Numerous factors have been advanced to account for the alternance of schwa with zero in French, such as lexical frequency, sonority, syllable structure, phonotactic constraints, etc.... In the present study we use a recently developed statistical modelling technique, mixed effects models with crossed random effects, to capture the relative contributions of multiple linguistic factors on both, schwa deletion and schwa’s physical duration when present. This study is based on the analysis of 4300 occurrences, extracted from the production of more than 300 speakers in a broadcast corpus. The implications of these findings for the debate on the nature of the processes involved in schwa deletion as well as for the nature of lexical representations will be discussed.