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(Wanderley 2002). Limited research to date combines acoustic and movement features of expressive performance. The current study examines the effect of expressive intent on both timing and movement in clarinet performance.

Expressive rubato timing in music performance is characterized by increased tone durations as performers approach cadences or phrase endings (Gabrielsson 1987, Palmer 1989), and additional lengthening of tones notated with long durations and shortening of tones notated with shorter durations (Sundberg et al. 1991). Inexpressive performances tend to exhibit less range of rubato timing than expressive performances (Gabrielsson 1987, Palmer 1989). These studies, however, did not investigate performers' movements or their relation to musical intent.

Wanderley (2002) analyzed clarinetists' movement gestures while they performed the same music in expressive and inexpressive ways. Following Delalande's (1988) classification of musicians' ancillary gestures as those visible body movements that are not directly linked to sound production, Wanderley (2002) recorded the ancillary movements of the clarinet bell with a motion tracker system. Surprisingly, clarinetists' vertical and horizontal bell movements were highly consistent across their repeated expressive performances. However, Wanderley's instructions to clarinetists to move the clarinet as little as possible in the inexpressive condition precluded comparisons of expressive timing with movement.

The current study examines the relationship of clarinetists' ancillary movements to their expressive goals by combining Palmer's (1989) expressive performance conditions with Wanderley's (2002) measures of bell motion inGwx.:)1 g] T [.x':k

Materials

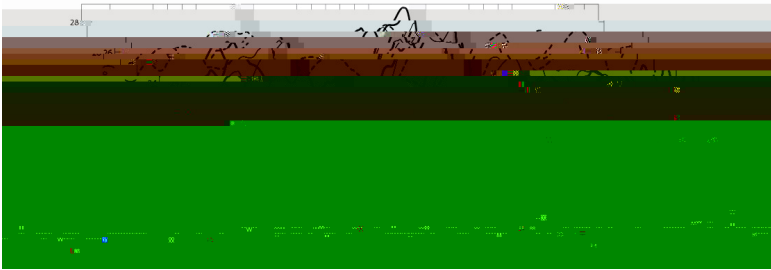**The first eight measures of Mozart's**

Figure 1. Mean clarinet bell elevation (degrees) in each expressive condition. Horizontal lines indicate significance regions (grey and black indicate p<0.05 and p<0.01, respectively); vertical shaded bars indicate locations of rests at phrase boundaries.
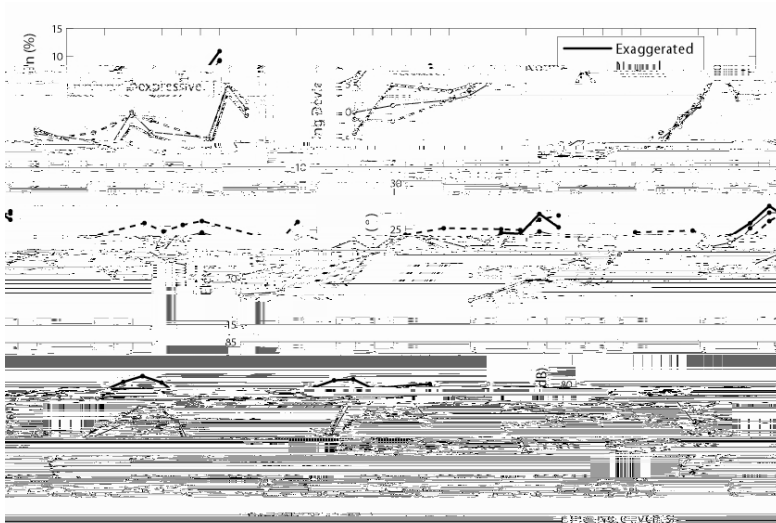

Figure 2. Mean timing deviation, bell elevation, and intensity (from standing mic) for each expressive condition. Gaps indicate locations of ends of phrases.

in clarinet elevation (measured by standard deviation) from inexpressive to exaggerated conditions ($F_{2,14}$=33.04, p<0.01).

Next we measured expressive timing, in terms of the difference between

lengthened tones. Figure 2 shows clarinetists' mean expressive timing deviations, which indicated slowing from the beginnings to the ends of each phrase. Furthermore, the variability of timing deviations (measured in standard deviation) increased with expressive intent ($F_{2,14}=5.3$, $p<0.01$)

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