Improving Fluid Intelligence – Single N-back Is As Effective As Dual N-back

Barbara E. Studer 1, Susanne M. Jaeggi2, Martin Buschkuehl2, Yi-Fen Su3, John Jonides2, Walter J. Perrig1
1Department of Psychology, University of Bern, Switzerland
2Department of Psychology, University of Michigan, USA
3Department of Educational Psychology and Counseling, National Taiwan Normal University, Taipei, Taiwan

Far Transfer Effects

- Far Transfer Tasks – Matrix Reasoning Tasks (Gf)
  - Raven’s Advanced Progressive Matrices (APM; Raven, 1990)
  - Bochumer Matrizentest (BOMAT; Hossiep, Turck, & Hasella, 1999)

Discussion

Both intervention groups were able to transfer their n-back training performance to material with which they had been unfamiliar (random shapes). Thus, the intervention had an effect on some general underlying processes involved in n-back performance, rather than just building up a very task- and stimulus-specific skill.

Far transfer effects were observed in both matrices tasks after training. This replicates our prior results, but it also extends our findings by showing that the transfer effect was present in more than just one Gf-task, and that it was obtained by training on a single n-back task as well.

Near Transfer Effects

- Single and dual baseline n-back task (non-adaptive, 2-, 3-, and 4-back levels; for the single task, we used random shapes as stimuli which we used before; Jaeggi et al., 2003).

Intervention x session interactions:
- Single task: F(2,82)=15.74; p<.001;
- Dual task: F(2,80)=66.52; p<.001.

Results

Specific Training Effects

Both training groups improved their performance. Furthermore, there was a qualitative training difference between the two groups (session x group interaction (F(19,836)=2.86; p<.001), indicating that the single-task group improved more than the dual-task group (F(30.10)=2.51; p<.05).

Intervention x session interactions:
- Single task: F(2,82)=5.03; p<.01;
- Dual task: F(2,82)=3.45; p<.05.

Note: *p<.05; **p<.01; ***p<.001

Method

Participants

89 undergraduate students; recruited at the National Taiwan Normal University (mean age =19.4 years; SD=1.5)

Control group: 43 (41 women)
Experimental group: 46 (35 women)

The experimental group was divided into 2 groups; matched on age, gender and pre-test performance in criterion measures:
- Dual n-back group: 21 (17 women)
- Single n-back group: 25 (18 women)

Training Tasks

- Dual n-back task: Adaptive version as used in previous study (Jaeggi et al., 2008) but with 8 syllables of the Mandarin phonetic system for the auditory part instead of letters from the Latin alphabet.
- Single n-back task: Adaptive visuospatial version of the n-back task. Participants trained 5 times a week for a period of 4 weeks (15 rounds per session; i.e. 15-20 minutes).

Near Transfer Tasks

- Single and dual baseline n-back task (non-adaptive, 2-, 3-, and 4-back levels; for the single task, we used random shapes as stimuli which we used before; Jaeggi et al., 2003).

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Correspondence: sjaeggi@umich.edu