

Curriculum vitae

Dr Tatsuya Daikoku

Current Affiliation

Max Planck Institute for Human Cognitive and Brain Sciences

Department of Neuropsychology

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Main research focus

Music & language

Implicit & Explicit statistical learning

Computational neuroscience, Machine learning

Auditory-motor interaction

Magnetoencephalography (MEG), Electroencephalography (EEG),

Transcranial magnetic stimulation (TMS)

Career

Researching, Clinical, and Teaching

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| 12/2016 – | Postdoctoral researcher at Department of Neuropsychology,
Max Planck Institute for Human Cognitive and Brain Sciences |
| 5/2016 – 11/2016 | Postdoctoral researcher
at Department of Experimental psychology,
University of Oxford |
| 4/2016 – 3/2017 | Visiting researcher at Graduate School of Medicine,
The University of Tokyo |
| 4/2012 – 3/2016 | Research assistant at Graduate School of Medicine,
The University of Tokyo |

- 10/2013 – 3/2016** Visiting lecturer in Medicine at Department of pharmacy,
Nihon Pharmaceutical University
- 4/2013 – 3/2016** Visiting lecturer in Medicine
at Tokyo College of Medico-pharmaco Technology
- 4/2009 – 3/2012** Wakayama Orthopedics

Co-supervision of Ph.D, Master, and bachelor students

- 4/2019 –** Kaguya Iwasaki, Master degree: Department of Kansei,
Behavioral, and Brain Sciences,
Tsukuba University
- 8/2017 –** Vera Tsugli, Doctor degree: Department of Biological and
Medical Psychology, University of Bergen
- 4/2016 –** Tomoko Okano, Doctor degree: Department of Clinical
Laboratory, Graduate School of Medicine, The University of
Tokyo
- 4/2013 –** Bachelor degree: Making Moc exam of basic medicine in
national HIM license

Invited lecture

- 12/2018** Integrated methods of Neurophysiological and computational
analysis on statistical learning. Center for Information and
Neural Networks, Cognitive Developmental Robotics (Japan)
- 11/2018** Integration of Neurophysiological and Computational Models of
Statistical Learning in Musical and Language Creativity, Vrije
Universiteit Brussel, Artificial Intelligence Lab
- 10/2018** Neurophysiological & Computational Understanding
of Entropy/Uncertainty encoding. CNRS, GIPSA-lab,
Département Parole et Cognition (Grenoble, France)
- 8/2018** Brain in musicians. Ika-r International Music Camp 2018 (Japan)
- 5/2018** Integrated methods of Neurophysiological and computational
analysis on statistical learning. Nottingham University (United

	Kingdom)
10/2017	Neurophysiological marker of statistical learning. University of Bergen, Haukeland University Hospital (Norway)
10/2017	Corpus study in statistical learning of music. University of Bergen, Haukeland University Hospital (Norway)
11/2016	International University of Health and Welfare School of Health and Welfare
11/2015	International University of Health and Welfare, School of Health and Welfare
9/2015	Kokushikan University, School of Science and Engineering
2/2015	Kokushikan University, School of Science and Engineering
2/2015	International University of Health and Welfare, School of Health and Welfare

Committee

2019	Symposium organizer: “music perception” Japan Human Brain Mapping (HBM), 2019, Tokyo
2015 –	A steering committee: The 21 st science and human symposium
2014 –	In charge of mock exam in basic medicine (Educational support company)

Education

4/2012 – 3/2016	Department of Clinical Laboratory, Graduate School of Medicine, The University of Tokyo: Doctoral Program of Medicine (Ph.D in Medicine)
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Awards and Honours

2015	The best poster award: The 20th Annual Meeting of Japanese Society of Cognitive Neuroscience
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2014	Poster award: The 19th Annual Meeting of Japanese Society of Cognitive Neuroscience
2013	Young Investigator Award: The 18th Annual Meeting of Japanese Society of Cognitive Neuroscience
2017	The Japan Society for the Promotion of Science. Neurophysiological markers for audiovisual statistical learning of speech sequences in healthy and dyslexic humans: Contribution of lipreading to language acquisition.
2016	JASSO (Japan Student Services Organization). Exemption of refund of scholarships because of outstanding research achievement

Funding and Grant

3/2019	Neurophysiology of music perception Applicant: Dr Tatsuya Daikoku Funding by: Brain Science Foundation (invitation fellowships)
4/2018 – 3/2019	Music characteristics retrieval based on human's implicit learning Applicant: Dr Tatsuya Daikoku Funding by: Kakehashi Foundation
4/2018 – 3/2019	Understanding of history in western-classical music based on human's implicit learning: evolutionary process of musicality in brain Applicant: Dr Tatsuya Daikoku Funding by: Suntory Foundation
8/2017 – 3/2018	“Understanding hierarchical models that share machine learning in computer and statistical learning in humans” Applicant: Dr Tatsuya Daikoku Funding by: Nakayama Foundation for Human Science
4/2017 – 3/2018	“Psychological study on temporal perception in Western- and Japanese-cultural music.” Applicant: Dr Tatsuya Daikoku Funding by: Kawai Foundation for sound technology & music

- 4/2017 – 3/2018** “Neural study on interval-timing and rhythm perception: comparison among Japanese-cultural musician, Western-cultural musician, and non-musician”
Applicant: Dr Tatsuya Daikoku
Funding by: The Kao Foundation for Arts and Sciences
- 4/2017 – 3/2019** “Neurophysiological markers for audiovisual statistical learning of speech sequences in healthy and dyslexic humans: Contribution of lipreading to language acquisition.”
Applicant: Dr Tatsuya Daikoku
Funding by: The Japan Society for the Promotion of Science
- 4/2016 – 11/2016** “Imaging sensorimotor interactions using brain transcranial magnetic stimulation in combination with neuroimaging.”
Applicant: Dr Tatsuya Daikoku
Funding by: Nakatani Foundation

Publications

Book

- [1] Yumoto M, Daikoku T. IV Auditory system. 5 basic function. In Tobimatsu S & Kakigi R (Eds.). Clinical Applications of Magnetoencephalography. Springer (ISBN 4431557288).

Patents

- [1] Daikoku T. The technology of feature extraction in music information: in Japanese (JP: 2017-242127(PAT.P)).
- [2] Daikoku T. METHOD AND APPARATUS FOR ANALYZING CHARACTERISTICS OF MUSIC INFORMATION (US: 16104284(PAT.P))

Research papers

- [1] Daikoku T. Entropy, uncertainty, and the depth of implicit knowledge on musical creativity: Computational study of improvisation in melody and rhythm. Frontiers in Computational Neuroscience (2018), 12:97.

- [2] Daikoku T. Musical Creativity and Depth of Implicit Knowledge: Spectral and Temporal Individualities in Improvisation. *Frontiers in Computational Neuroscience* (2018). 12:89. doi: 10.3389/fncom.2018.00089
- [3] Daikoku T., Takahashi Y, Tarumoto M, Yasuda H. Motor reproduction of time interval depends on internal temporal cues in the brain: Sensorimotor imagery in rhythm. *Frontiers in Psychology* (2018), doi: 10.3389/fpsyg.2018.01873
- [4] Daikoku T. Neurophysiological marker of statistical learning in music and language: hierarchy, entropy, and uncertainty. *Brain Sciences* (**Invited review article**), *Brain Sci.* 8, 114 (2018).
- [5] Daikoku T. Time-course variation of statistics embedded in music: Corpus study on implicit learning and knowledge. *PLoS ONE* 13(5), e0196493(2018).
- [6] Daikoku T., Yumoto M. Single, but not dual, attention facilitates statistical learning of two concurrent auditory sequences. *Scientific Reports* 7, 10108 (2017).
- [7] Daikoku T., Takahashi Y, Tarumoto M, Yasuda H. Auditory Statistical Learning During Concurrent Physical Exercise and the Tolerance for Pitch, Tempo, and Rhythm Changes. *Motor Control*, doi.org/10.1123/mc.2017-0006.
- [8] Daikoku T., Takahashi Y, Futagami H, Tarumoto M, Yasuda H. Physical fitness modulates incidental but not intentional statistical learning of simultaneous auditory sequences during concurrent physical exercise. *Neurological Research* 30, 107-116 (2017).
- [9] Daikoku T., Yatomi Y, Yumoto M. Statistical learning of an auditory sequence and reorganization of acquired knowledge: A time course of word segmentation and ordering. *Neuropsychologia* 95 1-10 (2016).
- [10] Daikoku T., Yatomi Y, Yumoto M. Pitch-class distribution modulates statistical learning of atonal chord sequences. *Brain and Cognition* 108, 1-10 (2016).
- [11] Daikoku T., Yatomi Y, Yumoto M. Statistical learning of music- and language-like sequences and tolerance for spectral shifts. *Neurobiology of Learning and Memory* 118, 8-19 (2015).
- [12] Daikoku T., Yatomi Y, Yumoto M. Implicit and explicit statistical learning of tone sequences across spectral shifts. *Neuropsychologia* 63, 194-204 (2014).
- [13] Daikoku T., Ogura H, Watanabe M. The variation of hemodynamics relative to listening to consonance or dissonance during chord progression. *Neurological research* 34, 557-563 (2012).

- [14] Yumoto M, Daikoku T. Neurophysiological Studies on Auditory Statistical Learning (in Japanese). Japanese journal of cognitive neuroscience 20(1), 38-43, 2018.
- [15] Daikoku T, Yumoto M. The neurophysiological difference between implicit and explicit statistical learning. *Experimental Brain Research*, under review.
- [16] Daikoku T, Mottonen R. Motor contributions to cortical oscillations and predictive coding during speech perception . *Brain and Language*, under review.
- [17] Daikoku T, Takahashi Y, Tarumoto M, Yasuda H. Motor reproduction of time interval depends on internal temporal cues in the brain: Sensorimotor imagery in rhythm. *Acta Neuropsychologia*, under review.
- [18] Daikoku T, Yumoto M. Musical expertise facilitates statistical learning of rhythm with a beat: relationship between predictability and the hierarchy of probability distribution. *Journal of Neuroscience*, under review.
- [19] Daikoku T, Panouilleres M, Mottonen R. Cortical oscillations and predictive coding during audiovisual speech perceptions. (in preparation)
- [20] Okano T, Daikoku T, Yumoto M. Neurophysiological evaluation for difficulty of auditory statistical learning. (in preparation)
- [21] Daikoku T, Okano T, Yumoto M. A neurophysiological relationships between transition probabilities in auditory sequence and hierarchies of statistical learning. (in preparation)
- [22] Daikoku T. Implicit knowledge and creativity in musical improvisation: Corpus study. under review.
- [23] Daikoku T. Tonality and hierarchical implicit knowledge in music: Musical score analysis on statistical learning. *Psychomusicology*, under review.
- [24] Daikoku T. Musical creativity and the depth of statistical knowledge: Time-course variation of musical characteristics in a composer. *Music Education Research*, under review.
- [25] Daikoku T. The relationships between tonality and hierarchy of stochastic structure in music: Corpus study on depth of hierarchy in statistical learning. *Musicae Scientiae*, under review.
- [26] Daikoku T. Statistical knowledge and musical creativity: Statistical distribution in musical improvisation, *Journal of New Music Research*, under review.
- [27] Daikoku T. Relationships of statistical regularities between melody and bass line in music: Computational study on statistical learning and knowledge. *Music Perception*,

under review.

- [28] Daikoku T, Panouilleres M, Mottonen R. Cortical oscillations and predictive coding during auditory and audiovisual speech perceptions: a combined TMS and EEG study. Biomagnetic 2017, Sendai, 2017/5.
- [29] Daikoku T, Yatomi Y, Yumoto M. Effects of pitch-class recognition on statistical learning of atonal chord sequences. *31th Annual meeting of Japan Biomagnetism and Bioelectromagnetics Society*, P02-014, 2016.
- [30] Takahashi Y, Daikoku T, Futagami H, Tarumoto M, Yasuda H. Effects in exercise on statistical learning of auditory sequences. *21 science and human symposium 11(7)*, pp.7-8, 2016 (ISSN 1882-8957).
- [31] Daikoku T, Yatomi Y, Yumoto M. Statistical learning in language acquisition and the correction of acquired syntactic knowledge. *30th Annual meeting of Japan Biomagnetism and Bioelectromagnetics Society 28(1)*, 98-99, 2015.
- [32] Daikoku T, Yatomi Y, Yumoto M. Neuromagnetic responses accompanying statistical learning . *30th Annual meeting of Japan Biomagnetism and Bioelectromagnetics Society 28(1)*, 90-91, 2015.
- [33] Daikoku T, Yatomi Y, Yumoto M. Neuromagnetic responses during linguistic statistical learning and modification of acquired knowledge. Proceedings of the 2015 IEICE General Conference, *A-13-5*, 2015.
- [34] Daikoku T, Yatomi Y, Yumoto M. Statistical learning of linguistic and musical sequences and tolerance for spectral frequency shifts. *21 science and human symposium 10 (47)*, 2015 (ISSN 1882-8957).
- [35] Daikoku T, Yumoto M, Yatomi Y. Magnetoencephalographic study on statistical learning and relative learning of auditory sequences. *28th Annual meeting of Japan Biomagnetism and Bioelectromagnetics Society*, No.P2006, 2013.

Academic conference

- [1] Okano T, Daikoku T, Ugawa Y, Yumoto M. Neuromagnetic responses accompanying the difficulty of auditory statistical learning. The 22th Annual

Meeting of Japanese Society of Cognitive Neuroscience, Tokyo, 2017/7.

- [2] Daikoku T, Mottonen R. Articulatory motor cortex contributes to predictive coding during speech perception: a combined TMS and EEG study. Speech Motor Control Conference, Groningen, 2017/7.
- [3] Daikoku T, Okano T, Yumoto M. Relative difficulty of auditory statistical learning based on tone transition diversity modulates chunk length in the learning strategy. Biomagnetic 2017, Sendai, 2017/5.
- [4] Daikoku T, Yumoto M. Right hemispheric dominance in concurrent statistical learning of attended and ignored auditory sequences. Biomagnetic 2017, Sendai, 2017/5.
- [5] Yumoto M, Daikoku T, Okano T, Yatomi Y. Statistical information embedded in the stimulus sequence figures a neuromagnetic probe for human auditory function. Biomagnetic 2017, Sendai, 2017/5.
- [6] Okano T, Daikoku T, Ugawa Y, Yumoto M. The difficulty of auditory statistical learning is reflected in neuromagnetic P1m and N1m responses. Biomagnetic 2017, Sendai, 2017/5.
- [7] Daikoku T, Yatomi Y, Yumoto M. Domain-specific pitch-class facilitates domain-general statistical learning of chord sequences. *The 9th ICME International Conference on Complex Medical Engineering, PS3-1 (CME 79), Okayama, 2015/7.*
- [8] Daikoku T, Yatomi Y, Yumoto M. Statistical learning in language acquisition. *19th International Conference on Biomagnetism (BIOMAG 2014). 1065265, Halifax, 2014/8.*
- [9] Daikoku T, Yatomi Y, Yumoto M. Statistical learning and relative processing of tone sequences. *30th International Congress of Clinical Neurophysiology (ICCN). P663, Berlin, 2014/3.*
- [10] Daikoku T, Yumoto M, Yatomi Y. Magnetoencephalographic study on statistical learning and relative learning of auditory sequences. *International Society for Advancement of Clinical Magnetoencephalography (ISACM meeting 2013). P1-03, Hokkaido, 2013/8.*
- [11] Daikoku T, Yatomi Y, Yumoto M. Domain-general statistical learning reflected in neurophysiological markers . The 45th Japanese Society of Clinical Neurophysiology, Osaka, 2015/11.
- [12] Takahashi Y, Daikoku T, Futagami H, Tarumoto M, Yasuda H. Effects of exercise

on statistical learning and the tolerance for spectral shifts. The 20th Annual Meeting of Japanese Society of Cognitive Neuroscience, I -02, *Tokyo*, 2015/8.

- [13] Daikoku T, Yatomi Y, Yumoto M. Neurophysiological markers for implicit and explicit statistical learning (Best poster award). The 20th Annual Meeting of Japanese Society of Cognitive Neuroscience, I -01, *Tokyo*, 2015/8.
- [14] Daikoku T, Yatomi Y, Yumoto M. Implicit and explicit statistical learning reflected in neurophysiological markers. BIO UT 2015, Tokyo, 2015/6.
- [15] Daikoku T, Yatomi Y, Yumoto M. The holistic-to-analytic timecourse of statistical learning in language acquisition. The 44th Japanese Society of Clinical Neurophysiology, 1-A-F-1, Fukuoka, 2014/11.
- [16] Daikoku T, Yatomi Y, Yumoto M. Magnetoencephalographic study on statistical learning in language acquisition (Poster award). The 19th Annual Meeting of Japanese Society of Cognitive Neuroscience, 10000, *Tokyo*, 2014/8.
- [17] Daikoku T, Yatomi Y, Yumoto M. The statistical learning of high order structure of tone sequences. The 43th Japanese Society of Clinical Neurophysiology, No.10188, *Kochi*, 2013/11.
- [18] Daikoku T, Yumoto M, Yatomi Y. Neuromagnetic responses accompanying domain-general learning. (Young Investigator Award). The 18th Annual Meeting of Japanese Society of Cognitive Neuroscience, IV-6, *Tokyo*, 2013/7.