

# The PC-survey: How does use of performance cues vary across musicians, instruments, musical styles, and performances?

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Performance cues (PCs) are the mental landmarks that a musician monitors to track the progress of a piece as it unfolds during performance. We describe a survey to determine how PC use is affected by experience, instrument, musical style, and by the goals of the performance. We summarize results from longitudinal case studies in which PCs were reported to suggest the kind of variation to be found. Understanding how musicians use PCs should improve pedagogy by increasing our understanding of how musicians memorize.

*Keywords:* music performance; memory; performance cues

Performance cues (PCs) are the landmarks in a piece of music that a musician thinks about during performance. They provide a mental map of the piece that allows the performer to monitor the music as it unfolds and to recover from mistakes and memory lapses. PCs are prepared during practice so that they come to mind automatically on stage, giving the musician the ability to focus on each aspect of the piece at the right moment, providing the flexibility needed for musical spontaneity and to recover from disruptions.

We know that musicians use PCs from longitudinal case studies in which experienced performers recorded their practice as they prepared new pieces for performance and then reported the PCs that they used (Chaffin 2006, Ginsborg *et al.* 2006, Chaffin *et al.* 2002, in press). The validity of the reports was supported by behavioral evidence from practice, polished performance, and written recall.

## MAIN CONTRIBUTION

Here, we describe a survey of PC use designed to find out how the number and type of PCs that a musician uses is affected by experience, instrument, musical style, and type of performance. We plan to ask musicians to report PCs for two pieces (one easy, one harder to prepare) that they have already prepared or are in the process of preparing for performance. Although we call it a “survey,” each musician’s contribution is more like a case-study, but with no recording of practice. Colleagues and their graduate students at a variety of institutions will conduct an open-ended series of independent but related studies, each composed of several of these case studies and each contributing to a central database. In this way, we will build up a more comprehensive picture of PC use. Meanwhile, the local investigators will answer specific questions about factors affecting PC use such as, for example, effects of conservatory training.

We will describe the procedure to be used in the survey and then report results from longitudinal case studies conducted to date to provide an indication of the kinds of results that we expect to obtain.

### Types of PC

We have found it useful to distinguish five main types of PC: structure, expression, interpretation, basic technique, and shared. Structural PCs are critical places in the formal structure such as harmonic and melodic boundaries. Expressive PCs represent turning points in the musical feeling (e.g. excited or sad). Interpretive PCs represent the changes in tempo, dynamics, timbre, or color that accomplish these expressive effects. Basic PCs represent details of technique that must be implemented in order to be able to produce these musical gestures as planned, such as a fingering required to set up the hand for what follows. Shared PCs coordinate ensemble playing.

Basic PCs vary considerably across instruments. Many instruments require attention to fingering, while a singer might think instead about breath control. String players must attend to left hand shifts and to right hand changes in bowing direction. Some kinds of interpretive PCs appear to be common across instruments (e.g. phrasing, dynamics, and tempo), while others are instrument specific (e.g. pedaling on the piano, intonation for strings, word meaning for singers).

Several PCs may refer to a single place in the music (see Figure 1). For example, basic, interpretive, and expressive PCs at the same spot might indicate a pianist’s decision to use the “1st finger” (basic) in order to play forte (interpretation) because this is the “emotional climax” (expression). The presence

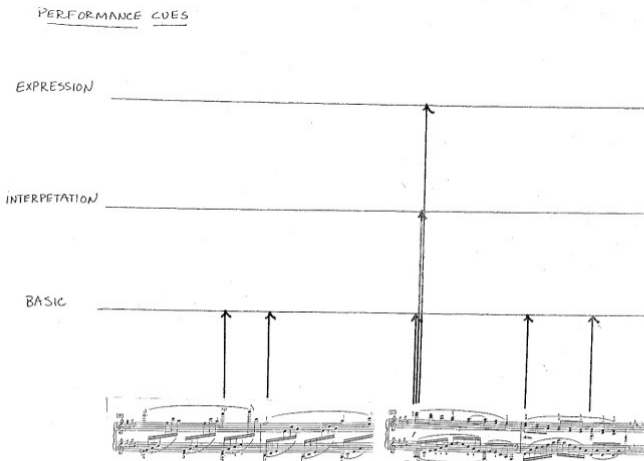


Figure 1. One page of a PC report by pianist Gabriela Imreh for Claude Debussy's Clair de Lune showing expressive, interpretive, and basic PCs.

Figure 2. Excerpts from PC reports made by cellist Tânia Lisboa for J. S. Bach's Cello Suite VI (Prelude) on four separate copies of the score for (1) structure (top left: harmonic (H), melodic (M), and lower level ( $L_3$ ) boundaries), (2) expression and interpretation (top right, interpretive PCs in parentheses), (3) hand position and intonation (bottom left, red and black respectively), and (4) bowing and fingering (bottom right, red and black respectively). (See full color version at [www.performance-science.org](http://www.performance-science.org).)

of the three different PCs would indicate that the pianist was prepared to think of any or all of these aspects at this point.

The musician does not necessarily think of every PC in very single performance. In reporting the presence of a PC, the musician is saying that s/he is prepared to think about this feature of the music during performance, if necessary. On a good day, the pianist in the above example may decide to leave the fingering and the *forte* to take care of themselves while focusing on the climax. On a bad day, the same pianist may be fighting to get the notes right and let the *forte* and climax take care of themselves in order to focus on the fingering. One benefit of well prepared PCs is that they allow the musician to give very similar performances under very different conditions, including changes in their own mental and emotional states.

### **Reporting PCs**

In the initial research on PCs, pianist Gabriela Imreh reported PCs on a specially prepared version of the score (see Figure 1, Chaffin 2006). Subsequently, most musicians have marked PCs on multiple copies of a published score. For example, cellist Tânia Lisboa used four separate copies of the score (see Figure 2, Chaffin *et al.* in press).

### **Some preliminary comparisons across musicians and pieces**

To show how PCs can be compared across musicians and pieces, we have summarized PC reports from nine longitudinal case studies, using previously published and unpublished data from our laboratory. Three pianists provided reports for the *Italian Concerto (Presto)*: a professional (Imreh) and two university student piano performance majors, one MA and one BA-level. Imreh also provided reports for a second piece, *Clair de Lune* by Claude Debussy. We also have reports by three other professional soloists for cello (Lisboa), voice (Ginsborg), and piano (Silva), and by two students: a BA-level trumpet performance major and a 14-year old piano student.

Figure 3 shows the number of PCs of each type for each piece. To allow comparison across pieces, frequencies were normalized by dividing by the number of beats in each piece. Despite the small sample, there are suggestive differences. The trumpet and grade-school students reported fewer PCs than other musicians by an order of magnitude. For the *Presto*, the two students reported fewer PCs than the professional. The professional pianist (Imreh) reported fewer PCs for the easier (for her) *Clair de Lune* than for the challenging *Presto*. With the exception of the *Presto*, the four professionals all reported similar numbers of PCs.

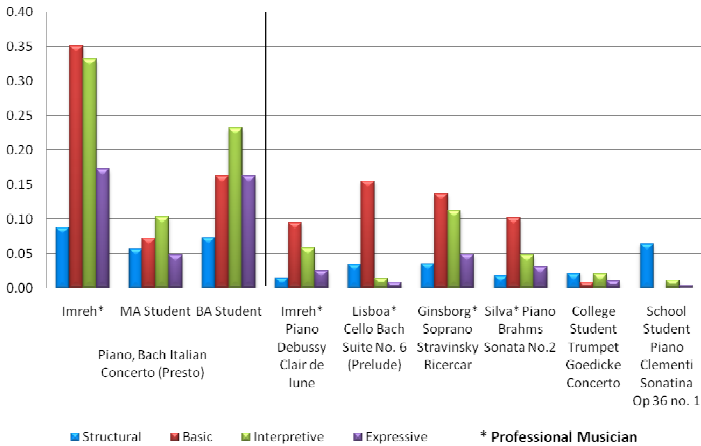


Figure 3. Number of performance cues per beat for different musicians and pieces. (See full color version at [www.performancescience.org](http://www.performancescience.org).)

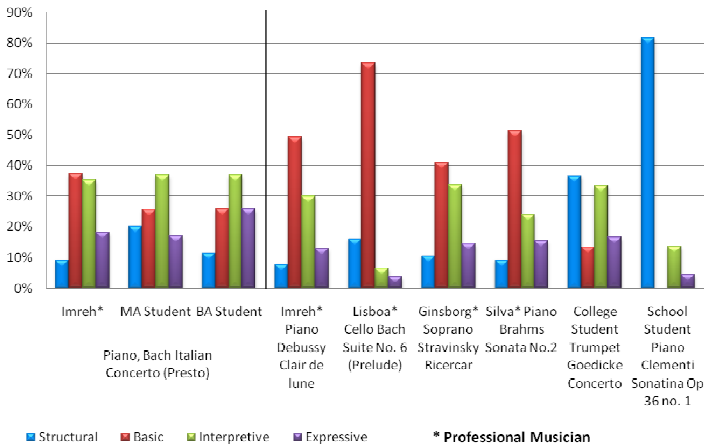


Figure 4. Percentage of performance cues of each type, normalized over number of beats. (See full color version at [www.performancescience.org](http://www.performancescience.org).)

Figure 4 shows the number of PCs of each type as a percentage of the total reported (normalized by number of beats). Experience mattered; the professionals used more basic PCs, the college students more interpretive PCs, the grade school student (and trumpeter) more structural PCs.

## IMPLICATIONS

All the longitudinal case studies of experienced soloists preparing new works conducted by our laboratory have found that the musicians engaged in extended practice of PCs. This suggests that PCs are necessary for reliable performance, perhaps because motor memory is unreliable (Chaffin *et al.* in press). While the proposed survey is unlikely to discover whether some musicians do *not* use PCs, it should identify the factors that affect PC use and establish the range of variability in the use of PCs.

We hope that PC surveys will become commonplace in music conservatories and departments. We believe that the self-study involved provides musicians with insight into their own learning and memorization. All of the musicians who have participated in the longitudinal case studies that form the basis for this work report that they found the process of self-study to be beneficial (Chaffin *et al.* 2002, pp. 266-268; Chaffin *et al.* in press). In addition, we expect the conclusions will be of value to music pedagogy and also to the psychology of music performance.

Materials for conducting PC surveys can be found on our website at [www.htfdcc.uconn.edu/psychlabs/musiclab.html](http://www.htfdcc.uconn.edu/psychlabs/musiclab.html).

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