'Notes Inégales' in Contemporary Performance Practice

Dirk Moelants

IPEM - Dept. of Musicology, Ghent University, Belgium
Dirk.Moelants@UGent.be

ABSTRACT

Playing the first of two equally notated notes notably longer than the second, the so-called 'notes inégales', is a common practice in the performance of French baroque music. It is a means of expression and enhances the metric structure of the (dance) music. Although there is a general agreement between performers about the application of 'inequality', its exact performance is an ongoing source of debate. In an experiment 8 harpsichordists and 8 baroque violinists performed 6 melodies of French baroque gavottes in three tempo conditions 40-60-80 bpm, along with a metronome. The mean ratio of inequality was about 1.63:1. Yet, a lot of variability was found with mean ratio's of individual performers varying between 1.89 and 1.33. Another main source of variance is the metric structure, with larger inequality found at metrically important points. The base tempo also has an important influence on the performance of the 'inégalité', but it is treated in very different ways by different performers. Pitch factors have only a minor impact. Even in simple pieces individuals convey a personal expressivity through their use of 'notes inégales'. The results can be related to historical evidence (e.g. from mechanical instruments) and to the prosody of the French language.

I.   INTRODUCTION

'Notes Inégales' or 'unequal notes' is a key concept in the performance of (French) baroque music. It indicates that notes notated with equal rhythmic values have to be performed unequal. In standard performance practice the first note in a couple is elongated at the expense of the second, but occasionally also the opposite is asked for. The latter is always announced in explicit verbal instructions ('notes coulés'). The practice of 'inégalité' is extensively discussed in treatises from the 16th to the 18th century (Borrel, 1931; Hefling, 1993; Fuller, 2001). In scores we regularly find explicit indications that certain passages should not be played 'inégale'. This can be indicated verbally (e.g. 'notes égales', 'détaché') or by dots placed over the note heads. Another comment often found in treatises concerns the treatment of big interval leaps, which are also supposed to be performed equal.

Mostly the inequality applies to the metric level that lays two levels below the beat indicated in the meter indication in duple time and one level below the beat in triple meter. Thus it mostly applies to eighth notes and sometimes to sixteenth notes, e.g. in allemandes and other movements clearly written in 4/4 (Hefling, 1993).

The main problem in the interpretation of 'notes inégales' is in the determination of the amount of inequality, the ratio between the longer and the shorter note in the pair. Apparently it was impossible (or just very impractical) for the composers to notate the exact rhythmic division they wanted (Byrt, 1996). Also in historical treatises the instructions are seldom very precise. Loulié (1696) illustrates the performance of notes inégales with couples of dotted eighths followed by normal eighth notes, thus suggesting a 1.5 (3:2) ratio. Other sources however rather suggest a dotted 3:1 ratio, while most sources remain vague asking to play the first note 'a little bit longer' (Hefling, 1993). One source that has gained particular interest in the study of inégalité (Schmitz, 1953; Houle, 1987) is père Engramelle's (1775) "La tonotechnie". This is a work that mainly deals with the technique of pinning for mechanical organs. Although it is written quite a bit later than the pieces studied here, it gives a very nice illustration of how inequality can be realized practically. In this work ratios ranging from 3:1 to 7:5 (1.4) are found. He also notes that the inequality should be stronger in gay tunes than in tender ones and that the ratios may vary within the same piece.

While the use of 'inégalité' in France is still relatively well documented and its importance is widely recognized by both scholars and performers, its use outside France (and specifically in works of Bach and Händel) is more controversial and has been subject for many scholarly disputes (Neumann, 1965, 1988; Babitz, Byrt & Collins, 1967; Donington, 1967; Hefling, 1993; Fuller, 2001, Byrt, 2007).

Traditional musicological research has focused on the study of original sources. Research in music performance has shown much less interested in 'notes inégales'. The related phenomenon of 'overdotting' was investigated by Fabian and Schubert (2003), analyzing Bach performances. Ornoy (2006) looked into a number of parameters in some works by Bach and Scarlatti, mainly looking for what distinguishes 'historically informed' performers from others. Although he finds 'notes inégales' in the 'historically informed' performances, it must be noted that he does not analyze any French music and does not give details about the ratios.

II.   EXPERIMENT

The experiment presented here was designed as a compromise between artistic performance and scientific control. Sixteen performers specialized in the (historically informed) performance of baroque music were asked to perform a number of musical fragments taken from original sources. Yet, in order to avoid the influence of differences in tempo and of tempo rubato, performers were asked to play with a metronome, thus reducing their artistic freedom.

A. Subjects
Eight baroque violinists and eight harpsichordists participated in the experiment. All of them were professional musicians (N = 9) or master-level conservatory students (N = 7). Their age ranged from 22 to 64, with a mean of 36.4. Eight of the subjects were male, eight female. All participants were trained in the performance of baroque music and had knowledge of and experience with the performance of French baroque music at a professional level. Two of the subjects were native French speakers, three other were living in French

speaking areas and everyone at least had a good knowledge of the French language.

B. Music

Six melodies were selected from French gavottes, composed around 1700. The gavotte is originally a French folk dance, which is adapted as a court dance starting from the late 16th century (Arbeau, 1588). It is related to the branle, which was popular in the 16th century and will gradually replace it during the 17th century. Gavottes are moderately fast binary dances, usually written in 2/2-meter, with a half-measure upbeat. They are considered to be relatively simple in their metric structure, and often contain 8th notes which have to be performed 'inégale' (Little, 2001).

Figure 1: The six gavotte-melodies, as used in the experiment.

The fragments for this experiment were selected from works by Louis-Nicolas Clérembault (Gavotte-Double from the "Premier Livre de Pièces de Clavecin", 1704), François Couperin (Gavotte, gracieusement, sans lenteur from the "Suite no. 1 pour Viole et Basse Chiffré", 1728), Gaspard Le Roux (Gavotte in a-minor from the "Premier Livre de Pièces de Clavecin", 1705), Marin Marais (Gavotte-Double in D-major from the "Pieces en Trio pour les Flutes, Viole et Dessus de Viole", 1692), Joseph Bodin de Boismortier (Gavotte en rondeau in e-minor from Diverse Pieces de Viole avec la Basse chifrée", 1730) and Roland Marais (Gavotte-Double in e-minor from the "Premier Livre de Pieces de Viole Avec la Basse chifrée", 1735). In every case only the main melody line was retained, in order to make performance on the violin possible. If necessary the pieces were transposed an octave higher for the same reason. The notation was standardized and all extra notation elements (e.g. articulation marks, ornaments) were removed (see figure 1). The selected pieces do not belong to the standard repertoire for violin or harpsichord, this to avoid effects of familiarity. After doing the experiment, performers were asked if they were familiar with any of the

fragments, and indeed nobody reported any of the fragments to be familiar. Another element that was taken into account in making the selection was the technical level, which should not be too high in order to avoid technical problems to interfere with the musical expression. Each of the fragments consists for a major part of couples of 8th notes that are supposed to be played 'inégale', pitch intervals are generally small, but a few larger leaps were included in order to test the influence of pitch interval on the performance timing.

C. Procedure

Musicians were invited by email. When they agreed to participate in the experiment an appointment was made and they received an email with the music and instructions written in Dutch, French and English. Below the English version:

"Herewith, six fragments from French gavottes, composed in the late 17th or early 18th century. Characteristic for this music is that it should be performed with so-called 'notes inégales'. This means that for every pair of eighth notes, the first is played longer than the second. With this study we want to find out how experienced musicians use this 'inegality' in practice. How are ratio's between the notes, are they constant or is there a lot of variability, which structural elements influence these variations (e.g. meter, pitch interval or direction,...), are there differences between individual performers, what is the influence of the global tempo,... ? We want to find the answer on this kind of questions in order to gain insight in contemporary performance practice of French baroque music.

Each of the six excerpts is to be played four times (always including repeat).

1. in a free tempo
2. with a metronome in a slow tempo (MM = 40 at the half measure level)
3. with a metronome in a moderate tempo (MM = 60 at the half measure level)
4. with a metronome in a fast tempo (MM = 80 at the half measure level)

Always play expressively, also in the metronome conditions. Don't think too much about how to perform the 'notes inégales', but make sure the music sounds natural, following your own 'bon goût'."

Recordings were made with Aevox Classic M MkII stereo microphones connected to an M-Audio Microtrack 24/96 and stored in 44.1 kHz wav. format. The recordings were made at places familiar to the performers, at their home, school or rehearsal place. Metronome ticks were generated by a Wittner MT-50 metronome and presented to the players through Sennheiser HD 215 headphones.

The first session in the recordings (free tempo) was not analyzed in detail. Rather it was considered as a trial session, which also allowed giving some feedback. Thus, e.g. some performers spontaneously added some ornaments or did not keep a constant position to the microphone.

D. Analysis

The performances were analyzed by hand using the program praat (http://www.praat.org/). This program, originally designed for analyses in phonetics, gives a precise analysis of the evolution in pitch and dynamics through time. It allows audio feedback and the indication of the perceived onsets with

a simple click of the mouse. This method allows an optimal control and precision. From the onset points, performed note lengths were calculated as well as the ratio between successive notes. The ratio between the 'notes inégales' will be the main variable used in this study. In parallel to this the musical scores were analyzed, listing the pitch, pitch intervals, note length and metric position for each note. Pitch interval was classified in 4 classes: minor seconds (N = 34), major seconds (N = 68), thirds (major + minor) (N = 16) and intervals larger than a third (N = 14).

III. RESULTS

The global ratio of inequality is 1.63 (SD: 0.386), which is close to a 5:3-ratio The ratio seems to reduce with increasing tempo with an average ratio of 1.68 at MM = 40, 1.61 at MM = 60 and 1.60 at MM = 80. The influence of pitch interval shows a global increase of the ratio with an increasing interval, with averages of 1.61 for semitone intervals, 1.63 for whole tone intervals and thirds and 1.69 for larger intervals. The influence of the position in the measure showed much stronger inequality on the strong beats than on the weak beats: 1.76-1.49-1.79-1.51 being the mean ratio's for the four successive pairs of eighth notes in the measure. However, the differences between performers are especially striking, with averages ranging from 1.33 to 1.89. Therefore it seems necessary to look at the individual interpretations, rather than at the global effects.
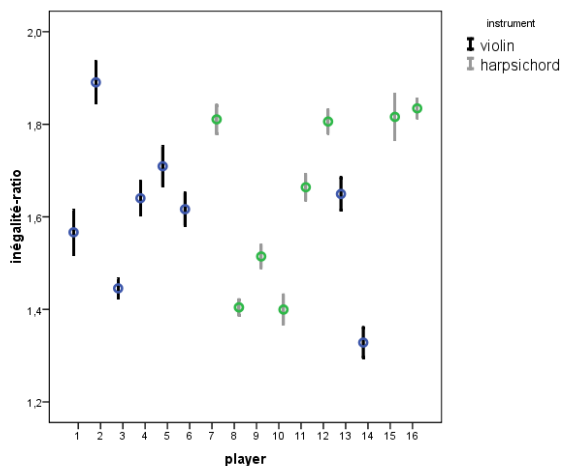

Figure 2: mean ratio of 'inégalité' shown for each performer with the 95% confidence interval of the mean, dark marks represent violinists, the lighter marks the harpsichordists.

First we can take a look at the global results of the individual subjects (figure 1). In addition to the large differences in mean ratio, also the within-subject variance varies widely, with standard deviations between 0.17 and 0.50. T-tests showed no significant influence of gender or instrument on the ratio or its standard deviation. In addition a new parameter was computed to give an idea about the 'fame' of the subjects. For this the number of hits scored by searching for their full name in the google.com search engine was used (in a few cases a manual check had to be done to separate the subjects from people with the same name). The minimum was 5, the maximum 111.000, with the median at 40. If we use this parameter to divide the subjects in two groups, this coincides with splitting the group

in two according to age (median 38.5). Also this 'age-fame' parameter does not show a significant influence on the inégalité-ratio and its standard deviation.

Analysis of variance was performed on the ratios of the 16 individual participants to look for effects of structural elements. Fourteen of the subjects show a highly significant effect of main tempo on the ratio. Only for two subjects there is no significant effect. The general tendency was to decrease the ratio with increasing tempo. This is also seen in a majority of the individual performers' results. However, if we look at figure 2, we see that the situation is more complicated and that differences between players are large. Players 4 and 9 do not show a significant effect of tempo. Players 1, 2, 8, 11, 13 & 15 show a gradual decrease with increasing tempo, but players 5 and 10 show exactly an opposite pattern, increasing the inequality ratio with increasing tempo. The other performers rather make a difference between one tempo category and the other two. Thus player 3 uses a larger ratio with MM = 80, while players 6 and 12 use smaller ratios at this tempo. Players 7, 14 and 16, finally, use larger ratios at MM = 40 compared to the faster tempi. Some performers make very large differences in their ratio according to the tempo, for others we find a small, but consistent change. Player 2, with ratios of 2.21 (SD .43) at MM = 40, 1.82 (SD .40) at MM = 60 and 1.64 (SD .33) at MM = 80, makes great differences in ratio, but still varies quite a lot within each tempo. Player 8, on the contrary, makes only a small difference in the mean ratio but with a very small variability: ratio 1.44 (SD .14) at MM = 40, 1.40 (SD .17) at MM = 60 and 1.38 (SD .19) at MM = 80. The player who shows the strongest effect of tempo is player 10 with ratios of 1.18 (SD .27) at MM = 40, 1.38 (SD .26) at MM = 60 and 1.63 (SD .28) at MM = 80, this is especially notable since this goes against the main tendency to diminish the ratio with increasing tempo.
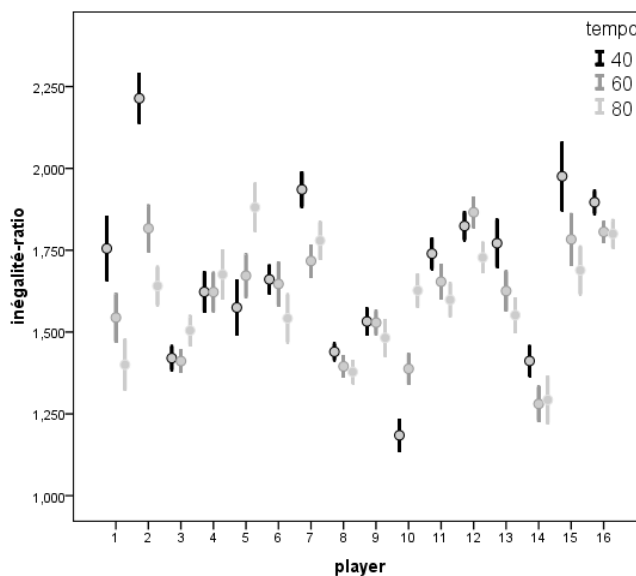

Figure 3: mean ratio of 'inégalité' shown for each performer at each of the three base tempi, error bars represent the 95% confidence interval of the mean.

To investigate the effect of metric position we compare ratios between couples of eighth notes that fall on the first (N = 34), second (N = 34), third (N = 30) and fourth (N = 36) quarter of the measure. Only one participant (16) does not have a significant effect of metric position, for all others the effect is highly significant. As shown in figure 3, the performers largely agree on the main tendency to use larger ratios on strong beats (corresponding to the 1st and 5th eighth note in the measure) and smaller ratios on the weak beats (the 3rd and 7th eighth note in the measure). Differences between performers are mainly found in the amount of change in mean ratio between strong and weak beats. While some players (e.g. player 12) only make a subtle difference, for some other the effect is very large. Player 1 for example, has mean ratios of 1.92, 1.25, 1.87, 1.29 on each of the four successive beats, thus varying from almost a 2:1 ratio on the first to a 5:4 ratio on the second beat. Player 14 uses ratios around 1.5 on the strong beat but makes the weak beats almost equal.
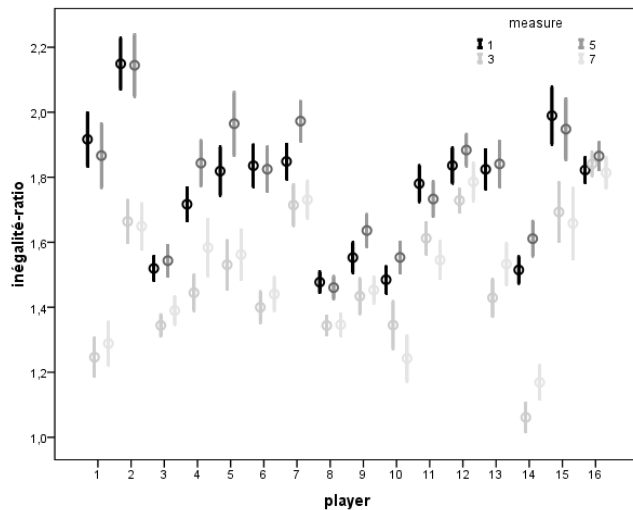

Figure 4: mean ratio of 'inégalité' shown for each performer for each the four beats in the measure, error bars represent the 95% confidence interval of the mean.

The effect of pitch interval (using the four categories: minor second, major second, third (minor or major) and intervals larger than a third) is only significant for five of the 16 subjects. The summaries for these five performers are shown in figure 4. Interestingly the effects are very similar for these five performers, each of them making hardly any difference between minor seconds, major seconds and thirds, but using a significantly larger ratio for the larger intervals.

IV. DISCUSSION AND CONCLUSIONS

The results show that the use of 'inégalité' largely depends on personal taste. Individual performers not only show large differences in mean ratio, they also differ in their treatment of structural elements. Only a few performers made a difference between larger and smaller pitch intervals. Surprisingly they uniformly use larger ratios at large pitch intervals. This seems to go against the period evidence that passages with large pitch intervals should not be performed 'inégale'. However, it must be noted that the larger pitch intervals used in the present

experiment always appear in isolation, whereas the historical sources typically point at passages with large intervals. Often these passages create an effect of polyphony through a 'streaming' effect. This effect could be destroyed by playing very unequal. However in the fragments used here, this is never the case. Rather it seems that the five performers who make the ratios of big intervals larger try to make sure to make these notes sound 'inégale' and therefore exaggerate their performance.
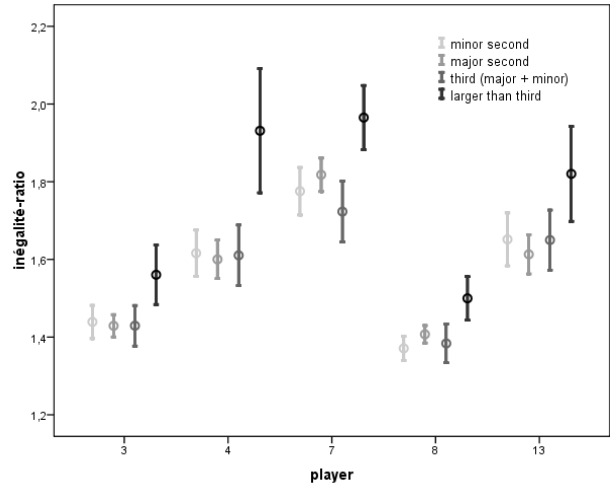

Figure 5: mean ratio of 'inégalité' for four pitch interval categories, shown for five performers who show a significant effect of pitch interval, error bars represent the 95% confidence interval of the mean.

Differences between performers are most obvious in their treatment of tempo. Almost all performers change 'inégalité'-ratio between the three tempo conditions. However, not only the magnitude of change, but also the direction differs greatly. The main tendency is to diminish the amount of inequality with increasing tempo, but some performers go completely against this tendency. The historical evidence on this point is very limited, but Engramelle (1775) reports that larger ratios should be used with increasing tempo. This would indicate that our 'minority group' is the one actually following the 'historical evidence'. However, this argument should be used with caution since the work of Engramelle is more recent that the music investigated here and does not give any information on gavottes. Moreover he stresses the importance of the specific character of each piece much more than the global tempo and does not consequently apply the tempo-ratio relation himself.

Another aspect that was found to have an important effect on the 'inégalité'-ratio is the metric position. Performers show a general agreement to use a larger inequality on strong beats as compared to weak beats. Also this finding is a bit surprising. Although Engramelle (1775) mentions that the ratio can change within one piece, there is no evidence at all that this would have any relation with the metric position. This aspect is not mentioned in other historical treatises, which usually just mention one performance strategy for the whole range of unequal notes in a piece. However, it is well understandable that the ratio is influenced by the amount of agogical accent the performers want to give to the structurally important notes. It

might even be an artifact of the use of metronome ticks, as performers can not make perform some notes longer without shortening other notes. However it must be noted that the metronome ticks sound only every other four notes, which would give the performer the possibility to shorten the three notes following the notes on the beats. In any case this link between 'inégalité'-ratio and metric position, allows us to determine the metric structure of a piece from these ratios (cf. figure 6).
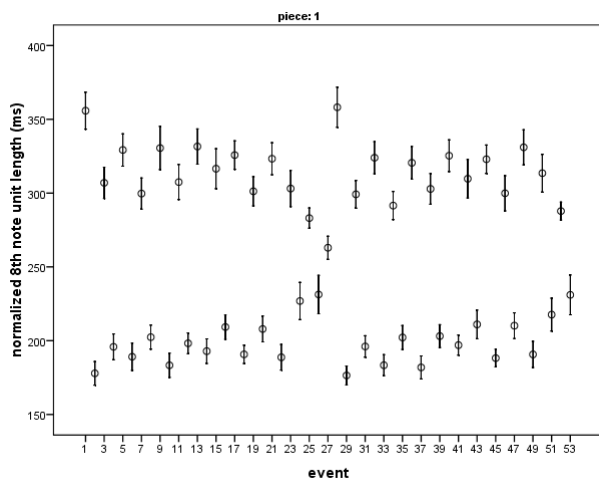

Figure 6: Average unit-length of each event in piece no. 1. The unit length is used here as an alternative for the ratio in order to be able to represent also other than 8ths. Therefore all note-lengths were divided by the number of 8ths they contain. Additionally they were all normalized to a performance at the middle tempo (MM = 60). Error bars represent the 95% confidence interval of the mean.

In general the ratios found seem small as compared to the historical evidence. Some historical treatises indicate a 3:1 ratio (Houle, 1993) while the smallest ratio found in Engramelle (1775) is 7:5 (1.4). Here ratios below 1.4 are found for some performers, while 3:1 is not reached at all and even 2:1 is only used by a part of the performers, in those cases where their interpretation of structural elements leads them to larger ratios.

Regarding the origin of 'inégalité', it has been suggested (Chailley, 1960) that there might be a link with the specific prosody of the French language. Links between language and rhythmic structure in music have been shown before (e.g. Patel, Iversen & Rosenberg, 2006). Moreover the link between prosody in poetry and metric structure in music in period thinking is obvious (Houle, 1987) and it was also reported by the participants of the experiment that they use language to develop a natural sense of inégalité, an example sentence would be "Bonjour monsieur, bonjour madame" ('Hello sir, hello madam'). An interesting extension of this research would be to se if the results can be related to speech.

Other possibilities for further research include the use of other instruments (e.g. viola da gamba, traverso), the comparison with other musical genres (e.g. more complicated court dances like the allemande or the courante). Or and

evaluation of listeners' perception (cf. Schubert & Fabian, 2001).

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