# Psychological Factors of Choking Under Pressure in Musical Performance

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## Introduction

### Background

- Psychological pressure often causes "**choking under pressure**"
  ⇒Deterioration of performance:
  (e.g. memory slip & motor errors)
- Previous studies have focused mostly on **sports**, such as …
  Factors of "choking under pressure" and their relationships [1]

### Purpose

- Our focus is on **musical performance**
  - **I. During Piano Performance**
    - Identify factors related to choking under pressure
    - Clarify factors related to performance degradation
  - **II.Personality characteristics**
    - Identify traits related to choking under pressure

## Method

### Data acquisition

- An online questionnaire survey
  - **Questionnaire items**
    - I. Experience of choking under pressure during piano performance (64 items)[1][2]
    - II. Personality characteristics (29 items)[1][3]
- Five Likert-type choices
- **Respondents**
  - 297 pianists (245 female)

### Data analysis

**I. During Piano Performance (64 items)**
- Exploratory factor analysis
- Covariance structure analysis

**II.Personality Characteristics (29 items)**
- Exploratory factor analysis
- *t* –test: Differences in characteristics based on tendency to choke under pressure

## Ⅰ. During Piano Performance

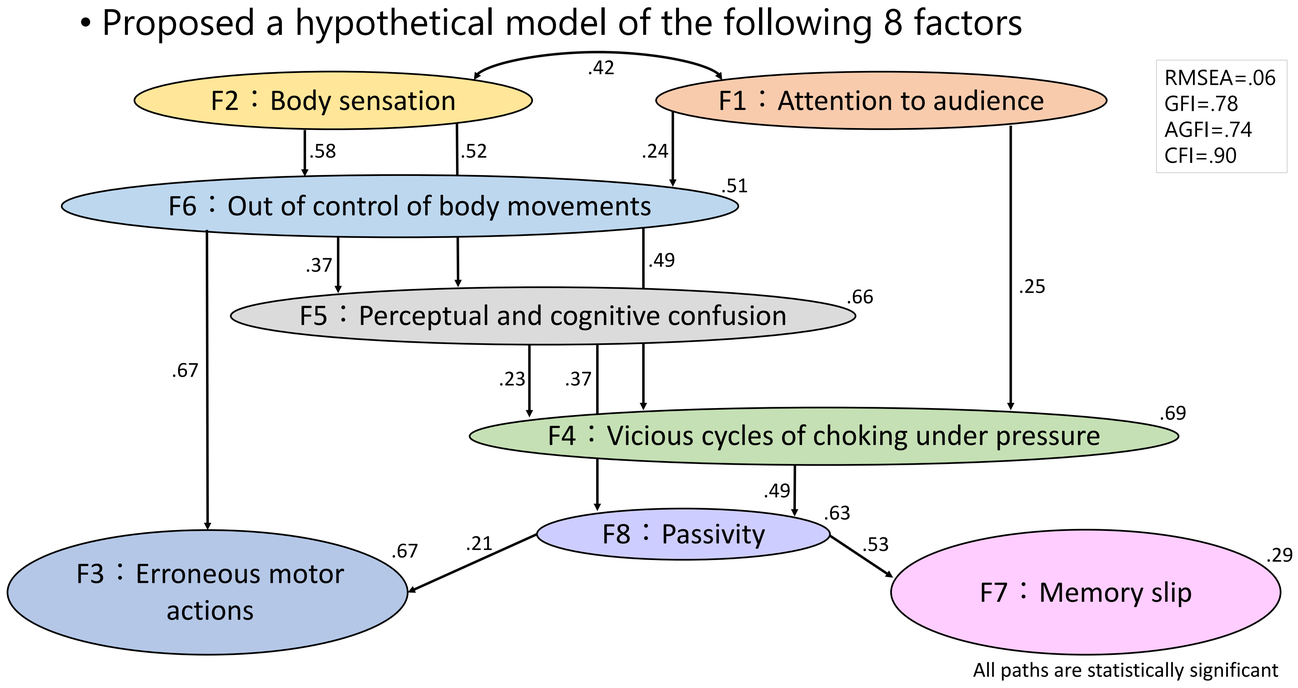
### Exploratory factor analysis

・Maximum likelihood method
・Promax rotation

| | Factors' name | Questionnaire items (Top 3 items) |
|---|---|---|
| F1 | Attention to audience | I was conscious of being evaluated by others |
| | | I was conscious of being in front of acquaintances |
| | | I was conscious of being in front of many people |
| F2 | Body sensation | My breathing was irregular and I felt short of breath |
| | | I felt a lump in my throat |
| | | I could not exert strength in my hands or feet |
| F3 | Erroneous motor actions | My performance did not lead to what I wanted to |
| | | I could not play as I wanted to |
| | | I was unable to perform correct movements / performance |
| F4 | Vicious cycles at choking under pressure | I tried to control myself, but it ended up accelerating choking under pressure |
| | | I tried to calm down, but I rushed rather than before |
| | | I could not move as I wanted to, which accelerated choking under pressure rather than before |
| F5 | Perceptual and cognitive confusion | I could not feel the weight of piano keys |
| | | I saw scenes differently from usual |
| | | I felt the hand like floating |
| F6 | Out of control of body movements | I felt rushed |
| | | I felt uneasy |
| | | My fingers and arms(body) became hard |
| F7 | Memory slip | I forgot musical scores |
| | | I could not remember what I remembered |
| F8 | Passivity | My performance was half-hearted |
| | | I played passively (failed to perform expressively) |
| | | Reaction to the unexpected thing was delayed during playing |

### Covariance structure analysis

- Proposed a hypothetical model of the following 8 factors




All paths are statistically significant

- **F1, F4 → F7**
  ⇒Supports processing efficiency hypothesis[4]
  - Lack of attention to self-motion causes performance degradation
- **F6 → F3**
  ⇒Body portions involved in the performance affect motor precision
  - Degradation of coordination between finger joints related to decline in performance[5]
- Different factors underlie different problems under pressure

## Ⅱ. Personality Characteristics

### Exploratory factor analysis

| | Factors' name | Questionnaire items (Top 3 items) |
|---|---|---|
| C1 | Neuroticism | I am anxious about many kinds of things easily |
| | | I am nervous |
| | | I tend to worry about less important things |
| C2 | Interpersonal positiveness | I cannot make new friends easily |
| | | I positively intreact with other |
| | | I act actively |
| C3 | Introversion | I have a quiet character |
| | | I have few words |
| | | I am lively characteristics |
| C4 | Public self-consciousness | I worry about rumors concerning myself |
| | | I act thinking about how other people will evaluate me |
| | | I am worry about being in front of people |
| C5 | Lack of confidence | I don't have enough confidence |
| | | I actively insist on my opinion |
| | | I have a positive personality |

### *t* -test

- Classified respondents into high and low groups based on 8 factors score
- Comparison of characteristics based on tendency to choke under pressure

| | | C1 Neuroticism | C2 Interpersonal positiveness | C3 Introversion | C4 Public self-consciousness | C5 Lack of confidence |
|---|---|---|---|---|---|---|
| F1 | Attention to audience | -4.83*** | 0.49 | -1.58 | -7.25*** | -6.75*** |
| F2 | Body sensation | -6.93*** | 0.45 | -1.04 | -5.29*** | -5.66*** |
| F3 | Erroneous motor actions | -5.47*** | 0.59 | -1.55 | -4.79*** | -7.41*** |
| F4 | Vicious cycles of choking under pressure | -5.54*** | -0.46 | -1.28 | -5.97*** | -6.78*** |
| F5 | Perceptual and cognitive confusion | -3.87*** | 1.08 | -3.39*** | -4.33*** | -4.37*** |
| F6 | Out of control of body movements | -7.07*** | 0.91 | -2.00* | -6.86*** | -8.19*** |
| F7 | Memory slip | -3.01** | 0.21 | -0.48 | -3.88*** | -2.73** |
| F8 | Passivity | -4.03*** | 0.09 | -1.25 | -4.61*** | -4.76*** |

*p<0.05 **p<0.01 ***p<0.001

- **C1, C4 and C5** → Related to choking under pressure
- **C2, C3** → Not related to choking under pressure
  - Identify a set of traits associated with choking under pressure

## Conclusion

### I. During piano performance

- 8 factors underlie choking under pressure
- Our model supports processing efficiency hypothesis
- Out of control of the body affects performance accuracy
- Our model may aid in preventing performance degradation by stage fright

### II. Personality characteristics

- C1, C4 and C5 are related to choking under pressure, but C2 and C3 is not

**Reference**

[1] T. Murayama and H. Sekiya. Factors related to choking under pressure in sports and the relationships among them. 2015.
[2] Y. Hirayama. Factor structure on the feature of stage fright experienced by music performers. 2016. (in Japanese)
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[4] J.D. Wine. Test anxiety and direction of attention. 1971. Psychol. Bull.
[5] S. Kotani and S. Furuya. State anxiety disorganizes finger movements during musical performance. 2018. J Neurophysiol.