rely on some other type of evidence to acquire the grammar: either indirect negative evidence (inferring that a structure is ill-formed through its absence from the ambient data) or direct negative evidence (being explicitly told that a structure is ill-formed). Indirect negative evidence is, in reality, a lack of evidence. To discover the illicit status of *sC* in Spanish/BP, English/French learners must have heard enough words spanning a range of syllable types in which an expected (*sC*-initial) form could occur but does not, and enough time must have passed before learners can safely conclude that such forms are therefore ill-formed. Direct negative evidence is usually only available in classroom settings; however, classroom instruction rarely focuses on ill-formed patterns in the domain of phonology. In short, when learning a subset phonological grammar, acquisition of the target grammar should be relatively slow.

Because second language learners have been shown to successfully learn syllable structure constraints that are a subset of those in their native language (e.g. Trapman & Kager 2009), we propose that another sort of evidence may be available to learn a subset grammar, what we call ‘indirect positive evidence’ (IPE) (Schwartz & Goad 2014). IPE is evidence from errors in the learner’s native language made by native speakers of the learner’s L2. Consider, for example, a native speaker of English who is in the process of acquiring BP. This individual may hear a native speaker of BP, who is in the process of acquiring English, producing English words that begin with *sC*. If the English speaker hears the BP speaker epenthesize a vowel before the cluster (e.g. *star* → *istar*), *s*/he may conclude that the constraints of BP do not allow *sC* clusters in word-initial position. This type of evidence is indirect because the evidence for the structure of the grammar of one language is accessible through errors made in the other language.

We experimentally tested whether IPE is viable for L2 acquisition. 32 native speakers of Canadian English, with no previous exposure to BP, were exposed to a dialogue between two BP speakers speaking English. All word-initial *sC* clusters in the dialogue were preceded by an epenthetic *i*. Participants were then required to judge the well-formedness of BP-like words. The results indicate that 13 performed in a BP-like manner: they were able to use the IPE to build a grammar that is a subset of their own English grammar. The remaining 19 behaved as English-like: they accepted words that begin with *sC* as well-formed in BP. In conclusion, our results show that indirect positive evidence may provide a ‘short-cut’ to learning a subset grammar. Exactly how it plays a role in naturalistic L2 learning remains to be seen.