

# Therapeutic Factors in the Group Singing Therapy by Social Robot for Patients with Schizophrenia: A Pilot Study

Yin-Huang Liao, M.Ed.<sup>1</sup>, Chia-Chun Wu, M.S.<sup>2,3</sup>, En-Lin Yang, M.A.<sup>4</sup>, Yi-Nuo Shih, Ph.D.<sup>2\*</sup>

<sup>1</sup>Department of Psychiatry, Cathay General Hospital, <sup>2</sup>Department of Occupational Therapy, College of Medicine, Fu Jen Catholic University, <sup>3</sup>Division of Psychiatry, Fu Jen Catholic University Hospital, <sup>4</sup>Department of Music, College of Arts, Fu Jen Catholic University, New Taipei City, Taiwan

## Abstract

**Objective:** Fewer robots are being used for psychological care, the objective of this pilot study was to explore the therapeutic factors in the group singing therapy by social robot to interact with people with schizophrenia. **Methods:** In this pilot study, we recruited nine subjects who were aged between 28 and 62 years. They received four sections of group singing therapy given by a social robot and an occupational therapist. Then, we collected a completed copy for therapeutic-factor questionnaire. **Results:** In this pilot study, the top three therapeutic factors in order were group cohesiveness, universality, and altruism. **Conclusion:** Social robot may be a good companion tool for chronic schizophrenia, and need to increase the number of subjects to improve the validity of the study results in the future.

**Key words:** music therapy, occupational therapy, singing group, group cohesiveness  
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## Introduction

Music-related interventions may play a significant rôle in the treatment of mental disorders [1]. In recent years, schizophrenia has become an issue for this common, chronic mental illness, deserving a research attention. Group therapeutic singing is one auxiliary intervening method that has been widely adopted on psychiatric wards. Studies found that music can influence a patient's physio-psychological condition. While music can effectively reduce negative symptoms, it is also low-cost and nonintrusive, and has few side effects [2].

Other studies found that therapeutic singing in a group provides a soothing effect, as music activity can help patients to improve their communication with others [1]. During this process, patients have enhanced their self-confidence, their self-expression, and the ability to communicate their emotions [2]. Music therapy benefits societal wellbeing of the mentally ill [3]. As an intervening form, music-therapy group comprises writing/editing lyrics, music grooving, listening to music and singing songs, among which, group singing is about the most commonly used [2, 3].

Yalom in 1975 [4] identified several decisive, clinical therapeutic factors in the effects of group therapy, the 12 most successful factors based on patient feedback from a group-therapy episode [2, 3, 5]. Those 12 therapeutic factors are altruism, group cohesiveness, universality, interpersonal learning, development of socializing techniques, imparting of information, catharsis, imitative behavior, corrective recapitulation of the primary family group, self-understanding, instillation of hope, and existential factors. All these factors are often used as performance indicators to assess the effectiveness of group therapy [2, 5].

In recent years, the use of robots still mainly involves physiological applications, such as surgical operations and post-stroke habilitation [6-8]. Many fewer robots are used for psychological care or companion care. One previous study was found that using social robot as companion can increase patient's sense of comfort, and that even brief, daily robotic

\*Corresponding author. No. 510, Chung Cheng Road, Hsinchuang, New Taipei City 24205, Taiwan.  
E-mail: Yi-Nuo Shih <062161@mail.fju.edu.tw>

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companionship can bring positive improvements to physical and mental health for patient with mental illness [9].

The above review of topics deserves further study. Due to the relatively small number of related research articles on this topic so far, the study of social robots for mental care certainly can use more developments [9]. In this pilot study, we intended to explore the therapeutic factors in the group singing therapy conducted by social robot to interact with patients with schizophrenia.

## Methods

### Study participants

We recruited nine participants in this pilot study. They were aged between 28 and 62 years, and were diagnosed with schizophrenia from a New Taipei City psychiatric rehabilitation homes.

The study was approved by the institutional review board of the Fu Jen Catholic University (IBB protocol number = C107174 and date of approval = February 18, 2020) with the stipulation of obtaining informed consents from study participants. All survey copies were collected anonymously. Written consent was collected immediately before the test, and participants were reminded that they can withdraw the participation in this study any time.

### Assessment tool for therapeutic factors

The therapeutic factor questionnaire in this study is taken from Chinese Association of Group Psychotherapy's therapeutic factors flashcards. As for the assessment method, we have followed the way that previous investigators had given tests, the highest score is 10 points, the lowest score is two points [2, 6].

### Social robot

One social robot is Zenbo® (ASUS Company, Taipei, Taiwan). It has the functions of playing songs and music, leading a singing along, and playing videos.

### Procedures

Group singing therapy conducted by social robot and an occupational therapist one time a week, 50–55 min each time, for four times totally. Each singing-group therapy session includes 5–10 min of warm-up activities conducted by an occupational therapist, 40 min of main singing group activities only by social robot named Zenbo®, and then five minutes of group sharing and discussion conducted by occupational therapist. At the fourth week, ask nine subjects to answer therapeutic-factor questionnaire.

## Results

As shown in Table 1, the top three therapeutic factors in order are (a) group cohesiveness (8.222), universality (7.889), and altruism (7.667). The lowest three therapeutic factors in order are (a) catharsis (6.444), (b) interpersonal learning (6.778), and (c) imparting of information (6.889).

**Table 1.** Therapeutic factors in the group singing therapy by social robot for patients with schizophrenia ( $n = 9$ )

Therapeutic factor	Mean $\pm$ SD	Order of frequency
Group cohesiveness	8.2 $\pm$ 1.9	1
Universality	7.9 $\pm$ 1.8	2
Altruism	7.7 $\pm$ 1.9	3
Existential factors	7.3 $\pm$ 2.6	4
Development of socializing techniques	7.3 $\pm$ 2.7	4
Corrective recapitulation of the primary family group	7.3 $\pm$ 3.0	4
Self-understanding	7.3 $\pm$ 2.8	4
Imitative behavior	7.2 $\pm$ 2.3	8
Instillation of hope	7.2 $\pm$ 2.3	8
Imparting of information	6.9 $\pm$ 2.7	10
Interpersonal learning	6.8 $\pm$ 2.9	11
Catharsis	6.4 $\pm$ 3.2	12

SD, standard deviation

## Discussion

Social robot may be a good companion tool for mental health when medical manpower is scarce. The many symptoms of schizophrenia can be stabilized and alleviated by giving medications. But studies were found that even patients with schizophrenia who take medicine regularly, still face many problems with living and social adjustment. In addition, besides medication treatment, patients with chronic schizophrenia also have to consider psychosocial adjustment while trying to reintegrate into society. Accordingly, practitioners have introduced and applied to patients many methods not based on medication, such as group therapy [2, 5].

The group cohesiveness, universality and altruism are important therapeutic factors about psychosocial adjustment, and those three therapeutic factors are higher than others in this pilot study about group singing therapy by social robot to interact with patients with schizophrenia. As shown in Table 1, catharsis was the lowest among the choices of therapeutic factors, suggesting that it is still difficult for robots to replace real human therapists to make patients with schizophrenia willing to share their thoughts and feelings.

### Study limitations

The readers are warned not to over-interpret the study results about social robot for musical group therapy here because this pilot study has four study limitations:

- This pilot study has small sample with only nine participants with schizophrenia.
- We used only group singing as therapy intervention. The results of this study might not applicable to other types of group therapy.
- For social robot, we used only Zenbo® Other types of social robot may produce different conclusions.
- This pilot study had only post-test in therapeutic factor questionnaire rated through patient's self-report, no other assessment tools were used to assess efficacy.

Due to those three study limitations in this pilot study, we suggest that we need to increase the number of study participants to strengthen the validity of the study results, and to explore the therapeutic factors in other groups by social robot, such as health education group, in the future. Finally, we need to consider using some copies of more sophisticated questionnaire with numerical conclusion from statistical analysis.

### Summary

Social robot may be a good companion tool for patients with chronic schizophrenia. We need to increase the number of subjects to improve the validity of the study results, and to do pre-test and post-test measurements to show the efficacy of treatment by participating the group therapy in the future.

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### Conflicts of Interest

The authors declare no potential conflicts of interest in writing this report.

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