Language rhythm is assumed to involve an alternation of strong and weak beats within a certain linguistic domain, although the beats are not constantly isochronously distributed in natural language. In certain structures, however, stress shifts take place in order to obtain a rhythmically regular structure of alternating stressed and unstressed syllables. These shifts, also known as the Rhythm Rule (Liberman & Prince, 1977), operate highly systematically in noun compounds of stress-timed languages such as German and English (Bohn et al., 2011; Vogel et al., 1995; Wagner & Fischenbeck, 2002) to avoid irregular sequences in form of so-called stress clashes (at least two adjacent stressed syllables) and stress lapses (at least two adjacent unstressed syllables). Previous ERP studies revealed that even subtle rhythmic irregularities induce higher costs in language processing (Bohn et al., 2013; Henrich et al., 2014, 2015). Moreover, it could be shown that clear and strong rhythmic irregularities can be detected independent of attention (Rothermich et al., 2010; Schmidt-Kassow & Kotz, 2009). However, since stress clashes and lapses are rather subtle and allowed deviations, they might not be perceivable if prosody is completely unattended. Previous neuroimaging studies on linguistic stress used phonological tasks and found effects in the supplementary motor area (SMA), insula, precuneus, superior temporal gyrus (STG), parahippocampal gyrus (PHG), lingual gyrus (LG) and inferior frontal gyrus (IFG) (Geiser et al., 2008; Domahs et al., 2013). The present study investigated the neural correlates of rhythmic (ir)regularities during natural story listening, i.e., without direct attention to the prosodic structure due to the absence of a phonological task. We examined if a) well-formed structures are processed differently than rhythmic deviations in German noun compounds, b) this happens in speech processing in the absence of a phonological task. The results show that the brain is in fact sensitive to even subtle deviations in the alternation of strong and weak beats during natural story listening. This is particularly evident in the activation of the SMA, which has been suggested to support temporal aspects of processing sequences of strong and weak syllables, and frontal lobe activation associated with tasks requiring more demanding processing of suprasegmental cues.