A growing literature has moved away from the position that syllables are highly articulated units (e.g. Steriade 1999, Côté 2000). Following from this, the observation that sC clusters escape the requirement that true branching onsets rise in sonority need not be attributed to structure (with s located outside the onset constituent) but, instead, finds its explanation in perception (Fleischhacker 2001, 2005): although a non-sibilant obstruent in an initial cluster typically must be followed by a sonorant to maximize its perceptibility (as in plan), s has strong internal cues to place and manner, which ensures its perceptibility even when followed by stops (as in span) (Wright 2004).

Although a perceptually-based approach along these lines can account for the well-formedness of initial sp, st, sk across languages, it fails to capture the following observations: (i) no language that permits sC clusters forbids s+stop; (ii) the well-formedness of sC gets worse as the sonority of C increases, the inverse profile of true branching onsets (Goad 2011, 2012). In view of these observations, this paper returns to the position that syllables are high articulated units and adopts the proposal of Government Phonology that s in initial sC clusters is the coda (rhymal dependent) of an empty-headed syllable (following Kaye 1992), as shown in (1).

Support for (1) comes from the typology of word-initial sC cluster well-formedness on the sonority dimension, shown in (2) (adapted from Goad 2012). As can be seen, the profile of sC clusters mirrors the constraints that hold for optimal syllable contact, consistent with a coda+onset analysis: the well-formedness of sC declines as the sonority of C increases. As expected, this profile holds regardless of whether sC clusters appear initially or when flanked by vowels: (V)s.TV > (V)s.NV > (V)s.IV > (V)s.rV (Goad 2012). As the consonant following s increases in sonority, a branching onset analysis would be preferred, but if this option is never available for sC clusters, then higher sonority sC clusters will simply be illicit, regardless of where they occur in the word.

The typology in (2), and concomitant representation in (1), makes certain predictions for the second language (L2) acquisition of sC cluster well-formedness: (i) learners acquiring a superset grammar who are exposed only to the well-formedness of s+sonorant should infer the well-formedness of s+stop; (ii) learners acquiring a subset grammar who are exposed only to the ill-formedness of s+stop should infer the ill-formedness of s+sonorant. The second prediction is examined here, in the broader context of the types of evidence that may be available to learners acquiring a subset grammar in phonology.

In the L2 acquisition of phonology, it is assumed that subset grammars can only be acquired using direct or indirect negative evidence or, for languages of certain profiles, using direct positive evidence from morphophonemic alternations. In view of the challenges that each of these types of evidence
presents (to be discussed), we explore another type of evidence that may be available in particular L1-L2 settings: indirect positive evidence (IPE). IPE is available through errors made by native speakers of the learner’s L2 in the learner’s L1 (Schwartz & Goad 2015).

The typology in (2) reveals that initial sC clusters are illicit in Brazilian Portuguese (BP). In native words and loanwords, sC is repaired via prothesis (Mateus & d’Andrade 2000). BP learners of English also epenthesize before sC when speaking English (Cardoso 2007). Prothesis in BP-accented English thus provides a possible source of IPE for the illicit status of sC in BP, if BP learners of English engage in conversation with anglophones who are, themselves, in the process of acquiring BP.

To test the viability of IPE, we experimentally examine whether native speakers of English (n=32), who are naïve to the structure of BP, can build an interlanguage grammar that is a subset of the grammar of their L1 using only IPE. Participants were exposed to the constraints of the second language in the form of a 7-minute dialogue between interlocutors speaking BP-accented English. All sC clusters in the dialogue were preceded by an epenthetic vowel. Specific predictions are in (3):

(3) 1. **Constraint:** Participants will be able to use IPE to determine that word-initial sC clusters are ill-formed in BP.
2. **Repair:** Participants will repair sC clusters in BP-like words using epenthesis, not deletion or metathesis; the epenthesis pattern will involve prothesis, not anaptyxis.
3. **Generalization:** Participants who only receive evidence that s+stop clusters are ill-formed in BP will conclude that s+sonorant is ill-formed as well, consistent with (1) and (2).

Prediction 1 was robustly supported, but only for a subset of participants. A binomial test established that the behaviour of 11 of the 32 participants (henceforth referred to as ‘learners’) was significantly different from chance (ps ≤ 0.001). Prediction 2 was strongly supported for the 11 learners; when the remaining participants repaired sC clusters, their repairs were more variable, indicating that acquisition of the constraint and repair go hand in hand and, more importantly, that other ways to repair sC clusters are accessible to grammars/learners in the absence of positive evidence. To test Prediction 3, participants were divided into two groups: 16 were exposed to a dialogue revealing the illicit status of both s+stop and s+sonorant (i.e. both were repaired); 16 were exposed to a different dialogue revealing the illicit status of only s+stop (there were no s+sonorant clusters as all). 8 of the 11 learners were in the latter condition. Consistent with Prediction 3, these 8 learners robustly generalized the constraint against initial s+stop to s+sonorant, supporting the typology in (2) and the phonotactic expectations arising from a coda+onset analysis of initial sC clusters.