Is there a link between hoarseness and language deficits?
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The study aimed at an identification of language deficits of children with a hoarse voice, with a special focus on articulation and association of hoarseness with sociolinguistic factors.

Methods
Two samples were analyzed: (1) S1: 6144 four-year-old children including 120 with hoarse voice; (2) S2: 2844 three- to six-year-old children including 147 with hoarse voice.

Language skills of all children were assessed with a validated short version of the test Marburger Sprachsreening (MSS b) [1, 2], which contains subtests on all linguistic domains. Results were compared retrospectively for children with a hoarse (HV) and normal (NV) voice by Mann-Whitney U-tests and/or phi-correlations. Additionally, a subgroup of children from S2 (N=986) participated in the articulation test PLAKSS [3]. Error patterns of HV and NV children in articulation were compared by Mann-Whitney U-tests.

Information on hoarseness was taken from MSS b where the testers classified all children as having or not having hoarse voice during the test situation. This MSS b item was cross-tabled (Chi-square or linear-by-linear association) with sociolinguistic variables from questionnaires for parents and daycare center teachers. For metric data, Mann-Whitney U-tests were utilized. Factors significantly associated with the MSS b item on hoarseness entered classification trees for the identification of the most important variables.

Results
In S1, HV children yielded significantly lower values than NV children in all subtests: speech comprehension, vocabulary, grammar, articulation, and in a total score of correct answers (Zs<2.12, ps<.05). In the smaller S2 sample, HV children scored lower only in articulation (Z=-3.02, p=.003), with a marginally significant result in repetition of sentences (phonological short-term memory). Both in S1 and in S2 (ɸs<.11, p≤.001) hoarseness correlated significantly with stuttering.

In PLAKSS, HV children scored significantly lower than NV children (Z=-2.59, p=.010). A detailed analysis of error patterns was carried out for randomly chosen 305 children. The HV group had significantly more often fronting, backing, assimilation, glottalization, interdentality, vowel errors (Zs<-2.04, ps<.05), and, marginally significantly, the weak syllables deletion. Also, HV children reached numerically higher numbers of errors in further seven error patterns, with no differences in nine error patterns.

For S1, a classification tree identified language disorders in the family as the most important factor associated with classification HV/NV (χ²(1)=7.81, p=.005), followed by hearing disorders of the child (χ²(1)=7.10, p=.008). A number of other factors were associated significantly with HV/NV such as sex (more HVs among boys), need for educational help and language therapies in acquiring German, relatives with a permanently hoarse voice in the HV group.
Discussion
Significantly lower scores of HV children in all linguistic domains, association of hoarseness with stuttering, language disorders and hoarseness in the families, and need for educational support demonstrate a possible genetic link between hoarseness and other language deficits. It might also be that children with language deficits spoke louder than their peers as a simple compensation strategy, which resulted in a permanent hoarseness. In the articulation, HV children produced most error patterns more often than NV children.

References