

# Effect of Perceptual Mode on the Identification of Expressiveness in Piano Performance

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## ***Abstract***

*The purpose of this study was to investigate whether the overall perception of the musical expressiveness of a piano performance is affected by the mode of presentation - audio, visual, or audio/visual combination - and whether or not mistakes made by the performer affect expressiveness scores. Subjects (N=90), were undergraduate music majors, randomly selected from two large state universities. A professional pianist performed an excerpt of a piece in three perceptual modes: audio only, visual only, and audio/visual combination, with and without mistakes. Subjects only saw, heard or heard and saw performances with and without mistakes and then rated each presentation for its musical expressiveness using a seven-point Likert scale. Two One-Way ANOVAs with repeated measures were used to analyze the data of audio only and audio/visual combination performances. A t-test with dependent variables was used to analyze the visual only mode. There were significant differences between the expressive and non-expressive performances regardless of the condition. Greater differences were found in the perception of expressive and non-expressive performances in audio/visual modes as opposed to the visual only and audio only modes. Lastly, the subjects' perception of the musical expressiveness of a piano performance was affected by the inclusion of intentional mistakes when the performance was not played expressively.*

**Keywords** *Piano performance, expressiveness, perceptual modes, audio, visual, mistakes*

## **INTRODUCTION**

A characteristic of music separating it from other endeavors is its expressive value. An audience that hears an expressive performance often appreciates that performance for its aesthetic qualities. It can be argued, however, that a performance performed in a flawless manner can also be appreciated for its perfection even if it is not necessarily expressive in nature. When preparing for a performance, musicians do not know whether it is the more expressive or the technically flawless performance that leads to a higher level of musical appreciation by the audience.

Studies show that artistic deportment, or the lack thereof, can either positively or negatively affect the level at which a performance is appreciated. Not only does hearing the music affect us (the audio mode), seeing the performer plays the music (the visual mode) also had an effect on our perception of the overall performance. In a study by Gillespie (1997), it appeared that audio/visual stimuli together produced significantly higher ratings for pitch stability, evenness, and overall sound than the audio only mode.

Gillespie (1997) compared the ratings assigned to audio and videotaped vibrato performances of inexperienced and experienced violinists and violists. Sixty-one inexperienced and experienced violinists and violists were videotaped while performing vibrato. A panel of experts rated the videotaped performance (audio/visual mode) and then, 6 months later, rated the audio only portion of the performance for vibrato width, speed, evenness, pitch stability, and overall sound. Gillespie concluded (1997:218), "Audiovisual examples provide more stimuli than do audio-only modes of presentation. The visual stimuli give viewers additional information about a performance that can either be helpful or distracting".

Regarding the effectiveness of visual-spatial stimuli on melodic discrimination, Forsythe & Kelly studied whether audio discrimination was significantly better when a visual-spatial stimuli was paired with melodic phrases. Forsythe & Kelly reported that fourth-graders showed that the pairing of visual-spatial stimuli seemed generally effective in aiding melodic discrimination (Forsythe & Kelly, 1989).

Lucas, Hamann & Teachout (1996) directed 29 subjects, graduate and undergraduate music majors at two large Midwestern state universities, to assess taped performances of two orchestras, two wind ensembles, and two choirs playing works both expressively and non-expressively. All performances were presented to subjects in three perceptual modes: an audio only mode, a visual only mode and an audio/visual combined mode. Lucas, Hamann & Teachout found that subjects clearly differentiated between expressive and non-expressive performances, regardless of the condition. However, subjects perceived less difference between expressive and non-expressive performances in the audio only mode than in the visual only or audio/visual modes. Thus, Lucas, Hamann & Teachout concluded that audiences seem to use both audio and visual stimuli to assess the expressive qualities of a performance.

Lucas and Teachout (1998) conducted a study in which 89 undergraduate music and non-music majors were shown a videotape of 24 short performances in three perceptual conditions and were asked to rate the musical expressiveness of each performance. Two small ensembles, a graduate string quartet and a vocal chamber quartet, performed the same piece of each group expressively and non-expressively. There were differences between the music majors and the non-music majors regarding their evaluations of the musical expressiveness of the small ensemble performances. It was concluded that visual aspects of performance (alone and in audio/visual combination) may allow for more discrimination in audience judgment of expressiveness than in audio performances alone.

In Price's (2005) study, 89 university students who were in the band area and had taken conducting class were asked to rate nine different 60-second excerpts of compositions that were performed by nine bands. These bands received Superior, Excellent or Good during festival rating. The excerpts were presented in visual-only and audio-only modes. The subjects were asked to rate from 100 (most expressivity) to 1 (least expressivity). The researcher found that there was no significant correlation among video-only, audio-only and festival ratings. There was also no significant relationship between the expressiveness of conducting and ensemble festival ratings. In addition, the researcher expressed concerns that some bands receiving Superior festival rating only received Excellent or Good in the study.

Morrison et al. (2009) extended Price's (2005) study and looked into the effect of conductors' expressiveness towards ensemble performances. The researchers created four 1-minute video and audio conducting excerpts. The four videos consisted of two examples of expressive conducting and two examples of conducting that was not expressive. The videos of performances were synchronized with a high-quality audio excerpt. Subjects ( $N = 118$ ) were university music majors and were asked to rate the expressiveness of each performance by using a 10-point Likert Scale. The subjects were consistent with their responses. They rated highly expressive conducting with significantly higher scores. Conducting that was not expressive received lower scores; even when it was accompanied with the same high-quality audio excerpt. This study also supported McGurk and MacDonald's (1976) study where the visual mode or representation played a significant role in influencing audience perceptions when rating expressive and non-expressive performances.

Silvey (2011) modified the study of Morrison et al. (2009). The study was presented in video and audio modes; and the videos were presented with high and low expressive conducting styles. The researcher synchronized excellent and poor audio performances with the same videos. One hundred and twenty subjects who were members in one Midwestern university were asked to rate four 1-minute excerpts by using a 10-point Likert scale. The researcher found that the subjects were able to identify conductor expressiveness based on excellent and poor ensemble performances, even when the videos were identical. It should be noted that the difference between the high and low quality performances were notably significant.

Waggoner (2011) conducted a study to investigate the ability of undergraduate students to identify errors when listening to a recording (audio mode) and when conducting a live ensemble (audio and visual modes). The researcher found that the 18 undergraduate majors were able to identify errors significantly better when listening to a recording than when conducting an ensemble. The results indicate that identifying errors when conducting ensembles should be emphasized with undergraduate majors, since rehearsing ensembles is a daily job of ensemble directors.

In summary, among the studies regarding the effect of the perceptual mode, researchers have found that both audio and visual stimuli do affect the overall perception of music expressiveness (Gillespie, 1997; Lucas, et al., 1997; Lucas and Teachout, 1998). University students were not able to make accurate judgments if only the audio or video mode was provided (Price, 2005). In addition, the expressiveness of conductors' conducting style in the visual mode swayed university music majors' perceptions regarding the quality of an ensembles' performance (Morrison et al., 2009; Silvey, 2011). Waggoner (2011) found that undergraduate majors were able to identify errors significantly better when listening to audio excerpts as compared to conducting during live performances. However, no research was found regarding whether mistakes, which can be made by a performer, would affect the overall perception of the musical expressiveness of a performance, or the effect of the mode of presentation in relation to performance. Thus, the purpose of this research was to investigate whether the overall perception of the musical expressiveness of a piano performance is affected by the mode of presentation – audio, visual or audio/visual combination – and whether or not mistakes effect the evaluation. In other words, three questions were raised. Will the

subjects differentiate between expressive and non-expressive performances regardless of the condition? Will the subjects' perception of the musical expressiveness of a piano performance be affected by the mode of presentation? And, will the subjects' perception of the musical expressiveness of a piano performance be affected by the inclusion of intentional mistakes?

## **Method**

Subjects (N=90) for this study were undergraduate music majors at two large state universities in the United States. They included twenty-six Freshmans, fourteen Sophomores, twenty-six Juniors, and twenty-four Seniors. Among these students, there were fifty-four Music Education majors, twenty four Performance majors, three Theory majors, and five Music Majors in a B.A. program. Seventeen students were majoring in Brass, five in Percussion, nine in Keyboard, seven in Strings, twenty-five in Voice, and twenty-seven in Woodwinds.

A professional pianist was asked to play a piece in four different ways: expressively without mistakes, non-expressively without mistakes, expressively with mistakes, and non-expressively with mistakes. No attempt was made to define expressiveness, as the interpretation of expressiveness in the piano performance was left to the performer. Mistakes were purposely played in measures 30, 32, and 43. Excerpts were all approximately 1 minute and 30 seconds in length. Since subjects' ratings of expressive and non-expressive performances may be influenced by the familiarity of a piece, an unfamiliar piece was chosen: Prelude, Op. 17. No. 11, by Felix Blumenfeld, a Russian composer. A side view showing the fingers and face of the pianist was taken so subjects could view the facial expressions and gestures of the performer. For each of the taping sessions, an external microphone was placed at the front of the piano in a position to record optimal sound. All performances were recorded on a master tape using a Panasonic video recorder. An independent panel of three college music educators viewed the master video. The three judges agreed that there significant differences among the expressive and non-expressive piano performances.

From the master video, evaluation video clips were created. The evaluation video clips consisted of three modes: audio only, video only, and audio/video combined. The expressive and non-expressive performances without mistakes were presented to the subjects in all three modes. Since a professional performer would not show obvious facial or physical cues when wrong notes were played, the expressive and non-expressive performances with mistakes were presented in only the audio, and audio/video combined modes. A total of 10 performances were presented.

In the audio presentations, the performances were recorded on the evaluation videos using only the sound with a black screen. In the video presentations, the performances were recorded on the evaluation tapes using only the picture without sound. Within the evaluating presentations, all performances were ordered randomly. Total listening time of the ten performances was 20 minutes.

Subjects were directed to review video performances and evaluate each presentation for its musical expressiveness. An evaluation form was administered to the subjects. After each performance, subjects were directed to evaluate the musical expressiveness of the performance by circling their ratings on a seven-point Likert scale.

## Results

Data were analyzed using two One-way ANOVAs with repeated measures and a t-test for dependent samples. The independent variable was the performance condition (audio expressive with and without mistakes, audio non-expressive with and without mistakes), and the dependent variable was the expressiveness ratings. A significant difference was found by performance condition. Results for the summary of all effects by audio only mode were  $F = 91.36$ ,  $p = 0.00$ . Results of this One-Way ANOVA with repeated measures can be found in Table 1. Using the Shaffe test, the data were compared and it was found that there were significant differences in the scores ( $p \leq .05$ ) between expressive with mistakes and non-expressive with mistakes; and expressive without mistakes and non-expressive without mistakes. (See Table 2).

**Table 1** Summary of One-Way ANOVA with Repeated Measures: Audio only mode performances

Effect	<i>df</i> <i>Effect</i>	<i>MS</i> <i>Effect</i>	<i>df</i> <i>Error</i>	<i>MS</i> <i>Error</i>	<i>F</i>	<i>P</i>
Audio	2.00	150.10	178.00	1.64	91.36	0.00

**Table 2** Sheffe Test: Audio performances

	Expressive with mistakes	Non- expressive with mistakes	Expressive without mistakes	Non-expressive without mistakes
Expressive with mistakes		0.01*	0.30	0.85
Non-expressive with mistake	0.01*		0.00*	0.13
Expressive without mistakes	0.30	0.00*		0.05*
Non-expressive without mistakes	0.85	0.13	0.05*	

In the second analysis, One-way ANOVA with repeated measures was used. The independent variable was the performance condition (audio/visual expressive with and without mistakes, audio/visual non-expressive with and without mistakes), and the dependent variable was the expressiveness ratings. Results for the summary of all effects by audio-visual modes were  $F = 47.50$ ,  $p = 0.00$ . (See Table 3). A significant difference was found for the main effects. From the Shaffe test, the data were compared revealing significant differences in the scores ( $p \leq .05$ ) between expressive without mistakes and non-expressive without mistakes; expressive without mistakes and non-expressive with mistakes, expressive with mistakes and non-expressive with mistakes, expressive with mistakes and non-expressive without mistakes, non-expressive without mistakes and non-expressive with mistakes. (See Table 4).

**Table 3** Summary of One-Way ANOVA with Repeated Measures: Audio-Visual mode performances

Effect	<i>df</i> <i>Effect</i>	<i>MS</i> <i>Effect</i>	<i>df</i> <i>Error</i>	<i>MS</i> <i>Error</i>	<i>F</i>	<i>P</i>
Audio Visual	3.00	53.59	267.00	1.12	47.50	0.00

**Table 4** Sheffe Test: Audio/Visual combination modes performances

	Expressive with mistakes	Non-expressive with mistakes	Expressive without mistakes	Non-expressive without mistakes
Expressive		0.00*	0.50	0.00*
Non-expressive with mistakes	0.00*		0.00*	0.00*
Expressive without mistakes	0.50	0.00*		0.00*
Non-expressive without mistakes	0.00*	0.00*	0.00*	

*Note.* \* $p \leq .05$

In the third analysis, a t-test for dependent samples was used. (See Table 5.) The independent variable was the performance condition (visual expressiveness, visual non-expressiveness), and the dependent variable was the expressiveness ratings. A significant difference was found between the expressive and non-expressive performances, with  $t = 11.84$ ,  $p = 0.00$ .

**Table 5** t-test for dependent samples with performance condition: Visual mode performances

		<i>t</i>	<i>df</i>	<i>p</i>
Expressive without mistakes	Non-expressive without mistakes	11.84	90.00	.00*

*Note.* \* $p \leq .05$

## Discussion

The first purpose of this research was to investigate whether the subjects could differentiate between expressive and non-expressive performances regardless of the condition. From Table 1, 2, and 3, the results indicate that there were significant differences among the audio only mode, visual only mode and audio/visual combination.

Thus, the result of this study indicated that the subjects were able to differentiate between expressive and non-expressive performances regardless of the condition.

The second purpose of this research was to investigate whether the overall perception of musical expressiveness of a piano performance was affected by the mode of presentation - audio, visual or audio/visual combination. Results from this study indicate that subjects could distinguish between expressive and non-expressive performances using three different types of information: sound only (aural mode), the performer's facial expression and gestures (visual mode), and a combination of sound and visual cues (audio/visual mode). Subjects made less distinction between expressive and non-expressive performances when only the sound of the piano performance was heard compared to the combination of audio and visual, where the performer's gestures could be seen. The highest expressiveness ratings were in the audio/visual combination mode.

In one previous study, Lucas, Hamann, and Teachout (1996) found significantly less difference between expressive and non-expressive performances in an audio only presentation than when the performance was presented in a video only or audio/video combined mode. Lucas, Hamann, and Teachout suggested that visual clues are important in discriminating between expressive and non-expressive performances. As observed in Table 1 in this study, ratings for expressive and non-expressive performances were closer in the audio only presentation mode than in the video only or audio/video combined modes. In addition, greater differences were found in the perception of expressive and non-expressive performances in audio/visual modes as opposed to the visual only mode. This study supports Price's (2005), Morrison's et al. (2009); Silvey's (2011) findings. One explanation for these differences may be that audiences receive more information about expressive performances from the performer's facial expressions and gestures than they receive from only the tone which is produced by the performer. This result also confirms Gillespie's (1997) findings regarding vibrato and pitch stability. Ratings of vibrato for inexperienced string players were higher for evenness and overall vibrato performance when judged in the audio/visual mode than when judged in the audio only presentation, while among experienced performers, the audio/visual ratings for pitch stability were significantly higher than the audio only ratings. Morrison et al. (2009) further explained in their study that audiences were influenced by a conductor's facial and conducting postures if their images were posted on a video screen; whereas, when performers were able to see the conductor face to face, they were more affected by the conductor's facial and conducting gestures.

The third purpose of this research was to investigate whether the perception of the expressiveness of the music was affected by the mistakes which were intentionally made by the performer. The only significant difference between the performances with and without mistakes in this study was in the audio/visual non-expressive performance. There was no significant difference when the performance was played expressively. The result indicates that the mistakes, which were made intentionally in this study, would only affect the perception of the expressiveness of the performance when the performer did not play expressively. This result was a healthy sign for undergraduate majors; they were sensitive to the expressiveness of a performance even when it was performed with mistakes.

Identifying mistakes was not the intention of this study. It should be noted though, that as the data were collected from the subjects, a professional conductor noticed that the subjects were not able to identify the mistakes that were purposely made in the performances. The reason is most likely a result of using an unfamiliar piece by Blemenfeld. This unfamiliar repertoire was chosen for the study to investigate how subjects perceive a piece despite the lack of familiarity.

For further study, a familiar piece that is performed by a professional and a non-professional performer could foster an investigation of the relative musical expressiveness of the two types of performers. How will levels of expertise affect the perception of expressiveness in a musical performance? How will familiarity of repertoire affect the perception of expressiveness for the performances? By conducting further studies, the researcher can continue to investigate how listeners analyze, compare and synthesize the performances of a piece of music, now based on the experience of the performers and the familiarity of the repertoire.

In conclusion, this study suggests that only playing the right notes does not necessarily produce a high rating from the listener. Performers should be encouraged to not only practice to become technically proficient, but also to study the music in a way that will produce an expressive performance. In addition, since artistic deportment can be positively affected by the mode of perception, especially the audio/visual combination mode, this study suggests that live performances are the optimal way for musicians to please their audience when they share their music. Undergraduate music students should be encouraged to attend live performances frequently in order to appreciate performances for their aesthetic values. This is extremely critical when all these majors will be teachers and directors who will teach or conduct music classes and ensembles in their daily lives.

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## **Biography**

Chet-Yeng Loong, Ph.D., has completed all levels in Kodaly and Orff-Schulwerk and is certified in both of these methods. She has presented at local, state, regional, national, and international conferences. Her research on early childhood and elementary music has been published in several leading journals. Currently, Dr. Loong serves as Chair of the Music Education Area at the University of Hawai'i, President of the Hawai'i Music Education Association, a member of the Editorial Board of the Orff Echo, a Reviewer for the Malaysian Music Journal, and a member of the steering committee of the Alliance for Active Music Making in General Music Teacher Education. She was the past Conference Chair of HMEA and past Chair of the AOSA Research Committee.

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