English stress placement has long been known to be sensitive to morphological structure. However, the exact nature of this sensitivity has been the subject of much controversy. One important focus of this controversy has been on secondary stress assignment in words like *originality* (◊ *original*), i.e. in derived words which have a secondary stress on the syllable that is main-stressed in their bases. Such cases have famously been used to support arguments about the cyclic nature of morphophonological rules (e.g. Kiparsky 1979; Halle & Kenstowicz 1991), as the position of secondary stress can be interpreted as preserving the stress from the base. In non-stratal theories the same generalisation has been captured, for example, by indexed correspondence constraints on the prosodic structure of the base and the derivative (e.g. Pater 2000).

Yet another type of explanation has been proposed by Collie (2007, 2008), on the basis of an empirical study that shows that the preservation effect is not only variable (with about 30% of her data showing no stress preservation), but that the variation is correlated with the relative frequency of the base with respect to the derivative. Collie interprets this finding as evidence in favour of a dual-mechanism approach, in which variation is the result of competition between two options that speakers have when processing complex words: One is the whole-word retrieval of stored, prosodified complex words and the other is the online computation of morphological and phonological structure (Bermúdez-Otero 2012 et seq.). In this account, then, secondary stress is indicative of morphological structure, in the sense that it reflects the morphological segmentability of a word. Crucially, segmentability in this sense is a gradient measure (cf. e.g. Hay 2003; Hay & Baayen 2002).

Whereas Collie's account is the only account to date to predict systematic variation in stress assignment, the empirical foundations of the argument still involve some unresolved issues that, due to the limitations of her dataset, Collie could not address in her work, but that raise questions about the validity of the proposal. Most of these issues have to do with the fact that the focus of Collie's study is limited to considering only one type of morphological structure, which is the immediate base-derivative relationship as posited by traditional structuralist analyses. For example, only the base *original* is considered in the analysis of *originality*, and only the base *demodulate* is considered in the analysis of *démodulation*. However, her dataset also includes words with various morphological structures, which all have been shown to bear on stress assignment in the literature. Such types of confounding structure are semantically transparent prefixes (see Kaye 1995; Raffelsiefen 1993; Wennerstrom 1993), opaque prefixes (see Dabouis 2016), and words with neoclassical roots (see Guierre 1979). Another limiting factor in Collie's work concerns the way segmentability was operationalised, which was restricted to relative frequency measures (as proposed in Hay 2003 et seq.). Other factors that relate to morphological decomposition, such as semantic compositionality (e.g. Ben Hedia & Plag 2017), were not considered. In sum, Collie's work provides initial convincing evidence that variation in secondary stress assignment is linked to how morphological structure is processed by speakers. However, existing research has not yet fully explored the complexities that are involved in this hypothesis.

The present paper comprises a first step to remedy this situation. We will present a systematic multivariate analysis of how secondary stress reflects morphological structure, taking into account different morphological segmentation options, measured in terms of both frequency-based and semantic correlates. Other factors to be considered include structural factors (such as syllable weight). To make up for the known limitations of available datasets, we will triangulate data of two different kinds: dictionary data and speech data.

The dictionary data is taken from Wells (2008). The analysis focuses on words whose base has primary stress on its second syllable and has no transparent morphological structure.
semantically transparent prefixes and neoclassical roots are left out). The dataset contains 258 words with a base stressed on its second syllable (e.g. supérior ♦ supériorité), among which 18 (7%) show stress patterns which diverge from that of their bases. Binary logistic regression shows significant effects of syllable structure and morphological structure on stress assignment. The variation in stress assignment can be explained best by the presence or absence of an opaque prefix and by the weight of the first syllable of the base relative to that of its second syllable (e.g. Pythagoréan ∼ Pythagoréan ♦ Pythagoras [paɪˈθɛɡərəs]).

The second dataset comes from a reading study, in which pronunciations of 52 different derivatives ending in -ity and -ion (e.g. accountability ♦ accountable; implausibility ♦ deliberation ♦ deliberate; humiliation ♦ humiliate) were elicited from 31 speakers of British English (N = 1,767). A mixed model regression analysis again shows significant effects of morphological structure: We find that both the (relative) frequency of the base and the presence of a prefix (both transparent and opaque) play a role, but the effect is modulated by other effects as well, in particular by effects of syllable weight and morphological category (-ity vs. -ion). We also find evidence to suggest that effects of relative frequency and effects related to transparent prefixes can be interpreted in terms of two alternative segmentation possibilities: A word like implausibility can be segmented into implausible + -ity (i.e. its traditional morphological segmentation) and im- + plausibility. As predicted by Collie (2007, 2008), the more frequent the morphological base (implausible in the example), the more likely do we get a preserving secondary stress (implàusibility in the example). The prefix-related effect, however, goes in the opposite direction. The more frequent the word without the prefix (plausibility in the example), the more likely do we get a secondary stress on the prefix (implausibility in the example).

The two datasets yield converging evidence that secondary stress indeed reveals morphological structure. Crucially, however, the effect is not limited to base - derivative relations, but also pertains to the internal structure of bases and the gradient nature of that structure, as well as to different options to segment multiply affixed words. Theoretical implications will be discussed. In particular, our findings provide a challenge for assumptions often found in the theoretical literature about the role and nature of morphological bases in morphophonology and, in particular, for theories which assume that morphophonological rules like stress rules operate on the basis of unique base-derivative relationships. These challenges are twofold: Our evidence for the role of transparent prefixes and segmentation options in stress assignment suggests that stress may not be computed with reference to one single morphological base for each word. The evidence we find for the role of opaque morphology suggests, contrary to traditional assumptions, that such structure is indeed visible and relevant to the phonology.

References