

# Effect of Performance Forms (Memorized and Non-Memorized) and Gender on Piano Students' Stage Performance Anxiety

Li Li\*

School of Art, Hanjiang Normal University, Shiyan 442000, Hubei Province, China

\*Corresponding author: Li Li, 921033690@qq.com

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## Abstract

The primary purpose of this study was to investigate the effect of performance forms (memorized and non-memorized) and gender on piano students' stage performance anxiety. Participants in this study included 22 piano students at a university in the United States. Data were collected through questionnaires and analyzed using SPSS 23.0. Results indicated that most participants preferred solo piano performances without a musical score rather than piano accompaniment performances with a musical score. Participants experienced higher performance anxiety during solo performances compared to accompaniment performances. Most participants attributed their anxiety to "task difficulty" and "effort." Performance forms had a significant effect on piano stage performance anxiety, and gender had a significant effect on the physiological reactions to solo performance anxiety and the psychological reactions to performance anxiety. Based on the effects of performance forms and gender on piano stage performance anxiety, different strategies should be applied for different performance forms and different performers (males and females).

## Keywords

Performance forms  
Gender  
Piano  
Stage performance anxiety

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## 1. Introduction

Music stage performance is an art of time, unlike painting, literature, or composing, which can be modified and replenished adequately before being

finished. Once performers start playing, they have no room to go back. Thus, music stage performance has characteristics of "openness, competition, and irrepeatability," which cause the most common

and serious problem for music performers—Music Performance Anxiety (MPA). Music performance anxiety is defined as a constant, continuously distressful, and impairing performance skill in a public context that may affect an individual's musical aptitude training and level of performance<sup>[1]</sup>. Music performers experience different levels of music performance anxiety. Since most panics experienced during public performances are due to the fear of forgetting<sup>[2]</sup>, it is important to study whether different performance forms (memorized and non-memorized) affect music performance anxiety differently. Accordingly, the main goal of this research is to study the effects of performance forms (memorized and non-memorized) and gender on piano stage performance anxiety and provide some suggestions for piano student performers to relieve their performance anxiety.

The incidence of stage performance anxiety across different majors is quite high. Stage performance anxiety can stem from a wide range of causes, such as social shyness, generalized anxiety disorder, and post-traumatic stress<sup>[3]</sup>. Previous studies have attributed stage performance anxiety to two main categories: internal and external. Internal attributions include neuroticism, extraversion, age, gender, self-efficacy, and perfectionism. External attributions include life history, musical training, and situational factors.

There are three approaches to relieving stage performance anxiety: behavioral, psychological, and cognitive. Behavioral approaches include progressive muscle relaxation, insight relaxation and systematic desensitization techniques, awareness and breathing techniques, some aspects of the Feldenkrais and Alexander methods, as well as yoga and Tai Chi. Psychological approaches mainly include self-hypnosis, imagery treatment, and exposure therapy. Cognitive approaches include attentional training and behavior rehearsal<sup>[4]</sup>.

Previous studies on stage performance anxiety have mainly focused on four aspects: incidence/level, effects, attributions, and strategies. However, no studies have focused on the effects of performance

forms (memorized and non-memorized) on piano stage performance anxiety. Additionally, the results of studies on the effect of gender on piano stage performance anxiety have been inconclusive. Therefore, the main goal of this study is to explore the effects of performance forms (memorized and non-memorized) and gender on piano stage performance anxiety and provide suggestions for piano student performers.

The research questions of this study include:

- (1) Do reactions to memorized and non-memorized performances demonstrate different levels of piano stage performance anxiety?
- (2) Does gender influence piano stage performance anxiety?
- (3) How can piano stage performance anxiety be overcome based on performance forms and gender?

## 2. Methods

### 2.1. Participants

Participants in this study included piano students from a university in the United States ( $n = 22$ ; undergraduates  $n = 7$ ; graduates  $n = 15$ ). The participants' ages ranged from 18 to 69 ( $26.50 \pm 16.45$ ) years old. On average, the participants had been playing the piano for  $17.00 \pm 8.89$  years. Seventeen participants preferred solo performance without a score, five participants preferred accompaniment performance with a score, and eighteen participants experienced higher anxiety during solo performance without a score. Only four participants experienced higher anxiety during accompaniment performance with a score.

### 2.2. Procedures

The questionnaire was designed based on the literature and the researcher's previous studies and included three parts:

- (1) Basic information about the participants, including their age, gender, education level,

performance experience, preferred performance form (solo without a score or accompaniment with a score), and the performance form that induced higher anxiety.

- (2) Reactions to stage performance anxiety during solo performance without a score, including skill, physiological, and psychological reactions, and reasons for these reactions (e.g., ability, effort, task difficulty, bad luck, and other reasons). This part concluded with an open-ended question about strategies to overcome stage performance anxiety.
- (3) The same five questions as the second part but focused on accompaniment performance anxiety with a score.

A Likert scale was used in the questionnaire, offering five response levels: Never, Rarely, Sometimes, Usually, and Always.

The data from this study were analyzed using SPSS 23.0 software. Comparative methods were used to analyze the collected data and study the effects of performance form and gender on the piano students' stage performance anxiety.

### 2.3. Reliability and validity

This study used the Content Validity Ratio (CVR) as an indicator of content validity. The researcher invited five experts in the fields of music education and psychology to assess the degree of fit between the questionnaire items and the survey objectives. The options were divided into four levels: (1) No relationship, (2) Weak relationship, (3) Moderate relationship, and (4) Strong relationship. According to the formula  $CVR = (E - N/2) \div (N/2)$ , where CVR is the Content Validity Ratio, E is the number of experts indicating "3" or "4," and N is the total number of experts. In this study, E = 9 and N = 10, so  $CVR = 0.80$ , indicating good content validity as nine experts agreed that the items were useful.

Internal consistency was used to measure the reliability of the questionnaire, usually measured

with Cronbach's alpha. The Reliability Statistics table provides the actual value for Cronbach's alpha of anxiety items (7–9 and 12–14), as shown below in **Table 1**:

**Table 1.** Reliability statistics

Cronbach's alpha	Number of items
0.827	6

From the sample of 22 participants, Cronbach's alpha is 0.827 ( $0.9 > \alpha > 0.8$ ), indicating a high level of internal consistency for this scale with the 22 samples.

## 3. Results

### 3.1. Descriptive statistics of sample data

#### 3.1.1. Gender and education ratio of the participants

Participants in this study included piano students at the University of Missouri-Columbia. The total number of participants was  $n = 22$ , consisting of 15 graduates (male,  $n = 7$ ; female,  $n = 8$ ) and 7 undergraduates (male,  $n = 5$ ; female,  $n = 2$ ).

#### 3.1.2. Preferred performing form

Sixteen participants (73%) preferred to perform piano solo without a musical score, 4 participants (18%) preferred to perform piano accompaniment with a musical score, and 2 participants (9%) preferred to perform both forms.

#### 3.1.3. Higher performance anxiety form

Seventeen participants (77%) experienced higher performance anxiety during piano solo performances, 4 participants (18%) experienced higher anxiety during piano accompaniment performances, and one participant (5%) had equal anxiety in both forms.

#### 3.1.4. Reasons for anxiety

This question was designed based on Weiner's attribution theory<sup>[5]</sup>. Sixty-four percent of participants

attributed their piano solo anxiety to “task difficulty,” 27% to “effort,” 4% to “ability,” and 5% thought it was normal (no specific reason). For piano accompaniment performance, 45% of participants attributed their anxiety to “effort,” 41% to “task difficulty,” 9% to “other reasons,” and 5% to “ability.” Thus, in solo piano performance, most participants attributed their anxiety to “task difficulty,” while in piano accompaniment performance, most participants attributed their anxiety to “task difficulty” and “effort.”

### 3.1.5. Strategies to overcome piano performance anxiety

Participants provided various strategies to overcome piano performance anxiety:

- (1) Before performance: Practice more, practice slowly, think positively, use appropriate techniques, engage in mental practice, play more for people, become familiar with the piano and its sounds, engage in breathing exercises, warm up, meditate, and visualize.
- (2) During performance: Enjoy the music rather than worry about memory, listen to and match the other musician(s) in accompaniment performance, and stay in the moment rather than worry about what is coming next.

## 3.2. Correlation between gender and anxiety level

Pearson's correlation test was used to determine the effects of gender on participants' piano stage performance anxiety. Significant effects were found between gender and physiological reactions of piano solo stage performance anxiety ( $r = 0.542$ ,  $P = 0.009$ ). Gender also had a significant effect on the psychological reactions of both piano solo and accompaniment performance anxiety (solo:  $r = 0.591$ ,  $P = 0.004$ ; accompaniment:  $r = 0.454$ ,  $P = 0.034$ ). However, no significant effects were found between gender and

other items of piano performance anxiety, such as skill reactions of solo performance ( $r = 0.404$ ,  $P = 0.062$ ), skill reactions of piano accompaniment performance ( $r = 0.329$ ,  $P = 0.135$ ), and physiological reactions of piano accompaniment performance ( $r = 0.301$ ,  $P = 0.173$ ).

A one-way ANOVA was then conducted to compare the mean anxiety levels between males and females. Results indicated that females' mean levels of stage performance anxiety were significantly higher than males, including skill ( $M = 4.0 > 3.5$ ), physiological ( $M = 4.0 > 2.42$ ), and psychological reactions ( $M = 4.3 > 3.08$ ) during solo performance, and skill ( $M = 3.3 > 2.83$ ), physiological ( $M = 2.90 > 2.33$ ), and psychological reactions ( $M = 3.1 > 2.25$ ) during accompaniment performance.

## 3.3. Difference between memorized (solo) and non-memorized (accompaniment) piano stage performance anxiety

A paired sample  $t$ -test was used to compare the piano solo stage performance anxiety and piano accompaniment stage performance anxiety. The mean of skill reactions of piano stage performance anxiety for solo performance was 3.7273, while the mean for accompaniment performance was 3.0455 ( $<$  mean of solo). The mean of physiological reactions of piano stage performance anxiety for solo performance was 3.1364, while the mean for accompaniment performance was 2.5909 ( $<$  mean of solo). The mean of psychological reactions to piano stage performance anxiety for solo performance was 3.6364, while the mean for accompaniment performance was 2.6364 ( $<$  mean of solo).

The  $t$ -test data indicated a significant difference between the skill reactions of piano stage performance anxiety for solo and accompaniment performances ( $M = 0.68$ ,  $t = 3.38$ ,  $P = 0.003 < 0.01$ ), a significant difference between the physiological reactions ( $M = 0.5454$ ,  $t = 2.16$ ,  $P = 0.042 < 0.05$ ), and a significant difference between the psychological reactions ( $M =$



1.0,  $t = 4.58$ ,  $P = 0.000 < 0.01$ ).

Results indicated a significant difference in piano stage performance anxiety between solo and accompaniment performances, with the level of piano solo stage performance anxiety being significantly higher than piano accompaniment stage performance anxiety.

#### 4. Discussion

This study investigated the effects of performance forms and gender on piano stage performance anxiety. The research questions included: (1) Do reactions to memorized (solo) and non-memorized (accompanied) performances demonstrate different levels of piano stage performance anxiety? (2) Does gender influence piano stage performance anxiety? (3) How can piano stage performance anxiety be overcome based on performance forms and gender?

The results indicated that most participants preferred solo piano performances without a music score (memorized) over accompanied performances with a music score (non-memorized). This preference may be due to differences between solo and accompanied forms. Accompanied performance requires not only self-preparation, as solo performance does, but also listening and matching with other musician(s). Thus, on stage, accompanists have double the responsibilities—both for themselves and the other performers. The performance effect results from all performers' efforts, so piano accompanists have less control over the performance compared to solo performers. Participants also provided strategies for overcoming piano stage performance anxiety, including preparation before the performance and mental regulation during the performance. Additionally, after performance, performers should evaluate their performance, assess their level of stage performance anxiety, identify the reasons for their reactions, and determine effective ways to relieve their stage anxiety. Over time, the level of piano stage performance anxiety will decrease.

Importantly, this study indicated a significant difference between piano stage performance anxiety for memorized (solo) and non-memorized (accompanied) performances. Gender had significant effects on the physiological reactions of memorized (solo) piano performance anxiety and the psychological reactions of stage anxiety in both solo and accompanied performances. Different performance forms (memorized and non-memorized) have different levels of piano stage performance anxiety due to their different practice methods, performance styles, and attention requirements. Soloists need to focus only on themselves, while accompanists must focus on their performance and coordinate with other musicians. Therefore, performers should overcome or relieve their performance anxiety according to their performance forms. Results indicated that solo piano performance without a music score had a higher level of stage anxiety than an accompanied performance with a music score. This difference may arise from memory issues (without a music score), mental preparation problems, or the number of players involved, which differ from those in accompanied performances. Further studies are needed to address these specific issues for soloists.

For accompanists' piano stage performance anxiety, their level of stage anxiety is generally lower than that of soloists, but they must still pay attention to their performance, as each member of an accompanied performance influences the overall effect. Accompanists should first focus on their own performance while also considering the overall performance. Even with a music score, accompanists may face other factors that influence their performance, different from those affecting soloists. Participants' responses to the fifteenth question of the questionnaire indicated that most attributed their piano stage performance anxiety to effort and task difficulty. Therefore, further studies should focus on these two factors, as they predominantly influence stage anxiety.

Another result of this study is that gender had a significant effect on the physiological reactions of solo and the psychological reactions of both solo and

accompanied piano stage performance anxiety. This finding suggests that continued investigation into the effects of gender on physiological and psychological ways to overcome piano stage performance anxiety is more important than other aspects, such as skill.

## 5. Conclusion

Based on the effects of performance forms and gender on piano stage performance anxiety, different strategies should be applied for different performance forms and different performers (males and females). For memorized performances (solo), performers should focus on memory techniques, mental regulation, and

balancing skills with task difficulty. For non-memorized performances (accompanied), performers can use these methods, excluding memory techniques, and should also focus on the overall performance and communication with other musicians. Additionally, males and females can benefit from observing and learning from each other, sharing their methods for regulating and overcoming stage performance anxiety. Female performers, in particular, should actively seek more ways to overcome their anxiety according to their level of stage anxiety. Accordingly, studying the effects of performance forms and gender on piano stage performance anxiety remains an important area deserving of future research.

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## Disclosure statement

The author declares no conflict of interest.

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