

The Effects of Attention Focus Balance Training on Conscious Movement Processing in Older Adults at Risk of Falling

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INTRODUCTION

- **Reinvestment (conscious movement processing)** is defined as the attempt to consciously perform movement skills through an internal focus of attention with the explicit knowledge of how the skill is performed (Masters, 1992; Masters & Maxwell, 2008).
- Older adults with a history of falling are suggested to have a higher trait propensity for conscious movement processing (i.e., reinvestment), compared to those without a history of falling (Wong et al., 2008, 2009).
- Conscious movement processing could affect movement automaticity (Masters et al., 1993, 2005), for example keeping standing balance, which could cause older adult falls.
- There is no published research investigated whether interventions of different attention focus balance training methods could ameliorate the propensity for conscious movement processing by older adults during rehabilitation. This pilot study represents the first attempt

OBJECTIVE

- **To examine the effect of external, internal, and no specific attention focus balance training during rehabilitation in older adults at risk of falling on their real-time (state) conscious movement processing propensity.**

METHOD

Participants

- Twenty-four older adults (mean age = 79.92±7.61) with moderate to high risk of falling participated in the pilot study and were reviewed in this preliminary analysis.
- Participants were randomly assigned to participate either in a **No Specific Attention Focus Balance Training Group (NBTG, n = 8)**, an **External Attention Focus Balance Training Group (EBTG, n = 8)**, or an **Internal Attention Focus Balance Training Group (IBTG, n = 8)**.

Procedure

- Participants in different groups participated in **twelve tailor-made training sessions (about 45 minutes) with different attention focus instructions during standing balance training.**
- In each training session, all groups will have, for instance, warm-up, flexibility training, strengthening training, walking training, body transport training with and without hand manipulation, **standing balance training with various levels of difficulties on a balance pad with different instructions in different balance training groups (20 minutes)**, and cool down.
- **Assessment sessions were completed before training at baseline (T0) and just after the completion of all training sessions (T1).**

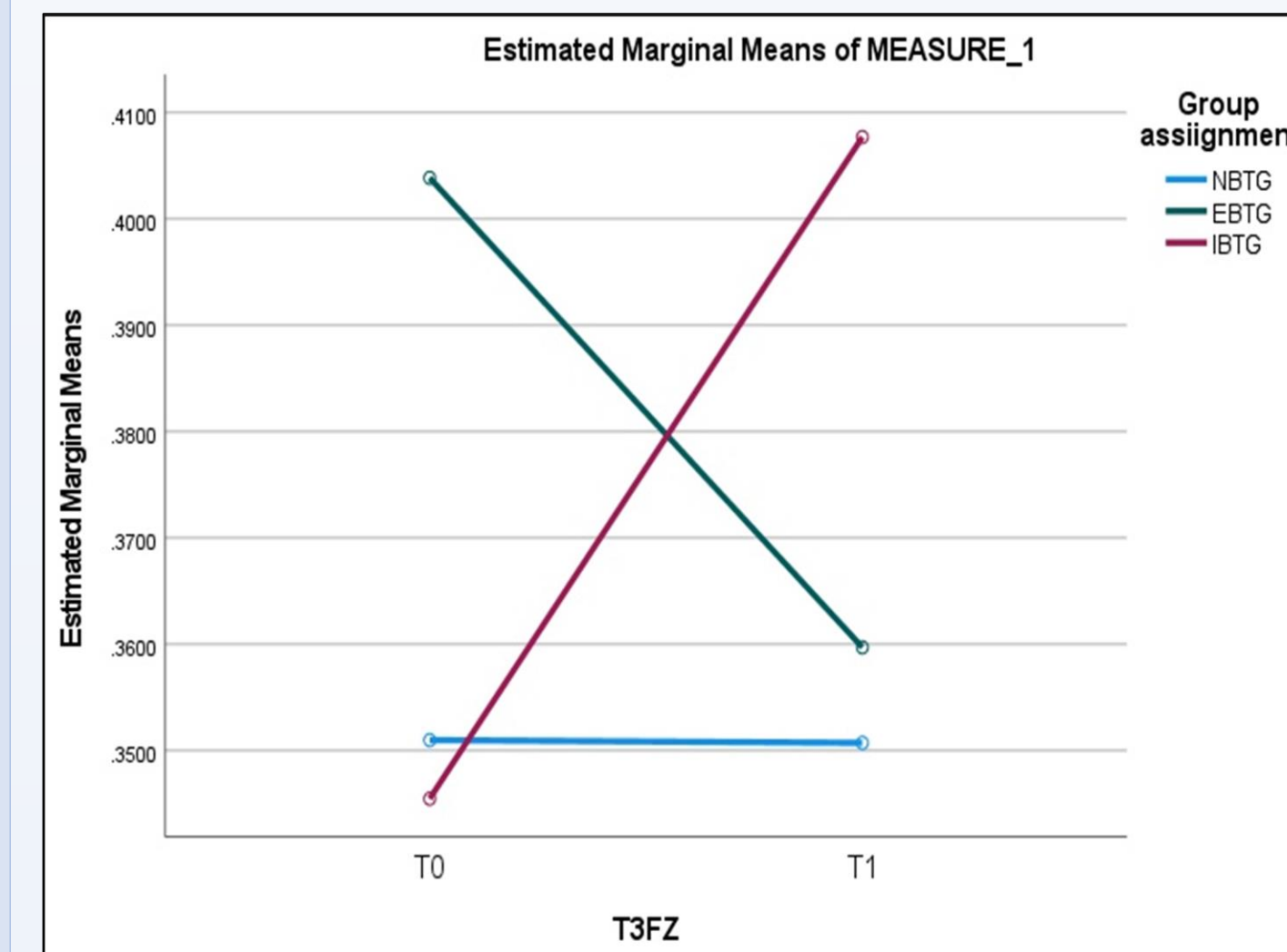
Outcome measure

- The primary outcome measure of the **real-time (state) conscious movement processing propensity during standing (Electroencephalography (EEG) T3-Fz coherence)** was evaluated in this preliminary analysis.
- A 3 (Group: NBTG, EBTG, IBTG) x 2 (Time: T0, T1) **mixed analysis of variance (ANOVA)** was conducted to examine the between-group differences (Group [NBTG, EBTG, & IBTG]), within-group differences (Time [T0, T1]), and the interaction effects (Group x Time).

RESULTS

Preliminary Data Analysis (EEG T3-Fz coherence during standing):

- **Main effects of:**
 - Group x Time interaction ($F(2, 21) = 1.044, p = 0.37, \eta_p^2 = 0.09$).
 - Group ($F(2, 21) = 0.223, p = 0.802, \eta_p^2 = 0.021$).
 - Time ($F(1, 21) = 0.039, p = 0.846, \eta_p^2 = 0.002$).



- **No statistically significant findings can be found in the preliminary analysis of this pilot study.**
- **However, trends can be observed for the potential training effects of the EBTG, IBTG, and NBTG.**

DISCUSSION

- Although no statistically significant findings could be revealed in this preliminary analysis for the primary outcome measure of the real-time (state) conscious movement processing propensity during standing (EEG T3-Fz coherence), **participants in the EBTG demonstrated a decreasing trend in the real-time (state) conscious movement processing propensity during standing (EEG T3-Fz coherence) after the external attention focus balance training.**
- **However, the trend was not observed in the NBTG and the IBTG after their groups' balance training.**
- **A large scale study is needed** to further investigate the potential beneficial effects of the external attention focus balance training in ameliorating the real-time (state) conscious movement processing propensity while keeping standing balance in at-risk older adults.

REFERENCES

- Chiu, H. F. K., Lee, H. C., Chung, W. S., & Kwong, P. K. (1994). Reliability and validity of the Cantonese version of mini-mental state examination—A preliminary study. *Journal of Hong Kong College of Psychiatrists*, 4(Suppl. 2), 25–28.
- Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, 12(3), 189–198.
- Masters, R. S. W. (1992). Knowledge, knerves and know-how: The role of explicit versus implicit knowledge in the breakdown of a complex motor skill under pressure. *British Journal of Psychology*, 83(3), 343–358.
- Masters, R.S.W., Eves, F.F., & Maxwell, J. (2005). *Development of a Movement Specific Reinvestment Scale*. ISSP 11th World Congress of Sport Psychology, Sydney, Australia.
- Masters, R. S. W., & Maxwell, J. (2008). The theory of reinvestment. *International Review of Sport and Exercise Psychology*, 1(2), 160–183.
- Masters, R.S.W, Polman, R.C.J., & Hammond, N.V. (1993). 'Reinvestment': A dimension of personality implicated in skill breakdown under pressure. *Personality and Individual Differences*, 14, 655-666.
- Tinetti, M.E. (1986). Performance-Oriented assessment of mobility problems in elderly patients. *Journal of the American Geriatric Society*, 34, 119-126.
- Wong, W. L., Masters, R., Maxwell, J., & Abernethy, B. (2008). Reinvestment and falls in community-dwelling older adults. *Neurorehabilitation and Neural Repair*, 22(4), 410–414.
- Wong, W. L., Masters, R. S. W., Maxwell, J. P., & Abernethy, B. (2009). The role of reinvestment in walking and falling in community-dwelling older adults. *Journal of the American Geriatrics Society*, 57(5), 920–922.

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