Shohei Hidaka

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Education

Ph.D. Informatics, Kyoto University, 2007
Thesis: "A Geometric Model of Categorization Space for Lexical Acquisition".

M.A. Informatics, Kyoto University, 2004
Thesis: "The Linguistic Category Influence on the Children's Bias of Word Acquisition".

B.A. Biology, Kyushu University, 2002
Thesis: "Mathematical Analysis of Geological Heterogeneity Effects on the Distribution of Species".

Research Experience

Assistant professor	2010–present
Japan Advanced Institute of Science and Technology	Ishikawa, Japan

Mathematical modeling and psychological experiment of language development.

Visiting scholar	2012
Indiana University	Bloomington, IN

Mathematical modeling and psychological experiment of language development.

Post-Doctoral Research Fellow	2008–2010
National Institutes of Health	Indiana University

Mathematical modeling and psychological experiment of language development.

Research Fellow	2006–2008
Japanese Society for the Promotion of Science	Kyoto University

Mathematical modeling of language development and object recognition.

Teaching Experience

Lecturing a graduate level introductory class "Introduction to Cognitive Science" (認知科学入門) in the spring semester 2011, 2012, 2013, and 2014.

Hosting two graduate students from Indiana University visiting to Japan Advanced Institute of Sciences for their JSPS summer projects in 2011 and 2012. Hosting a research scholar from Indiana University from August to November in 2013.

Lectures for Cognitive Science Spring Seminars 2012 and 2014 in Malta University.

Tutorial on statistical modeling in cognitive sciences (JCSS SIG-LAL): 日高 昇平 & 西田 豊 (2012). 統計的モデルの考え方：確率分布から多変量解析まで, 日本認知科学会・対話と学習研究会・第 46 回研究会.

Supervising six graduate students for their minor thesis in 2010, 2011, 2012, and 2013.

Lecture series in JAIST Summer School 2011 (日高昇平・白肌邦生 (2011) JAIST サマースクール 2011「知識科学のフロンティア：生体計測がつなぐ認知神経科学とサービス経営」)

Supervising three graduate students (on the research projects on brain imaging), Spring, Summer, and Fall 2010 in Indiana University.

Research assistant (Introductory class of knowledge science), Spring 2010, 2011, 2012, 2013, and 2014.

Supervising four research assistants (on the research projects of cognitive development), Indiana University, Spring, Summer, Fall 2009, and Spring 2010.

Teaching Assistant, Advanced Informatics (Basic Neural Network Modeling), Kyoto University, Spring 2004.

Social contributions

Volunteer activity for non-typical developing children since May 2010-2011 (Komatsu Municipal Hospital).

Program committee of International Conference Development and Learning (2010).

日本認知科学会第 29 回大会プログラム委員 (2012).

日本認知科学会運営委員 (2013-2014).

電気情報通信学会編集委員 (2014-2015).

Membership

Membership in Japanese Cognitive Science Society (since April 2004).

Membership in Cognitive Science Society (since August 2006).

Membership in Japanese Society for Artificial Intelligence (since April 2013).

Membership in The Institute of Electronics, Information and Communication Engineers (since April 2014).

Membership in Association for Computing Machinery (2011).

Publication (June 23, 2014)

Peer Reviewed Journal Articles

Hidaka, S. (accepted). General Type Token Distribution., *Biometrika*.

日高 昇平 (2013). 人の多感覚コミュニケーションにおける情報ネットワークの可視化. **電気情報通信学会誌**, Vol. 96, No. 12, pp. 945-950.

Hidaka, S. (2013). A Computational Model Associating Learning Process, Word Attributes, and Age of Acquisition., *PLOS ONE*, 8(11): e76242.

Yurovsky, D., Hidaka, S., and Wu, R. (2012) Quantitative Linking Hypotheses for Infant Eye Movements., *PLOS ONE*, 7(10): e47419.

Hidaka, S. & Smith, L. B. (2011). Packing: A Geometric Analysis of Feature Selection and Fast-Mapping in Children's Category Formation., *Cognitive System Research*, 12 (1), 1-18.

Hidaka, S. & Smith, L. B. (2010). Acquisition of a Single Word to a Population of Words., *Language Learning and Development*., 6 (3), 206-222.

Maouene, J. , Hidaka, S. & Smith, L. B. (2008). Body parts and early-learned verbs., *Cognitive Science*, 32, 1200-1216.

日高 昇平, 吉田 華子, & 齋木 潤. (2006) 発達研究固有の実験的制約を考慮した定量的分析方法～バイリンガルの新奇語汎化課題に対する応用～., **認知科学**, 13, 484-487.

日高 昇平 & 斎木 潤. (2005). 幼児の新奇語カテゴリ化のモデル研究., **認知科学**, 12, 235-251. (In English: Hidaka, S. & Saiki, S. (2005). A model study of infants ' novel word categorization., *Cognitive Studies*, 12, 235-251.)

Manuscripts under review

Hidaka, S., Torii, T. & Masumi, A. (under review). Which types of learning make a simple game complex?, *Complex Systems*.

Hidaka, S. & Kashyap, N. (under review). Pointwise dimension estimation., *Physical Review E*.

Hidaka, S. (under review). Estimating the latent number of types in growing corpora with reduced cost-accuracy trade-off., *Journal of Child Language*.

布山美慕, 日高昇平, & 諏訪正樹. (submitted). 読書中の熱中・忘我状態の観測と観察., **認知科学**.

Imai, M., Miyazaki, M, Yeung, H., Hidaka, S., Kantartzis, K., Okada, H., & Kita, S. (under review). Sound symbolism facilitates word learning in 14 month-olds., *PLoS ONE*.

Book Chapters

Smith, L. B. Maouene, J. & Hidaka, S. (2007). *The Body and Children's Word Learning*, In Plumert, J. M., Spencer, J. P. (ed.) The Emerging Spatial Mind. Oxford University Press, Oxford, pp. 168–192.

Preprints

Hidaka, S. & Kashyap, N. (2013). On the Estimation of Pointwise Dimension., eprint arXiv:1312.2298.

Hidaka, S. (2013). General Type Token Distribution., eprint arXiv:1305.0328.

Hidaka, S. (2012). Characterizing Multivariate Information Flows., eprint arXiv:1212.5449.

Peer Reviewed Conference Papers

Fuyama, M., Hidaka, S., & Suwa, M. (2014). The Continuous Measurement of Absorption in Reading Based on the Time Series of Subjective Evaluation and Heart Rates. *The Jagiellonian-Rutgers Conference in Cognitive Science 2014* (CogSciJR14).

Miyazaki, M., Hidaka, S., Imai, M., Yeung, H. H., Kantartzis, K., Okada, H., & Kita, S. (2013). The facilitatory role of sound symbolism in infant word learning. In *Proceedings of The Thirty Fifth Annual Meeting of Cognitive Science Society*, 3080-3085.

Hidaka, S. & Fujinami, T. (2013). Topological Similarity of Motor Coordination in Rhythmic Movements. In *Proceedings of The Thirty Fifth Annual Meeting of Cognitive Science Society*, 2548-2553.

Hidaka, S. (2012) Identifying Kinematic Cues for Action Style Recognition. In *Proceedings of The Thirty Fourth Annual Meeting of Cognitive Science Society*, 1679-1684.

Yurovsky, D., Hidaka, S., & Wu, R. (2012) Quantitative Linking Hypotheses for Infant Eye Movements, In *Proceedings of The Thirty Fourth Annual Meeting of Cognitive Science Society*, 1203-1208.

Nossal, N., Tsuchiyama, N., Hidaka, S., Iida, H. (2012). fNIRS Survey of Brain Function at the Moment of Winning, Game Programming Workshop 2012.

Suzuki, Y. & Hidaka., S. (2011). Estimating similarity judgment processes based on neural activities measured by near-infrared spectroscopy (NIRS). (Also published in the book "Advances in Cognitive Neurodynamics (III)")

Hidaka S and Yu C (2011). Informational Coupling in Social Interaction as a Goodness of Communication. Front. Comput. Neurosci. Conference Abstract: IEEE ICDL-EPIROB 2011.

Hannagan T, Wu R, Hidaka S and Yu C (2011). A Computational Model for Cued Infant Learning. Front. Comput. Neurosci. Conference Abstract: IEEE ICDL-EPIROB 2011.

Takahashi, K., Hidaka, S & Watanabe, K. (2010). Decoding Subjective Simultaneity from Neuromagnetic Signals, 17th International Conference on Biomagnetism.

Yurovsky, D., Hidaka, S., Yu, C., & Smith, L. B. (2010). A Generative Model of Eye, Movements in Cross-Situational Learning. *XVIIth Biennial International Conference on Infant Studies*, Baltimore, Maryland, March 10-14.

Yurovsky, D., Hidaka, S., Yu, C., & Smith, L. B. (2010) Liking Learning to Looking: Habituation and Association in Infant Statistical Language Learning, In *Proceedings of The Thirty Second Annual Meeting of Cognitive Science Society*, 1589-1594.

Hidaka, S., & Yu, C. (2010) Analyzing Multimodal Time Series as Dynamical Systems, 12th International Conference on Multimodal Interfaces and 7th Workshop on Machine Learning for Multimodal Interaction.

Hidaka, S., & Yu, C. (2010). Spatio-Temporal Symbolization of Multidimensional Time Series, International Workshop on Spatial and Spatiotemporal Data Mining.

Yu, C., Smith, T.G., Hidaka, S., Scheutz, M., & Smith, L.B. (2010). A Data-Driven Paradigm to Understand Multimodal Communication in Human-Human and Human-Robot Interaction . In P.R. Cohen, N.M. Adams, M.R. Berthold (Eds.) Advances in Intelligent Data Analysis IX, LNCS 6065 (pp. 232-244). Berlin/Heidelberg: Springer Verlag.

Hidaka, S., Maouene, J. & Smith, L. B. (2009). Different Word Classes are Learned in Different Ways: Evidence from Vocabulary Growth. In *Proceedings of International Cognitive Linguistics Conference 11*.

Hidaka, S. (2009). Different Classes of Words are Learned in Different Ways. In *Proceedings of The Thirty First Annual Meeting of Cognitive Science Society*, oral presentation.

Maouene, J., Hidaka, S., & Smith, L. B. (2008). Body-Part Categories of Early-Learned Verbs: Different Granularities at Different Points in Development In *Proceedings of The Seventh International Conference on Development and Learning*.

Hidaka, S. & Smith, L. B. (2008). How Features Create Knowledge of Kinds. In *Proceedings of The Thirtyth Annual Meeting of Cognitive Science Society*, pp. 1029–1035.

Hidaka, S. & Saiki, J. (2006). A solution to current limitations in the analysis of developmental data. In *The Fifteenth Biennial International Conference on Infant Studies*.

Hidaka, S., Saiki, J., & Smith, L. B. (2006). Semantic packing as a core mechanism of category coherence, fast mapping and basic level categories. In *Proceedings of The Twenty Eighth Annual Conference of Cognitive Society*, pp. 1500–1505.

Maouene, J. , Hidaka, S. & Smith, L. B. , (2006). Body parts and the first 100 verbs., In *Proceedings of The Twenty Eighth Annual Conference of Cognitive Society*, pp. 555–560.

Hidaka, S., Saiki, J., & Smith, L. B. (2006). Semantic packing: an account for category coherence. In *Proceedings of The Seventh International Conference on Cognitive Modelling*, pp. 130–135.

Hidaka, S. & Saiki, J. (2006). Feature discovery in object individuation. In *Proceedings of The Fifth International Conference on Development and Learning*.

Maouene, J. , Hidaka, S. & Smith, L. B. , (2006). Children and adults rely on body parts for early-acquired verbs., In *Proceedings of The Fifth International Conference on Development and Learning*.

Hidaka, S. & Saiki, J. (2005). Prototype-specific learning for children's vocabulary. In *Proceedings of The Fourth IEEE International Conference on Development and Learning*, pp. 201.

Hidaka, S. & Saiki, J. (2004). A connectionist account of ontological boundary shifting. In N.R. et al. Pal, editor, *ICONIP 2004, Lecture Note in Computer Science 3316*, pp. 22–25, Berlin, Springer-Verlag.

Hidaka, S. and Saiki, J. (2004). A mechanism of ontological boundary shifting. In *The Twenty Sixth Annual Meeting of the Cognitive Science Society*, pp. 565–570.

Invited Talks

日高 昇平 (2014). 最適化ではない計算論 : 統計的モデリングと非線形力学的解析法の融合., Young Perceptionists' Seminar・若手会ジョイントセミナー, 2014 年 9 月 5 日, 休暇村志賀島（福岡県福岡市東区）.

日高昇平 (2013). 模倣の基礎理論の構築およびシミュレーションによる実証., 第１４回人工知能研究成果発表会. 2013 年 9 月 18 日, 今池ガスビル.

Hidaka, S. (2013). Statistical Modeling of Eye Movements in Cognitive Developmental Studies . In Symposium "Probabilistic Principles of Brain Computation", Neuro2013. (日高 昇平 (2013). 認知発達研究における注視行動の統計的モデリング., 神経回路学会シンポジウム「脳と確率」(2013 年 6 月 20 日～23 日, 京都国際会館)

Hidaka, S. (2012). Word Learning In Social Interaction. In Cognitive Science Spring Seminars (University of Malta, March, 26th, 2012).

Hidaka, S. (2012). Decoding emotional contexts in bodily actions., Lecture for Master in the Science of Performative Creativity (University of Malta, March, 29th, 2012).

Shohei Hidaka (2012). Characterizing Attention and Learning from Infant Eye Movements., In the workshop "Gaze Bias Learning II", Linking neuroscience, computational modeling, and cognitivedevelopment., Tamagawa University.

日高 昇平 & 西田 豊 (2012). 統計的モデルの考え方：確率分布から多変量解析まで, 日本認知科学会・対話と学習研究会・第 46 回研究会.

Hidaka, S. (2012). Toward a computational model of creativity: Novel hypothesis generation from structural knowledge. Seventh International Conference on Knowledge, Information and Creativity Support Systems.

日高昇平 (2011). 身体動作に内在する状況性への情報理論的アプローチ, 第 32 回社会的知能発生学研究会, 2011 年 12 月 22-23 日, リッチモンドホテルプレミア仙台.

Reports/ Reviews

日高　昇平 (2013). データから知識へ：多変量情報流による潜在的機構の推定., 知識共創フォーラム (知識共創第 3 号, III7-1-III7-10).

日高　昇平 (2013). 力学的不変量仮説： 運動制御の最適化理論の上位原理として., 第 15 回身体知研究会予稿集, 9-15. (Dynamical Invariance Hypothesis: As a Superordinate Principle Upon Motor Control Optimality Theory., SIG-SKL-15, 9-15.)

日高 昇平 & 西田 豊 (2012). 統計的モデルの考え方：確率分布から多変量解析まで, 学習と対話 Vol. 2012, No.1, 21-26 (日本認知科学会・対話と学習研究会・第 46 回研究会).

Tanaka, A., Takezawa, M., Nakamura, K., Hayashi, Y. , Hidaka, S. & Honda, H. (2009). Reports of the 31st Annual Conference of the Cognitive Science Society and Cognitive Science in the Netherlands, Cognitive Studies Vol. 16, No. 4, pp.532-540.

Research Grants

KAKENHI Grant-in-Aid for Challenging Exploratory Research 25560297 (科学研究費補助金挑戦的萌芽研究, 2013-2014 年度, 総額 3,900,000JPY, 代表).

KAKENHI Grant-in-Aid for Scientific Research B 23300099 (科学研究費補助金基盤研究 B, 2011-2014 年度, 総額 8,060,000 円, 代表).

2012 年度研究者支援創造性研究奨励賞 (NeuroCreative Lab, 2013 年度, 総額 1,000,000 円, 代表).

JAIST Grant for Advanced Research Base (平成 23 年度　先端研究拠点形成支援, 2011-2012 年, 500,000 円, 分担).

KAKENHI Grant-in-Aid for Scientific Research Activity Start-up 50582912 (科学研究費補助金 研究活動スタート支援, 2011-2012 年度, 総額 2,782,000 円, 代表).

Artificial Intelligence Research Promotion Foundation 22AI 161-9 (平成 23 年度人工知能研究助成金, 22AI 第 161 号-9, 財団法人人工知能研究振興財団, 2011-2012 年度, 総額 500,000 円, 代表).

KEKENHI Grant-in-Aid for JSPS Fellows 06J02935 (科学研究費補助金特別研究員奨励費, 2006-2007 年度, 総額 1,900,000 円, 代表).

Honors and Awards

2012 年度研究者支援創造性研究奨励賞 (NeuroCreative Lab, 2012).

British Psychological Society International Collaboration Award (For collaborative work with Ratchel Wu and Daniel Yurovsky, British Psychological Society, 2010).

Travel Grant for International Conference, Kyoto University Foundation, 2006.

Travel Grant for Short term International Research, Kyoto University, 2006.

Travel Grant for Short term International Research, Kyoto University, 2005.

Travel Grant from the Japan Cognitive Science Society, 2009 (Reported in Cognitive Studies Vol. 16 (2009) , No. 4 pp.532-540).

Research grand for young scientists, Kyoto University, 2005.

Outstanding Paper Award, 22th Annual Conference of the Japanese Cognive Science Society, 2005 (第 22 回認知科学会発表賞, 日本認知科学会, 2005 年 7 月).

Computer Skills

Expert: Matlab

Intermediate: R, Perl, LaTeX, HTML, ActionScript, C

Basic: C++ , Ruby, SQL, Mathematica, Linux, SPSS

Computatioinal Modeling Skill

Datamining/Machine Learning techniques for a large scale cognitive and psychological database. Applied Statistics, Complex Network, Neural Networks, Corpus Linguistics, Bayesian Modelling, and Nonliear Time Series Analysis.

Languages

Japanese (mother tongue)

English (good knowledge)

Other Skills

The game of Go (Baduk in Korean, Weiqi in Chinese): Amateur expert level (6 dan in Japanese ranking),

Shogi (Japanese Chess): Amateur intermediate grade (1 dan in Japanese ranking).

Judo 1 dan (black belt).