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## From Air to Aria. Relevance of Respiratory Behaviour to Voice Function in Classical Western Vocal Art.

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▼ **Abstract** ▶ **Subject headings**

While previous studies of opera singers respiratorybehaviour have focused on kinematic or dynamic aspects mainly, this thesis attempts to adopt a broader perspective. Not onlylung volumes, rib cage and abdominal wall kinematics areconsidered, but also the effects of lung volumes and respiratorybehaviour on phonation characteristics. Also, we attempted to payparticular attention to musically related factors.Statistical data on opera singers initiation andtermination lung volumes, breath group volumes and flow rates,all related to vital capacity, were gathered. Consistency ofphonatory and inhalatory respiratory behaviour was estimated, aswell as rib cage and abdominal wall influence on lung volumechange. The singers were found to perform songs from theirrepertoire in aquasi-realistic concert situation. Further, theeffect of lung volume on voice function was studied in non-singersubjects and professional male opera singers habitualbehaviour and non-habitual inhalatory behaviour. Comparisonsbetween high and low lung volume of vertical laryngeal position,subglottal pressure, and voice source characteristics were made.In addition, the effect of two polar inhalatory behaviours on thesame voice

function parameters was examined. When performing songs and arias from their repertoire, the professional opera singers used the full range of lung volumes, likely to affect all lung volume dependent mechanisms involved in respiratory control. Even though displaying different behaviours, they were highly consistent within their individual breathing patterns, especially so with regard to rib cage movement and lung volume change. Lung volume was found to affect voice function in non-singer subjects, such that the overall glottal adduction was smaller at high than at low lung volume. When using a non-habitual inhalatory behaviour, the singers voice function was qualitatively affected in a similar manner as that observed in non-singers. However, the singers habitual breathing behaviour seemed to include a strategy that either inhibits or minimises the influence of lung volume dependent mechanisms, such that these effects are reduced and presumably perceptually irrelevant. The polar inhalatory abdominal wall behaviours had no effect on voice function. Keywords: Abdominal wall, breathing, consistency, inhalation, lung volume, respiratory behaviour, phonation, ribcage, singers, singing, subglottal pressure, tracheal pull, vertical laryngeal position, voice source.

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