

Group Piano Training Enhances Cognition and Psychosocial Function in Adults Undergoing Cancer Treatment

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Abstract

Music training interventions administered in a group format are efficacious at improving quality of life in adults; however, few studies examine the effects of active music training programs on quality of life and cognition in patients undergoing cancer treatment. Based upon Bandura's Social Learning Theory (1977), we hypothesized that group piano training would be more beneficial than individual piano training to mood and quality of life which contribute to cognition. Participants were randomly assigned to a 9-week group or individual piano program. Measures of memory, cognitive speed, inhibitory control, and psychosocial well-being were administered pre- and post-training. Participants completed a follow-up interview to examine program perceptions. Results of a paired-samples t-test showed a significant difference in QLS scores ($p=.02$) with enhanced performance for those enrolled in group piano training. We also observed reduced depressive symptoms as reported on the BDI. Participants in group piano training demonstrated enhanced response inhibition on the Flanker task suggesting enhanced higher inhibition/attention. Interview data revealed that all participants perceived improvements in physical, emotional, and mental well-being. The results suggest that piano training, especially in a group setting, may be therapeutic for patients undergoing treatment for cancer.

Introduction

Symptom burden and quality of life vary among cancer patients with common complaints ranging from cognitive symptoms such as depression and brain fog to physical symptoms such as fatigue, pain, and nausea. Music can play a powerful, non-invasive and non-pharmaceutical effect in alleviating some of these symptoms. According to Social Support Theory, support influences the disease coping process by moderating stress and forming healthy treatment practices. Our study aims to further explore the benefits of group music training on cognitive and psychosocial outcomes in adult cancer patients.

Methods

Adults (N=13) undergoing treatment for a cancer diagnosis were recruited from Moffitt Cancer Center. Participants were randomly assigned to a group or individual piano program. All participants completed measures of cognition and quality of life at pre and post-testing time-points as well as a semi-structured interview to evaluate feasibility and acceptability of the intervention.

Piano Training Program: Participants attended nine weekly, progressively difficult 60-minute lessons that included basic piano repertoire, music theory, and technical exercises (e.g., scales, chord progressions). All lessons were taught using a manualized program, *Keys to Staying Sharp* (Bugos, 2018) that included repertoire from the Alfred Basic Adult All in One Method Level 1, intended for use with adults with little to no previous experience in music.

Measures

Quality of Life of Cancer Patients (Sprangers et al., 1993) is a 30-item self report questionnaire about difficulty with activities of daily living, health/symptoms, and well being.

Beck Depression Inventory II (Beck, Steer, & Brown, 1996) is a 21-item multiple-choice test that measured symptoms of depression.

NIH Toolbox Flanker Task (Eriksen & Eriksen, 1974) is a measure of inhibitory control and attention in a computerized arrow selection task.

Quantitative Results

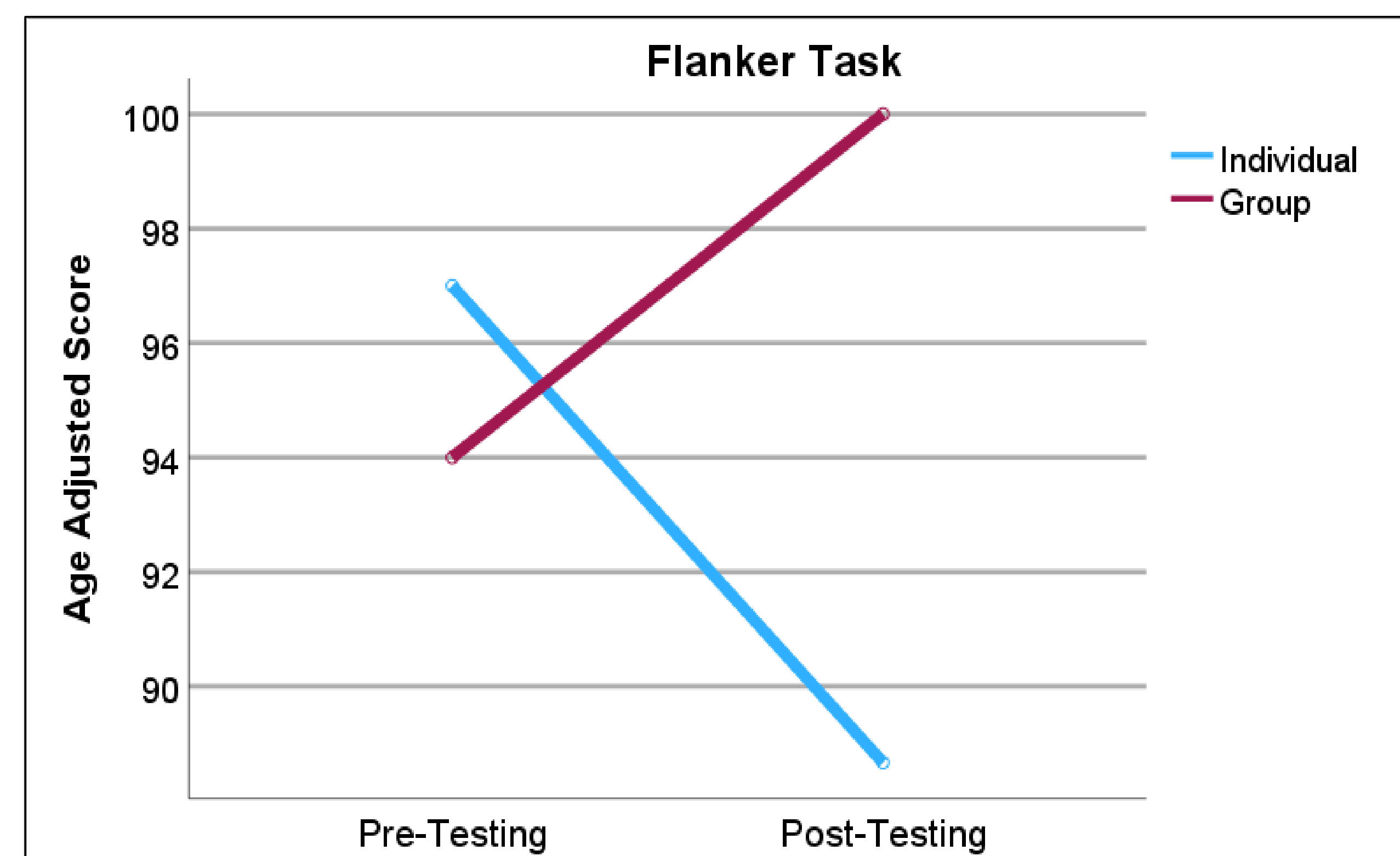


Table 1. *Quality of Life Scale*

Individual Mean		Group Mean	
Pre-Test	Post-Test	Pre-Test	Post-Test
1.82 ± 0.13	1.71 ± 0.08	2.06 ± 0.40	1.73 ± 0.20
Mean Difference: 0.11 ($p=0.30$)		Mean Difference: 0.33 ($p=0.0498$)	
Mean Difference: 0.24 ($p=0.022$)			

Table 2. *Beck Depression Inventory II*

Individual Mean		Group Mean	
Pre-Test	Post-Test	Pre-Test	Post-Test
9.5 ± 6.45	6.75 ± 5.12	8 ± 6.32	4.25 ± 3.10
Mean Difference: -2.75		Mean Difference: -3.75	

Qualitative Results

Interview Themes

- An overall beneficial long-term effect on mood, better mental state and sense of accomplishment/fulfillment
- Positive experience, a little challenging but at an appropriate level
- Most participants performed for family
- Some report better posture and overall well-being
- Radiation and surgery were the most common treatments

Interview Quotes

- "I really am in a different world. And it does take me away from all the troubles and stress I'm going through and pain..."
- "I really felt...accomplished, emboldened, I felt proud of myself emotionally... I was satisfied."
- "Because mentally I felt better, physically I felt better."
- "I feel like I made a connection with people for the rest of my life."
- "I would say that the biggest benefit for me...was my mood...it just made me feel happy."

Conclusions

Our data showed an increase in the quality of life and reduced symptoms of depression for participants enrolled in individual and group piano training. Those in the group piano training saw a greater improvement, with a mean difference of 0.33 ($p=0.0498$) for QLQ C30 and 3.75 for BD II. Data on the Flanker Task indicated that those in the group training program exhibited significantly improved inhibition when compared to those enrolled in individual lessons. Interview data further support this, as most participants self-reported an increase in mental and emotional status. The sense of satisfaction gained from successfully completing a challenging piece had positive effects on self-efficacy and happiness. Some participants reported that piano was a form of stress relief, helping distract them from their treatment and struggles. These factors contribute to the long-term mood benefits found for most participants. Quantitative and qualitative findings suggest that piano lessons improve quality of life in patients with cancer, primarily through emotional enhancement. This may alleviate negative stress associated with radiation and surgical treatments.

Acknowledgments

We wish to acknowledge the following individuals for recruitment and testing assistance: Melissa Mallory, Jessica Browning Hoang Ngo, and Madison Rivera. We would like to thank the National Endowment for the Arts (NEA) for their generous support.

