

[Look Up Full Text](#)
[Find PDF](#)
[Full Text Options](#)
[Export...](#)
[Add to Marked List](#)

Efficacy of a newly developed auditory-cognitive training system on speech recognition, central auditory processing and cognitive ability among older adults with normal cognition and with neurocognitive impairment

By: [Yusof, Y](#) (Yusof, Yusmeera)^[1,2]; [Mukari, SZMS](#) (Mukari, Siti Zamratol-Mai Sarah)^[3]; [Dzulkifli, MA](#) (Dzulkifli, Mariam Adawiah)^[4]; [Chellapan, K](#) (Chellapan, Kalaivani)^[5]; [Ahmad, K](#) (Ahmad, Kartini)^[2]; [Ishak, I](#) (Ishak, Ismarulyusda)^[2]; [Maamor, N](#) (Maamor, Nashrah)^[2]; [Ishak, WS](#) (Ishak, Wan Syafira)^[2]

GERIATRICS & GERONTOLOGY INTERNATIONAL

Volume: 19 Issue: 8 Pages: 768-773

DOI: 10.1111/ggi.13710

Published: AUG 2019

Document Type: Article

[View Journal Impact](#)

Abstract

Aim To evaluate the efficacy of a newly developed auditory-cognitive training system on speech recognition, central auditory processing and cognition among older adults with normal cognition (NC) and with neurocognitive impairment (NCI). Methods A double-blind quasi-experiment was carried out on NC (n = 43) and NCI (n = 33) groups. Participants in each group were randomly assigned into treatment and control programs groups. The treatment group underwent auditory-cognitive training, whereas the control group was assigned to watch documentary videos, three times per week, for 8 consecutive weeks. Study outcomes that included Montreal Cognitive Assessment, Malay Hearing in Noise Test, Dichotic Digit Test, Gaps in Noise Test and Pitch Pattern Sequence Test were measured at 4-week intervals at baseline, and weeks 4, 8 and 12. Results Mixed design anova showed significant training effects in total Montreal Cognitive Assessment and Dichotic Digit Test in both groups, NC (P < 0.001) and NCI (P < 0.01). The NC group also showed significant training effects in the Malay Hearing in Noise Test (quiet) (P < 0.01), Gaps in Noise Test (P < 0.001) and Pitch Pattern Sequence Test (humming) (P < 0.05). All training effects were sustained up to 4 weeks after the training ended. Conclusions The present study suggests that the newly developed auditory-cognitive training system has the potential to improve general cognition and some of the auditory processing abilities in both the NC and NCI groups. Because of the short test-retest intervals used in the present study, it is possible that the training effects were influenced by learning effect and, therefore, should be considered cautiously. Geriatr Gerontol Int 2019; 19: 768-773.

Keywords

Author Keywords: [auditory processing](#); [auditory-cognitive training](#); [cognition](#); [elderly](#); [speech recognition](#)

KeyWords Plus: [WORKING-MEMORY](#); [HEARING-LOSS](#); [AGE](#); [ENHANCEMENT](#); [MECHANISMS](#); [LANGUAGE](#); [RECALL](#); [MOCA](#)

Author Information

Reprint Address: Mukari, SZMS (reprint author)

+ Natl Univ Malaysia, Inst Ear Hearing & Speech, Kuala Lumpur, Malaysia.

Addresses:

- + [1] Minist Hlth, Putrajaya, Malaysia
- + [2] Natl Univ Malaysia, Fac Hlth Sci, Kuala Lumpur, Malaysia
- + [3] Natl Univ Malaysia, Inst Ear Hearing & Speech, Kuala Lumpur, Malaysia
- + [4] Int Islamic Univ Malaysia, Kuala Lumpur, Malaysia
- + [5] Natl Univ Malaysia, Fac Engrn & Built Environm, Kuala Lumpur, Malaysia

E-mail Addresses: zamratol@ukm.edu.my

Funding

Funding Agency	Grant Number
Malaysian Ministry of Education	LRGS/BU/2012/UKM-UKM/K/02

Publisher

WILEY, 111 RIVER ST, HOBOKEN 07030-5774, NJ USA

Journal Information

Impact Factor: [Journal Citation Reports](#)

Categories / Classification

Research Areas: Geriatrics & Gerontology

Web of Science Categories: Geriatrics & Gerontology; Gerontology

[See more data fields](#)

Citation Network

In Web of Science Core Collection

0

Times Cited

[Create Citation Alert](#)

29

Cited References

[View Related Records](#)

Use in Web of Science

Web of Science Usage Count

2

2

Last 180 Days

Since 2013

[Learn more](#)

This record is from:

- Web of Science Core Collection
- Science Citation Index Expanded
- Social Sciences Citation Index

Suggest a correction

If you would like to improve the quality of the data in this record, please suggest a correction.

Cited References: 29

Showing 29 of 29 [View All in Cited References page](#)

(from Web of Science Core Collection)

1. [A dynamic auditory-cognitive system supports speech-in-noise perception in older adults](#) Times Cited: 94
By: Anderson, Samira; White-Schwoch, Travis; Parbery-Clark, Alexandra; et al.
HEARING RESEARCH Volume: 300 Pages: 18-32 Published: JUN 2013
2. [Working memory and language: an overview](#) Times Cited: 830
By: Baddeley, A
JOURNAL OF COMMUNICATION DISORDERS Volume: 36 Issue: 3 Pages: 189-208 Published: MAY-JUN 2003
3. Title: [not available] Times Cited: 1
By: Baldwin, CL.
Auditory Cognition and Human Performance: Research and Applications Published: 2012
Publisher: Taylor & Francis, Boca Raton, FL
4. [The Effect of Associative Memory Exercises in Older Adults](#) Times Cited: 2
By: Campuzano, Mari T. Garcia; Shams, Ehsan; Virues, Javier; et al.
WORLD CONFERENCE ON PSYCHOLOGY AND SOCIOLOGY 2012 Book Series: Procedia Social and Behavioral Sciences Volume: 82 Pages: 707-712 Published: 2013
5. Title: [not available] Times Cited: 6
By: Cavanaugh, JC; Blanchard-Fields, F.
Adult Development and Aging Published: 2015
Publisher: Cengage Learning, Stamford, Connecticut
6. [Speech understanding and aging](#) Times Cited: 164
Group Author(s): CHABA
Journal of Acoustical Society of America Volume: 83 Pages: 859-895 Published: 1988
7. [The impact of cognitive training and mental stimulation on cognitive and everyday functioning of healthy older adults: A systematic review and meta-analysis](#) Times Cited: 159
By: Kelly, Michelle E.; Loughrey, David; Lawlor, Brian A.; et al.
AGEING RESEARCH REVIEWS Volume: 15 Pages: 28-43 Published: MAY 2014
8. [Computerized Cognitive Training with Older Adults: A Systematic Review](#) Times Cited: 234
By: Kueider, Alexandra M.; Parisi, Jeanine M.; Gross, Alden L.; et al.
PLOS ONE Volume: 7 Issue: 7 Article Number: e40588 Published: JUL 11 2012
9. [Memory enhancement in healthy older adults using a brain plasticity-based training program: A randomized, controlled study](#) Times Cited: 359
By: Mahncke, Henry W.; Connor, Bonnie B.; Appelman, Jed; et al.
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA Volume: 103 Issue: 33 Pages: 12523-12528 Published: AUG 15 2006
10. [Projections of global mortality and burden of disease from 2002 to 2030](#) Times Cited: 5,290
By: Mathers, Colin D.; Loncar, Dejan
PLOS MEDICINE Volume: 3 Issue: 11 Article Number: e442 Published: NOV 2006
11. [The role of covert retrieval in working memory span tasks: Evidence from delayed recall tests](#) Times Cited: 73
By: McCabe, David P.
JOURNAL OF MEMORY AND LANGUAGE Volume: 58 Issue: 2 Pages: 480-494 Published: FEB 2008
12. [Comparable mechanisms of working memory interference by auditory and visual motion in youth and aging](#) Times Cited: 6
By: Mishra, Jyoti; Zanto, Theodore; Nilakantan, Aneeha; et al.
NEUROPSYCHOLOGIA Volume: 51 Issue: 10 Pages: 1896-1906 Published: AUG 2013
13. [Effects of Age and Working Memory Capacity on Pitch Pattern Sequence Test and Dichotic Listening](#) Times Cited: 9
By: Mukari, Siti Z.; Umat, C.; Othman, Nor I.
AUDIOLOGY AND NEURO-OTOLOGY Volume: 15 Issue: 5 Pages: 303-310 Published: 2010
14. [Development and standardization of single and double dichotic digit tests in the Malay language](#) Times Cited: 12
By: Mukari, Siti Z.; Keith, Robert W.; Tharpe, Anne M.; et al.
INTERNATIONAL JOURNAL OF AUDIOLOGY Volume: 45 Issue: 6 Pages: 344-352 Published: JUN 2006
15. [Relative contributions of auditory and cognitive functions on speech recognition in quiet and in noise among older adults.](#) Times Cited: 1
By: Mukari, Siti Zamratol Mai Sarah; Yusof, Yusmeera; Ishak, Wan Syafira; et al.
Brazilian journal of otorhinolaryngology Published: 2018-Dec-10 (Epub 2018 Dec 10)

16. **GIN (Gaps-In-Noise) test performance in subjects with confirmed central auditory nervous system involvement** Times Cited: 163
By: Musiek, FE; Shinn, JB; Jirsa, R; et al.
EAR AND HEARING Volume: 26 Issue: 6 Pages: 608-618 Published: DEC 2005
17. **The montreal cognitive assessment, MoCA: A brief screening tool for mild cognitive impairment** Times Cited: 6,098
By: Nasreddine, ZS; Phillips, NA; Bedirian, V; et al.
JOURNAL OF THE AMERICAN GERIATRICS SOCIETY Volume: 53 Issue: 4 Pages: 695-699 Published: APR 2005
18. Title: [not available] Times Cited: 1
By: Paas, F; Van, GT.
Principles for Designing Effective and Efficient Training of Complex Cognitive Skills Pages: 166-194 Published: 2016
Publisher: Human Factors and Ergonomics Society, Santa Monica, CA
19. **Speech Comprehension Training and Auditory and Cognitive Processing in Older Adults** Times Cited: 29
By: Pichora-Fuller, M. Kathleen; Levitt, Harry
AMERICAN JOURNAL OF AUDIOLOGY Volume: 21 Issue: 2 Pages: 351-357 Published: DEC 2012
20. **The Malay Hearing in Noise Test** Times Cited: 7
By: Quar, Tian Kar; Mukari, Siti Z. M. S.; Wahab, Noor Alaudin Abdul; et al.
INTERNATIONAL JOURNAL OF AUDIOLOGY Volume: 47 Issue: 6 Pages: 379-380 Published: 2008
21. **Is the Bahasa Malaysia version of the Montreal Cognitive Assessment (MoCA-BM) a better instrument than the Malay version of the Mini Mental State Examination (M-MMSE) in screening for mild cognitive impairment (MCI) in the elderly?** Times Cited: 17
By: Razali, Rosdinom; Jean-Li, Lim; Jaffar, Aida; et al.
COMPREHENSIVE PSYCHIATRY Volume: 55 Supplement: 1 Pages: S70-S75 Published: JAN 2014
22. **Effects of Senescent Changes in Audition and Cognition on Spoken Language Comprehension** Times Cited: 110
By: Schneider, Bruce A.; Pichora-Fuller, Kathy; Daneman, Meredyth
AGING AUDITORY SYSTEM Book Series: Springer Handbook of Auditory Research Volume: 34 Pages: 167-210 Published: 2010
23. **The need for and development of an adaptive Listening and Communication Enhancement (LACE (TM)) program** Times Cited: 106
By: Sweetow, Robert W.; Sabes, Jennifer Henderson
JOURNAL OF THE AMERICAN ACADEMY OF AUDIOLOGY Volume: 17 Issue: 8 Pages: 538-558 Published: SEP 2006
24. **Listening and communication enhancement (LACE)** Times Cited: 10
By: Sweetow, Robert W.; Sabes, Jennifer Henderson
Seminars in Hearing Volume: 28 Issue: 2 Pages: 133-141 Published: MAY 2007
25. **EFFECTS OF AGE, ACOUSTIC CHALLENGE, AND VERBAL WORKING MEMORY ON RECALL OF NARRATIVE SPEECH** Times Cited: 16
By: Ward, Caitlin M.; Rogers, Chad S.; Van Engen, Kristin J.; et al.
EXPERIMENTAL AGING RESEARCH Volume: 42 Issue: 1 Special Issue: SI Pages: 126-144 Published: JAN 1 2016
26. **Increases in the Rate of Age-Related Hearing Loss in the Older Old** Times Cited: 15
By: Wattamwar, Kapil; Qian, Z. Jason; Otter, Jenna; et al.
JAMA OTOLARYNGOLOGY-HEAD & NECK SURGERY Volume: 143 Issue: 1 Pages: 41-45 Published: JAN 2017
27. **A review of causal mechanisms underlying the link between age-related hearing loss and cognitive decline** Times Cited: 103
By: Wayne, Rachel V.; Johnsrude, Ingrid S.
AGEING RESEARCH REVIEWS Volume: 23 Pages: 154-166 Part: B Published: SEP 2015
28. **The effect of presentation level on the Gaps-In-Noise (GIN (c)) test** Times Cited: 19
By: Weihing, Jeffrey A.; Musiek, Frank E.; Shinn, Jennifer Brooke
JOURNAL OF THE AMERICAN ACADEMY OF AUDIOLOGY Volume: 18 Issue: 2 Pages: 141-150 Published: FEB 2007
29. **Dichotic Digit Test. Case Study** Times Cited: 3
By: Zenker Castro, Franz; Fernandez Belda, Rafael; Barajas de Prat, Jose Juan
ACTA OTORRINOLARINGOLOGICA ESPANOLA Volume: 59 Issue: 10 Pages: 503-505 Published: DEC 2008

Showing 29 of 29 [View All in Cited References page](#)