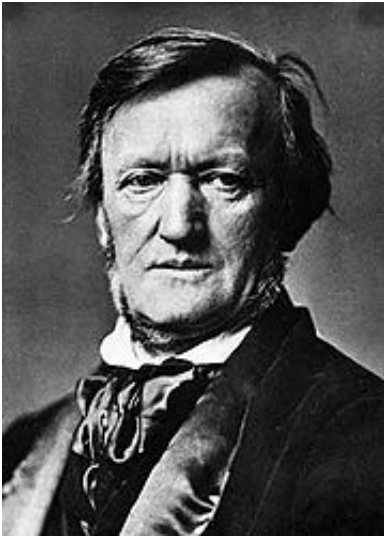


Wagner's 'difficult' reputation unwarranted says research

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Richard Wagner in 1871. Via Wikipedia.

The composer Richard Wagner is well-known, even notorious, for writing operas that can challenge both performers and listeners. A new study published in the *Journal of the Acoustic Society of America* reveals that Wagner set his text to music in a way that uses the acoustics of the soprano voice in a manner that helps both performers and listeners.

"Each vowel in European languages is associated with a set of resonance frequencies of the vocal tract," says author, Dr John Smith of the University of New South Wales "Both the intelligibility to listeners and the ease of production by singers could be improved if the pitch of the

musical note written for a vowel corresponded with one of its resonance frequencies."

"If this occurred we should expect to find that vowels normally sung with an open mouth would occur more often at the high notes of the soprano range," says UNSW co-author, Professor Joe Wolfe. The researchers tested this idea by examining the musical scores for eight operas.

For over 20,000 notes sung by solo sopranos in these operas, the authors recorded the vowel sound associated with each note. In the Wagnerian operas, vowels that required an open mouth were used significantly more often for the very high notes. However, this was not the case for the other operas studied.

The preferential use of vowels in an appropriate range of pitch (vowel-pitch matching) might have evolved because Wagner's idea of opera was a continuous music drama in which singers often have to communicate lengthy, subtle aspects of plot via sung text alone. Earlier operas often linked separate arias and choruses with the plot explained by recitative and actions on stage. There was thus less need for intelligibility at high pitch in these other operas.

Furthermore, Wagner wrote for much larger orchestras than available to Mozart or Rossini, and wrote vocal parts that severely test the stamina and capabilities of singers. Thus the employment of vowel-pitch matching could have helped satisfy the concomitant requirements of intelligibility, vocal power and easier singing of difficult parts.

"We know of no written evidence that Wagner tried to make singing parts easier for sopranos," says Dr Smith, "but this research indicates that suitable matching of vowels with pitch increased systematically as Wagner's experience as a composer increased".

Wagner was unusual as he wrote the librettos for all his operas and thus had a distinct advantage in matching text with [music](#). Furthermore Wagner had considerable time to 'polish' his operas; Rossini wrote some 26 operas in seven years whereas Wagner wrote only fourteen in over 50 years.

Technical details

To simplify presentation, the researchers grouped the 12 German vowels into four groups according to the jaw-height involved in their production. The resonance frequency (the frequency at which sound is transmitted from the vibrating vocal folds to the outside air) of each jaw-height category was defined as: closed (250-400Hz), half-closed (400-550Hz), half open (550-750Hz) and open (750-1000Hz).

The degree of vowel-pitch matching is illustrated in Figure 1 below. It shows the extent of pitch-resonance matching for soprano roles in the eight operas studied. The degree of matching is indicated by the symbol "gamma", a parameter that indicates the preference for the appropriate vowel-pitch combinations.

Positive and negative values of "gamma" indicate favorable and unfavorable pitch-resonance matching, respectively. Values associated with open vowels that have a high resonance frequency are indicated by shading. The operas are shown in historical order from left to right.

Source: University of New South Wales ([news](#) : [web](#))

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