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Influence of Stage Performance Psychology on Piano Playing and Adjustment Strategies

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Abstract: Piano playing is not only a combination of technology and art but also a complex psychological process. However, in stage performances, many performers are affected by nervousness, which affects the quality of their performance, manifesting as distraction, stiff fingers, and uncontrolled rhythm, resulting in a decline in musical expression. To this end, this paper studies the impact of stage performance psychology on piano playing and explores effective psychological adjustment strategies to improve performers' ability to control details. By analyzing the performance of performers in different psychological states, this paper explores the psychological adjustment strategies in the performance preparation stage, including the coping methods of personalized tension and anxiety and situational tension and anxiety. At the same time, the synergy of vision, hearing, touch and movement is studied to optimize the performers' instant memory ability and sense of rhythm. In addition, combining psychological theory with performance practice, strategies such as improving concentration, simulated stage rehearsal, relaxation training and positive psychological suggestion are proposed to reduce psychological pressure and enhance stage adaptability. The study shows that after psychological adjustment training, the error rate of the experimental group drops significantly to 3.2% ± 0.6, a decrease of about 39.6%, indicating that psychological adjustment strategies (such as relaxation training, concentration training, simulated stage rehearsal, etc.) have obvious effects in improving performance accuracy.

1. Introduction

Piano playing is a highly complex psychological and physiological activity, involving the performer's emotional expression, skill application, and psychological adjustment. The performer's performance on stage is not only affected by his or her technical proficiency but also closely related to his or her psychological state. Emotional problems such as tension and anxiety often affect the accuracy, fluency, and expressiveness of the performance. Therefore, how to effectively adjust the performer's psychological state and improve the quality of performance has become an important issue of concern in academia and practice. Existing research has mostly focused on technical training in music performance, but relatively little attention has been paid to psychological factors. In response to this issue, this study aims to explore the impact of psychological adjustment

strategies on the performance and psychophysiological state of pianists, especially their potential role in reducing anxiety, improving performance accuracy and rhythm stability.

This study compares the psychological and physiological data of the experimental group and the control group, combines with performance indicators such as playing accuracy and fluency, and deeply analyzes the positive impact of psychological adjustment training on piano playing. The research results not only provide a theoretical basis for psychological adjustment in piano playing but also provide a useful reference for practical teaching and performance training.

This paper first introduces the background and significance of the study, expounds the importance of psychological adjustment in piano playing, and combines relevant theories and literature review to clarify the theoretical basis of the study. Subsequently, the research methods are described, including experimental design, subject selection, data measurement and analysis methods, to ensure the scientificity and operability of the study. Next, the experimental results are presented, and key variables such as error rate, rhythm stability, playing fluency and psychological and physiological indicators are analyzed and discussed to verify the effectiveness of psychological adjustment training. Finally, the paper summarizes the research conclusions, points out the positive impact of psychological adjustment training on piano performance, reflects on the limitations of the research, and proposes the improvement direction and application prospects of future research.

2. Related Work

In recent years, the relationship between music learning and psychological factors has received widespread attention. Researchers have explored how psychological state, teaching methods and external environment affect music performance and learning outcomes from different perspectives. Li's autoethnographic study explored how teachers and social and cultural environments affect music learning, and how this process shapes our musical journey and outlook on life, achievement goals and ways of achieving them [1]. Al-Rousan et al. explored the relationship between psychological stability and academic performance of middle school students in Irbid Province, Jordan. The results showed that students' psychological stability was at a medium level. In addition, the study showed that the various dimensions of psychological stability had a significant impact on academic performance [2]. Li et al. explored the impact of piano playing on the psychological health of performers, surveying senior students from universities and music colleges in Beijing and Shanghai. The results showed that expressive performance requires both technical ability and inner experience[3]. Keli et al. explored the interaction between psychological processes and piano practice, revealing how cognitive theory, mindfulness training, flow state, emotional engagement, and performance psychology jointly affect piano playing. The pursuit of flow experience makes practice more immersive and efficient. Psychological factors affect the emotional expression and authenticity of performance, while performance psychology involves the psychological state and anxiety management during performance[4]. Cheng and Southcott explored the factors that motivate older elementary and middle school students to practice piano, and how piano teachers can stimulate students' intrinsic motivation. The results of thematic analysis showed that students' practice participation was influenced by external factors such as emotions and parental support [5]. Jia explored the complex relationship between piano playing skills and musical expression, analyzed the synergy between the two, and revealed how musicians incorporate personal creativity and emotions into their performances to present rich musical interpretations [6]. Liu and Ye explored the impact of musical ear and vocal organ development on vocal performance, and adopted a problem-based online music education method, focusing on vocal singing with piano accompaniment. The study developed an online training course that included theoretical training, practical skills, and artistic literacy improvement. 83% of students believed that the course was

highly effective for performances and competitions [7]. Novosiadla explored the development of performance skills of students majoring in music and education in piano courses, focusing on the impact of psychophysiological factors on performance. The results showed that scientific movement training can improve performance freedom and enhance self-control and motor self-regulation [8]. Meng explored how musical interpretation triggers spontaneous and autonomous physical responses from a multidisciplinary perspective of physiology, psychology, and performance. The study found four major factors that affect non-technical movements in music performance: music score, performer experience, individual characteristics, and performance environment [9]. Peng explored the impact of the interactive music composition system MusicFlow on students' piano skill development and evaluated the potential of digital technology in piano education through a questionnaire survey. The results of the experimental study showed that there was a significant difference in the overall mean values of piano skills among different groups ($Z = -2.53$, $p = .031$) [10]. Cao aimed to explore the relationship between online piano learning, academic performance assessment, and learning motivation. The study involved 40 students aged 19 to 25. The experimental group used online piano learning, and the control group used traditional full-time courses. The results showed that the motivation of the experimental group was significantly higher than that of the control group at all stages [11]. Although existing studies have explored the impact of psychological factors on piano performance, there is a lack of systematic analysis of the mechanism of how psychological adjustment training can specifically improve performance, and related experimental research is still relatively limited.

3. Method

3.1 The Influence of Psychological Activities on Performance

Every moment of piano playing is a manifestation of psychological activities such as emotion and control, motivation and memory, desire and imagination. Moderate tension can enhance the expressiveness of music, but excessive tension may affect the performer's thinking and control ability, and even lead to mistakes.

(1) Psychological state during the preparation stage

The psychological changes are more obvious from 15 minutes before the performance to 5 minutes after the performance. During this period, the performer may experience adverse reactions such as inability to concentrate, irritability, abdominal pain, and difficulty breathing due to nervousness. Nervous psychology can be divided into two types:

Personalized tension and anxiety: The tension caused by the performer's sensitive or introverted personality needs to be adjusted through long-term psychological counseling and targeted training.

Situational tension and anxiety: Mainly due to unfamiliarity or inadaptability to the performance environment, this can be alleviated by familiarizing yourself with the stage and adapting to the environment in advance.

(2) Synergy of vision, hearing, touch and movement

Piano playing is a complex psychological process involving vision, hearing, touch and movement. Vision is the first step in piano playing. Since the piano score is relatively complex, the performer needs to pay attention to multiple parts, chord patterns and performance instructions at the same time. In actual playing, the eyes should move before the hands to ensure the continuity of the melody and the fluency of the music. Differences in instant memory ability are an important factor affecting sight-reading ability.

3.2 The Psychological Process of Music Creation and Its Influence

(1) The psychological basis of music creation

Music works originate from the psychological experience of the composer and are expressed through musical language. Creation, performance, and listening are all affected by psychological activities and have an effect on the psychological state of the performer. As an art of time, music continues to develop over time, and piano playing has therefore become a complex psychological process.

(2) Two stages of music creation

Psychological experience stage: composers accumulate emotional and aesthetic experience through social experience, which is the psychological basis of music creation. Whether musicians, painters or poets, their creations are all derived from psychological experience of social life.

Musical expression stage: composers use musical language to transform psychological experience into specific musical images. This process requires imagination and creative thinking, and is also influenced by the internal laws of music art. When composers conceive musical works, they will form a blueprint in their hearts and then transform it into a specific score.

3.3 Psychological Adjustment Practice in Piano Playing

(1) Focus attention and reduce external interference

Piano players should always keep a clear mind and avoid being disturbed by external factors. Attention should be focused on the piano playing itself, and the mind should be immersed in the music to make the performance more natural and smooth.

(2) Be fully prepared to reduce unexpected situations

Before performing on stage, performers should be fully prepared, including:

Mastering the repertoire and improving performance skills.

Understanding the stage environment, such as the quality and feel of the piano, the sound effects of the audio equipment, etc.

By simulating stage performances, improve the ability to respond to unexpected situations.

(3) Adapt to the performance situation and improve psychological tolerance

Performers can accumulate experience and improve their ability to adapt to the stage environment through multiple performances. In addition, interaction with the audience can also enhance confidence and make the performance more expressive. In the face of performance tension, performers can use relaxation training and psychological suggestion to improve their psychological tolerance.

3.4 Psychological Adjustment Strategies for Pianists

(1) Build self-confidence and improve psychological adaptability

Lack of self-confidence is an important cause of stage nervousness. Performers should improve their self-confidence through sufficient practice, believe that they can successfully complete the performance, and reduce the fear of failure. Positive self-suggestion, such as "I can do it", can effectively relieve nervousness.

(2) Get familiar with the performance environment and reduce uncertainty

Performers can reduce nervousness by:

They can familiarize themselves with the stage in advance and understand the piano's placement, tone characteristics, and feel.

During the rehearsal, they can simulate the environment of the formal performance to reduce the unfamiliarity of the stage.

They can observe the impact of stage size, audience size and stage lighting to adjust to the atmosphere of the performance.

(3) Pay attention to psychological adjustment and ensure concentration

Players should learn to adjust their mental state during the performance, avoid external interference, and focus on the music itself. They can use relaxation techniques such as deep breathing and meditation to achieve the best state of mind and body function.

(4) Accumulate stage experience through practice

Accumulating stage experience is crucial to psychological adjustment. Performers can improve their ability to respond on the spot through frequent stage performances and learn to overcome psychological and physical discomfort in actual performances. At the same time, asking experienced performers for advice, receiving feedback and improving performance strategies can help improve stage performance.

4. Results and Discussion

4.1 Study Subjects

Thirty piano players (including students from professional music colleges and amateur players) are selected and randomly divided into an experimental group (15 people) and a control group (15 people) according to their playing experience and psychological stress level.

4.2 Experimental Variables

Independent variables (intervention factors): The experimental group receives systematic psychological adjustment training (concentration training, relaxation training, simulated stage rehearsal, positive psychological suggestion, etc.), while the control group maintained the original performance habits without psychological intervention measures.

Dependent variables (measurement indicators):

Performance accuracy (wrong note rate, rhythm stability),

Performance fluency (finger flexibility, coherence),

Emotional changes (heart rate changes, subjective anxiety scores).

4.3 Experimental Process

(1) Pre-test phase (week 1)

A standardized piano performance test is arranged uniformly to measure initial performance accuracy, fluency, heart rate and other psychological and physiological indicators.

The anxiety level before the performance is measured using the Self-Rating Anxiety Scale (SAS), and the subjective tension score (1-10 points) is recorded.

(2) Psychological adjustment training (weeks 2-4) (only for the experimental group)

Attention training: meditation, concentration exercises (such as recalling the score with eyes closed);

Relaxation training: deep breathing, progressive muscle relaxation,

Simulated stage rehearsal: multiple practice in a formal performance scene,

Psychological suggestion training: positive self-talk (such as "I can do it").

(3) Post-test phase (week 5)

Another piano performance test is arranged to measure performance accuracy, fluency, and psychological and physiological indicators;

The anxiety level and changes in self-confidence of the performers are recorded and compared

with the pre-test data.

4.4 Data Analysis

In this experiment, the effects of psychological adjustment training on the performance and psychological and physiological state of pianists are studied. In order to comprehensively evaluate the training effect, this paper selects several key indicators, including performance accuracy (measured by the error rate), rhythm stability (measured by rhythm error), and psychological and physiological state (assessed by heart rate, SAS score and subjective tension score).

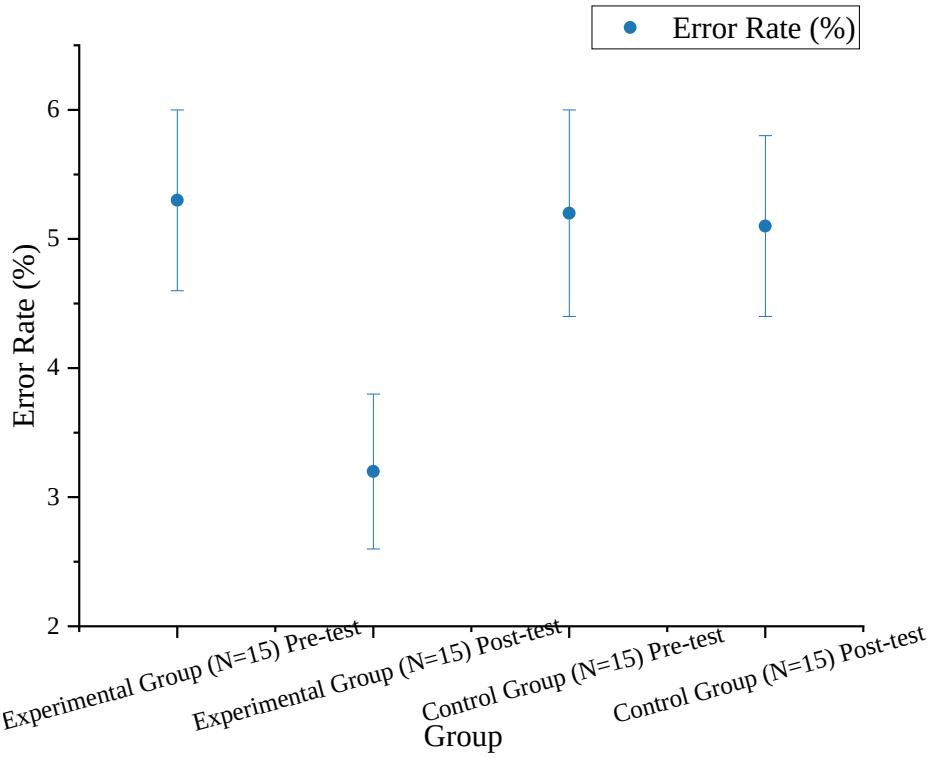

Figure 1. Error Rate Evaluation

The experimental data in Figure 1 show that in terms of error rate, the experimental group and the control group perform similarly in the pre-test (5.3% ± 0.7 in the experimental group and 5.2% ± 0.8 in the control group), indicating that the performance accuracy of the two groups of subjects is comparable before the experiment. However, after psychological adjustment training, the error rate of the experimental group drops significantly to 3.2% ± 0.6, a decrease of about 39.6%, indicating that psychological adjustment strategies (such as relaxation training, concentration training, simulated stage rehearsal, etc.) have a significant effect in improving performance accuracy. In contrast, the control group, which does not receive psychological adjustment training, had little change in the error rate, which only drops from 5.2% ± 0.8 to 5.1% ± 0.7, a decrease of only 1.9%, indicating that conventional practice has limited effect on improving the error rate. It can be seen that psychological adjustment training can effectively reduce mistakes in piano playing, improve the accuracy of performance, and make performers more stable in actual performances.

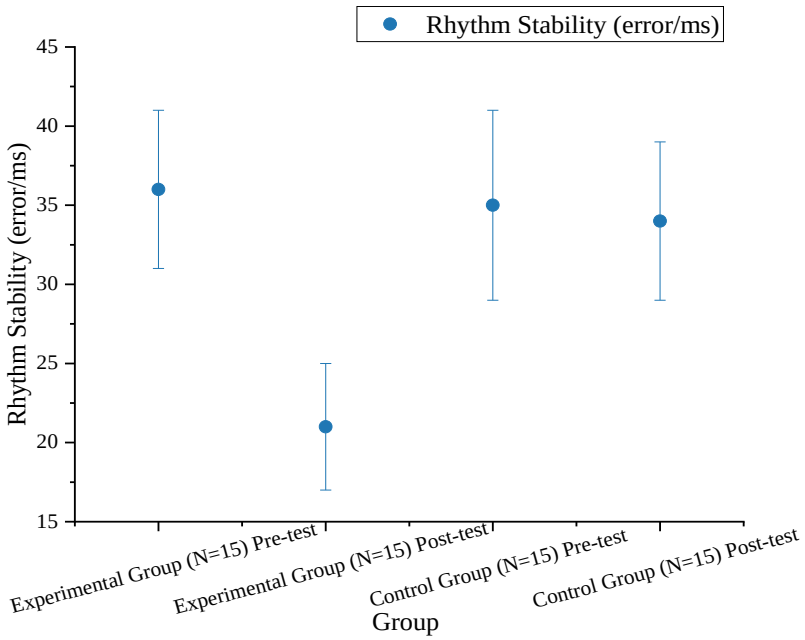

Figure 2. Rhythm stability (error/ms) comparison

After psychological adjustment training, the rhythm error of the experimental group drops significantly to 21 ± 4 ms, a decrease of about 41.7%, indicating that psychological adjustment strategies (such as attention training, rhythm perception reinforcement exercises, psychological suggestion, etc.) are helpful to improve rhythm control ability and make performance more stable. In contrast, the rhythm error of the control group only slightly decreased from 35 ± 6 ms to 34 ± 5 ms, a decrease of only 2.8%, with almost no significant improvement. The specific data is shown in Figure 2. This shows that without psychological adjustment training, conventional practice has limited effect on improving rhythm stability. In summary, the experimental results fully demonstrate that psychological adjustment training can effectively improve the pianist's ability to control rhythm, reduce rhythm deviations caused by tension or distraction during performance, and make the music presentation more fluent and accurate.

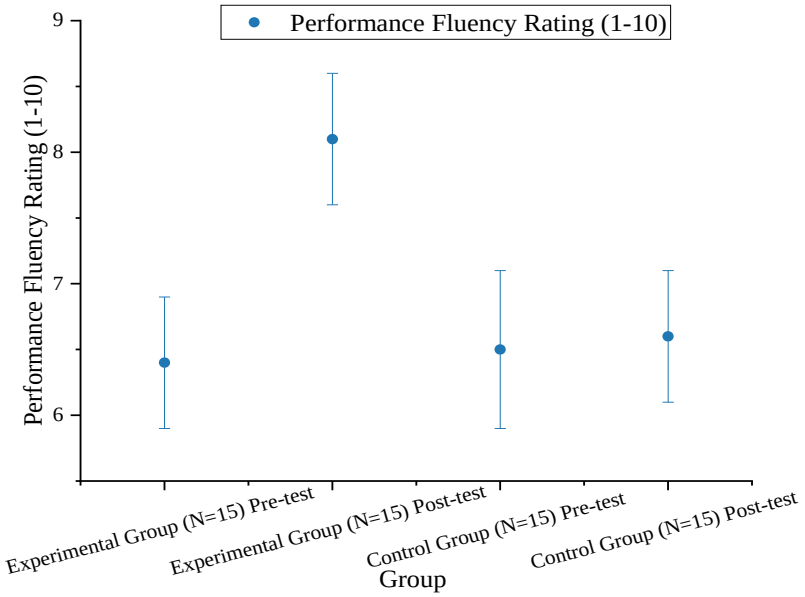

Figure 3. Performance Fluency Scores

In terms of the performance fluency scores in Figure 3, the experimental group and the control group perform similarly in the pre-test (6.4 ± 0.5 in the experimental group and 6.5 ± 0.6 in the control group), indicating that the performance fluency levels of the two groups of subjects are similar at the beginning of the experiment. However, after psychological adjustment training, the performance fluency score of the experimental group significantly increases to 8.1 ± 0.5, an increase of about 26.6%. This indicates that psychological adjustment strategies (such as relaxation training, deep breathing techniques, and psychological cues) can effectively improve the psychological adaptability of performers, making their performances more fluent and natural. In contrast, the performance fluency score of the control group remained almost unchanged, only slightly increasing from 6.5 ± 0.6 to 6.6 ± 0.5, an increase of only 1.5%, indicating that conventional practice has limited effect on improving performance fluency. Therefore, psychological adjustment training significantly improves the performance fluency of performers, making them more confident and relaxed in actual performances, thereby achieving higher quality musical expression.

In terms of psychological and physiological indicators (heart rate, SAS score, subjective tension score), the experimental group and the control group performed similarly in the pre-test, indicating that the subjects' psychological tension levels are basically the same before the experiment. However, after psychological adjustment training, all indicators of the experimental group improved significantly, as shown below:

Table 1. Heart rate, SAS score and subjective tension score

Group	Heart Rate (bpm)	Self-Rating Anxiety Scale (SAS Score)	Subjective Tension Score (1-10)
Experimental Group (N=15) Pre-test	96 ±3	56 ±4	7.6 ±0.6
Experimental Group (N=15) Post-test	85 ±4	43 ±5	4.5 ±0.7
Control Group (N=15) Pre-test	97 ±3	55 ±5	7.5 ±0.6
Control Group (N=15) Post-test	96 ±3	54 ±4	7.4 ±0.6

The following analysis can be drawn from the data in Table 1:

The heart rate of the experimental group decreased from 96 ±3 to 85 ±4, a decrease of about 11 bpm, a decrease of 11.5%, indicating that the psychological adjustment strategy can effectively help the performers relax and make them calmer during the performance. The heart rate of the control group remains almost unchanged (from 97 ±3 to 96 ±3), indicating that regular practice has little effect on the reduction of heart rate. The SAS score of the experimental group decreases from 56 ± 4 to 43 ±5, a decrease of 23.2%, reflecting a significant decrease in the anxiety level of the subjects. In contrast, the SAS score of the control group only decreases from 55 ±5 to 54 ±4, with almost no significant change. The tension score of the experimental group decreases from 7.6 ±0.6 to 4.5 ± 0.7, a decrease of 40.8%, indicating that the psychological adjustment training effectively improves the psychological adaptability of the performers, enabling them to better control their nervous emotions during the performance.

5. Conclusion

The influence of stage psychology on piano performance cannot be ignored. A good psychological adjustment strategy can help improve the quality and expressiveness of performance. Performers can effectively improve their psychological quality by building confidence, familiarizing themselves with the stage environment, maintaining concentration, and accumulating performance experience, making their piano performance more natural, confident, and contagious. At the same time, psychological activities in the process of music creation also directly affect the form of music expression. Understanding psychological factors is crucial for performers. This study

compares and analyzes the psychological and physiological indicators of the experimental group and the control group before and after the psychological adjustment training, including heart rate, anxiety level, subjective tension, and performance performance, and reached the following conclusions. Psychological adjustment training significantly reduces the anxiety level and subjective tension of the performers. After receiving psychological adjustment training, the heart rate, self-rating anxiety scale (SAS score), and subjective tension score of the experimental group all show significant improvements. Psychological adjustment training helps improve the accuracy and rhythm stability of performance. In summary, the application of psychological adjustment training in piano playing is of great significance. It can effectively relieve the anxiety of the performers, improve the accuracy and rhythm stability of the performance, and thus improve the overall performance. However, this study also has certain limitations. The research subjects are limited to piano players, and the sample size is small, so the generalizability of the results may be limited. This study mainly focuses on the short-term effects of psychological adjustment training on performance, and fails to explore the changes in long-term training effects. Therefore, future research can expand the sample size, cover more types of instrument players, and further examine the long-term effects of psychological adjustment training.

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