Supplementary material online

As reported in the main text, the Linguistic category x Time interaction was not qualified by higher-order interactions involving Valence and Muscle factors, including the 4-way interaction (all ps > .32). This suggests that the two phasic EMG modulations found for state vs. descriptive action verbs (Figure 2) – that occurred on top of the emotionally congruent facial activations – were similar in both muscles and for both positive and negative verbs. While the pattern of results is suggestive of (muscle- and valence-unspecific) arousal responses that add to the emotion congruent facial activation, we performed further analyses to investigate the physiological meaning of these responses. Two groups of analyses were conducted separately for state and descriptive action verbs.

EMG response to state verbs

For emotional state verbs, we considered the time window in which these verbs tended to show greater EMG activity relative to action verbs and neutral fillers i.e. time bin 2-3 (301-900 ms after stimulus onset, second and third grey diamonds in Figure 2) and computed the mean EMG signal from that window. We first tested whether the increase in the mean EMG level for emotional verbs was greater than for neutral fillers in both muscles. Two t-tests confirmed that a significant increase could be detected in both the corrugator ($M = 0.018$ µV, $SD = 0.02$; $t(19) = 4.08$, $p < .001$) and zygomatic muscle ($M = 0.018$ µV, $SD = 0.02$; $t(19) = 3.39$, $p = .003$), suggesting the increase was not carried out by only one of the two muscles or by their average (as also suggested by the lack of interaction with factor Muscle in the main ANOVA).

We then tested the contribution of emotionally congruent facial activations to the EMG response to state verbs. In particular, we tested whether a congruency effect could be detected,

by contrasting mean EMG activity for congruent muscle-valence combinations (i.e., zygomatic activity for positive state verbs and corrugator activity for negative state verbs) to incongruent muscle-valence combinations (i.e., zygomatic activity for negative state verbs and corrugator activity for positive state verbs). A *t*-test showed no significant difference in EMG level between the two combinations (congruent combination: $M = 0.026\,\mu V$, $SD = 0.03$; incongruent combination: $M = 0.026\,\mu V$, $SD = 0.03$; $t(19) = 1.81$, $p = .09$), indicating that for state verbs, no significant congruency effect could be detected in the early time window. These analyses further suggest that the initial increase of EMG activity for emotional vs. neutral state verbs detected at time bin 2-3 reflected a generalized and unspecific response that could be detected in both muscles.

EMG response to action verbs

In a second group of analyses, we focused on action verbs. We considered the time window at which these verbs showed greater EMG activity relative to state verbs and neutral fillers, that is time bin 6-10 (1501-3000 ms after stimulus onset, 6th-10th green triangles in Figure 2) and computed the mean EMG signal from that window. An increase in the mean EMG level for action verbs relative to fillers could be detected in both the corrugator ($M = 0.022\,\mu V$, $SD = 0.04$; $t(19) = 2.52$, $p = .021$) and zygomatic muscle ($M = 0.046\,\mu V$, $SD = 0.09$; $t(19) = 2.19$, $p = .041$).

Importantly, also for action verbs, we tested the contribution of emotionally congruent facial activation by investigating whether a congruency effect could be detected. A *t*-test revealed larger EMG activity for congruent muscle-valence combinations (i.e., zygomatic activity for cheek-related action verbs and corrugator activity for brow-related action verbs; $M =$

0.039 µV, $SD = 0.07$) compared to incongruent muscle-valence combinations (i.e., zygomatic activity for corrugator-related action verbs and corrugator activity for zygomatic-related action verbs; $M = 0.003$ µV, $SD = 0.02$; $t(19) = 2.11$, $p = .048$). This suggests that emotionally congruent facial reactions may have contributed to the apparently unspecific EMG increase detected for action verbs in the 1501-3000 ms time window.