

In both instrumental and vocal Persian classical music, ornamentation plays a critical part in expressing a performer's mood, displaying an artist's technical prowess, and beyond all, as a means of conveying the character of this music system and its culture. Ornamentation varies according to whether the music is vocal or instrumental.

### **1. Ornaments in Persian classical vocal music: *tahrīr***

Persian classical singing involves distinctive ornamentations and techniques that differentiate it from other Middle Eastern singing techniques. The most important ornament in Persian singing is *chah-chaheh* or *tahrīr*. This is one type of melismatic ornamentation specific to Persian music and it is sometimes is likened to yodelling, although it exhibits specific differences (listen to audio clip [Stream1-IC-1] of the Introductory Concert). Castellengo et al., characterise this vocal technique from the laryngeal and spectrographic point of view. They described it as a quick alternation between laryngeal mechanisms, chest (M1) and the falsetto or head register (M2). While in yodelling the melody expands sequentially in the chest (M1) and the falsetto or head register (M2), *tahrīr* stays mainly in M1 with short ornamental trips in M2 with a frequency jump over a short 50–70 ms interval (Castellengo, During, & Lamesch, 2007).

This appoggiatura technique is mainly used in the unmetred form of singing in Persian classical music called *āvāz*, where it can generate long phrases comprised of *tahrīr* in the style of cascading tones (listen to audio clip [Stream1-IC-1] of the Introductory Concert). *Tahrīr* is also used more in the form of an ornament in metred vocal music. In Persian classical music, the nightingale's song is a common analogy for *tahrīr*. Among several types of *tahrīr*, nightingale-like *tahrīr*, referred to as *tahrīr'e bolboli*, is also one specific type of melismatic vocal ornamentation (Miller, 1999) [p. 354]. According to the late Mohammad-Reza Shajarian, Iran's modern master of Persian classical singing, *tahrīrs* are categorised based according to their number of steps and the quality of *tahrīr* (Shajarian & Shajarian, 2000) [p. 130-131]. Based on their number of steps, *tahrīrs* may be single, double, triple, quadruple, quintuple, sextuple, septuple, octuple. In terms of quality, there are 24 different types and each of them can be used with specific numbers of steps.

Using computational techniques, different researchers have analysed specific characteristics of *tahrīr* and compared it with other ornaments such as vibrato, which is also used in Persian classical singing (Bahadoran, 2016; Shafiei, 2019). Bahadoran describes *tahrīr* as a transition

between a base (primary) note and a secondary high-pitched note. Vibrato is an oscillation of two different pitches occurring simultaneously (Bahadoran, 2016). In Persian music this secondary note is called *tekyeh*, which means leaning (Shafiei, 2019). The deviation in pitch and rise to the secondary tone in *tahrīr* is significantly larger from the base note compared to that of a vibrato (Bahadoran, 2016). In vibrato, the extent of deviation varies from less than a semitone for solo singers either side of the note to less than a tenth of a semitone either side in choirs (Dejonckere, Hirano, & Sundberg, 1995; Seashore, 1937).

## 2. Ornaments in Persian classical instrumental music

While ornaments vary from one Persian instrument to another, they generally include tremolos, turns, and appoggiaturas. In instruments that are played by plucking the strings with fingers or a plectrum, for example, *oud*, *tār* and *setār*, or those that are played with a hammer – the *santūr* – every note longer than a quaver is played tremolo (Pass, 2013). This type of tremolo is called *rīz* and is shown in Figure 1.



Figure 1. This figure shows how one single note (on the left) is played as *rīz* (on the right) (Tala'i, 1999).

*Shalāl* is another instrumental ornament used by the plucked string. In playing *shalāl*, the first note is plucked many times as tremolo (Figure 2) (Pass, 2013).



Figure 2. Playing *shalāl* by plucked instruments (Tala'i, 1999).

*Dorrāb* is used on plucked strings and has different types, including left and right (Figure 3).



Figure 3. A single note (on the left) played as *dorrāb* (middle and right).