

Extension and Contraction

David Starkweather

David Starkweather is the cellist on the faculty of the University of Georgia. He grew up near San Francisco, then attended the Eastman School of Music. This was followed by four years of graduate work at the State University of New York at Stony Brook, where he studied cello with Bernard Greenhouse. In 1985, Starkweather spent half a year in Switzerland for intensive work with Pierre Fournier, earning the famous French cellist's accolade as "one of the best cellists of his generation." He was awarded a certificate of merit as a semi-finalist in the 1986 Tchaikovsky Competition.

Starkweather has been featured on the National Public Radio show Performance Today and in a PBS one-hour recital program televised nationwide. A review in the Atlanta Constitution praised his "sensitive phrasing and Starkweather's obvious technical facility." His previous articles for AST were "Methods of Shifting" (Winter 1988) and "Choice of Fingerings" (Summer 1990).

When beginning cellists learn left-hand skills, they usually progress to extensions before they learn shifting. This early emphasis on extensions is due to the need for the pitches a half-step above and below first position. While cellists are initially taught extensions in the limited context of first position, extensions are important in other situations. This article covers the physical aspects of the basic extension and larger extensions, the use of extensions in thumb position, the contraction and its application when an extension is used, and the use of finger contraction in shifts and positions.

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The Basic Extension

Basic extensions expand the interval between 1 and 2 from a half-step to a whole step, creating a major third between 1 and 4. The basic extension is commonly used with the first finger placed anywhere within the first minor sixth of the fingerboard (see the brackets in example 1). A demonstration of the physiology of the hand illustrates how the larger interval is created between 1 and 2. Curl your fingers and attempt to move 1 away from the other fingers. Now try the same thing with the fingers straight. The distance between the fingers is obviously much greater when the fingers are straight. On the cello, the first finger straightens for extensions. Observing this from the back of the hand, notice how the extension also changes the angle of the finger at the large base knuckle.

Larger Extensions

The larger extension of the interval between 1 and 4 to a perfect fourth is

fairly common among advanced players, especially if they have large hands. When 1 is moved to the next lower string, the interval from 1 to 4 is an octave. This extension is often used without any placement of the second and third fingers. Stretching the thumb away from the neck can help maximize the span from 1 to 4. Note that the hand relaxes to a relatively closed position as soon as possible. A larger extension to a minor third between 1 and 2 is dependent on the size of the cellist's hand and the position on the fingerboard of the particular passage being played. This is a very useful extension for passages such as the one shown in example 2.

Many cellists choose to increase the use of extensions in slow, melodious passages. Extensions can have the effect of turning the finger at a greater angle to the string, slanting toward the bridge. This increases the width of the finger pad contacting the string and results in the substitution of the thicker second and third fingers for 3-4 fingerings. The net effect is an improvement in both tone and vibrato.

The most awkward extensions are those in which 1-2 remains a half-step and 4 must be placed a minor third above 2. Several examples from the Bach Suites come to mind. For example, in the Prelude of Suite No. 4 in E-flat Major, measures 56 and 57 are best fingered 2-4-2-1 on each beat. In contrast to most extensions, the best intonation with this particular pattern results from turning the hand with the fingers slanted back toward the nut.

Extensions in Thumb Position

Extensions in thumb position operate differently because the thumb and fingers extend from each other more naturally. Additionally, in thumb position, the thumb and fingers are placed

in various patterns of half-steps and whole steps between adjacent fingers; thus, extensions in thumb position involve reaches larger than a whole step from 1 to 2 and from thumb to 1. The interval from 1 to 2 may be increased to an augmented second, as in the key of D minor between B-flat and C-sharp. The equivalent 1-2 extension of a minor third is shown in example 3, as is the fairly common 1-3 extension of a perfect fourth.

Extensions between the thumb and 1 can be considerable, depending on the size of the cellist's hand and the position on the fingerboard. Such extensions enable the cellist to play tenths across two adjacent strings from thumb to 3, as well as reaching an octave from thumb to 1 or 2. A reach of an octave on one string is possible in the upper half of the string, making artificial harmonics possible by dividing the string in half (found in various etudes and Victor Herbert's *Petite Valse*). Except in cases of extreme extension, the angle of the thumb across the string should not change but should remain at a right angle.

Extension and Contraction

The player's hand relaxes after fingering an extension so that the fingers draw closer together again. Unnecessary tension in the hand can easily result from extensions, but the placement of an extended finger should be accompanied by a contraction of the hand so that the extension has essentially "walked" the hand into a new position. A series of extensions accompanied by contractions results in what may be called *inchworm* fingering. Example 4 shows the use of inchworm fingering in thumb position. In this particular case, the thumb is extended back and the second finger then steps down to join it. There is really no shifting involved as the fingers walk down the string.

The type of fingering where the fingers walk the hand into a new position is especially useful in stepwise melodies having the ascending pattern of two whole steps followed by a half-step. Two extensions can be used so that both 1-2 and 2-3 are whole steps. The fingers do not remain extended, but move the hand along into a new position. This double-extension technique takes the place of shifts, which can disrupt both the legato bowing and the larger rhythmic groups of the phrase.

Extensions for Large Hands

Cellists with large hands have an advantage, since their maximum extension is much larger. Thus, some large-handed cellists play example 5 with the top fingering, extending the minor second from B on the D string to C on the A string. Likewise, the minor third between the last two notes of measure 2 does not involve a shift if you have large hands and a well-developed extension technique. Note the

possibility of using a double-extension fingering for the first four notes of example 5. Alternatively, the 4-4 shift may be chosen for expressive reasons.

Contraction to Change Position

While extensions are among the first new techniques introduced after a novice cellist has become acquainted with first position, finger contraction is an important element of technique that also needs to be taught. Along with

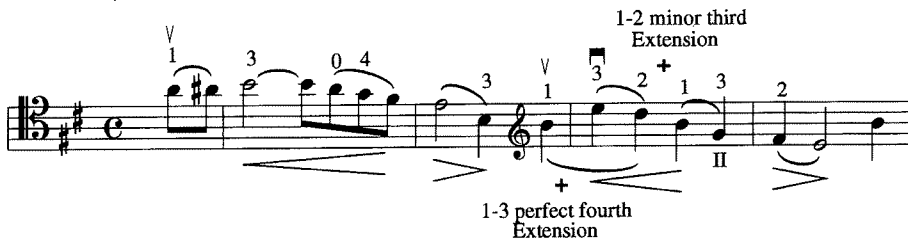
Example 1. J. S. Bach: Suite No. 4 in E-flat Major, BWV 1010. Gigue, mm. 1-2



Example 2. Johannes Brahms: Sonata No. 1 in E Minor, op. 38. Allegro non troppo (1st mvt.), mm. 133-137



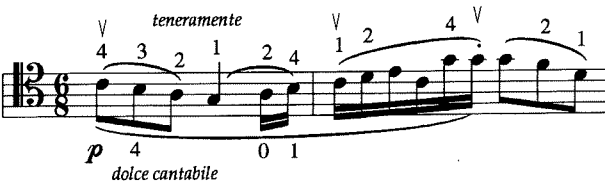
Example 3. Antonín Dvorák: Concerto in B Minor, op. 104. Allegro (1st mvt.), mm. 147-151



Example 4. Berteau: Etude in G Major (No. 6 in the Duport etudes)



Example 5. Ludwig van Beethoven: Sonata No. 4 in C Major, op. 102, No. 1. Andante (1st mvt.), mm. 1-3



extensions and shifting, finger contraction is another method that adjusts the hand into a new position. This is accomplished by placing a finger closer than normal to the finger in use. The hand and fingers then adjust in relation to the placement of the new finger. The second line of example 6 shows how finger contraction can be used to move gradually and very cleanly from one position to another. Finger contraction should also take place in both ascending and descending scale passages on one string. The first contraction marked in example 6 demonstrates one such case. The second finger lifts, allowing the third finger to move closer

than usual to the first finger before being placed on the B.

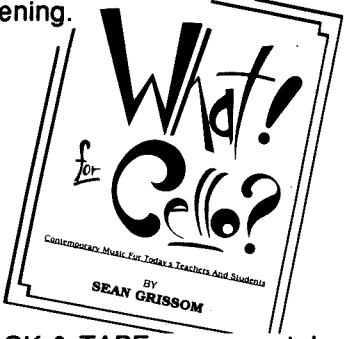
In thumb position, the fingers may occasionally be contracted to an interval of a major or minor third between thumb and 3 (in contrast to the normal distance of a perfect fourth). Several such cases are indicated by the brackets in example 7.

As with all physical aspects of playing the cello, the hand must be trained by repetition of the correct motion. A final point to emphasize in this regard is the importance of extension and contraction of the hand when shifting. After training the left hand to maintain good hand position, the interme-

diate cellist tends to keep the fingers rigidly in half-step formation in the first minor sixth of the fingerboard. A brief extension or contraction in the direction of a shift reduces the distance of the shift and produces a cleaner, more fluid technique. Referring to example 1, the first finger arrives on B-flat by an extension plus a half-step shift.

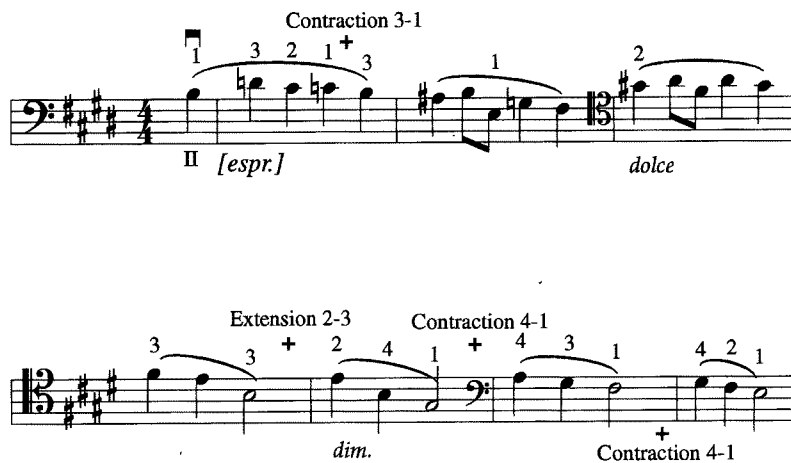
Scales should be practiced with this type of hand flexibility in mind, extending on string crossings and contracting when shifting on one string. The goal, of course, is a flexible and balanced hand position that remains relaxed, accurate, and coordinated. ♣

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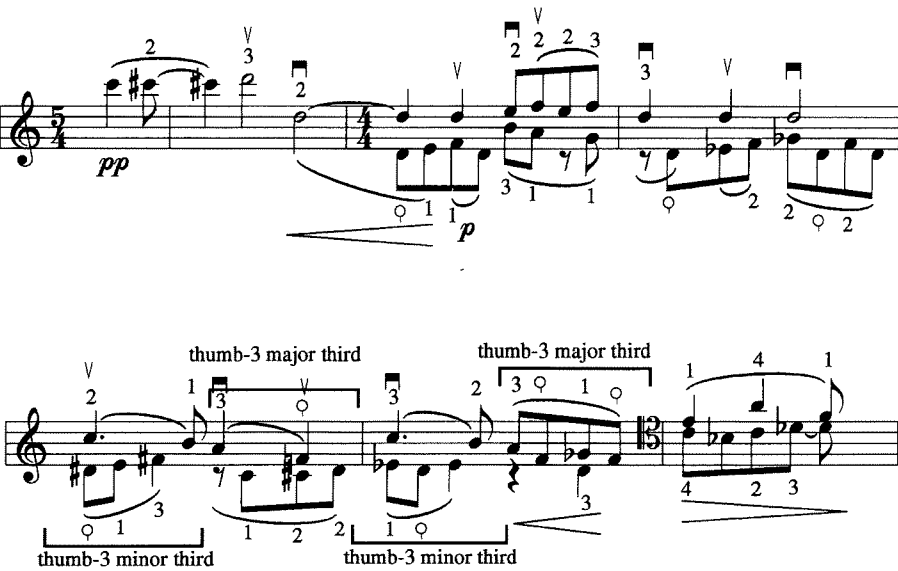
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Example 6. Johannes Brahms: Sonata No. 1 in E Minor, op. 38. Allegro non troppo (1st mvt.), mm. 243-250



Contraction 3-1
 II [espr.] dolce
 Extension 2-3 Contraction 4-1
 dim. Contraction 4-1

Example 7. Dmitri Shostakovich: Concerto No. 1, op. 107. Cadenza



thumb-3 major third
 thumb-3 minor third
 thumb-3 minor third

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