

Computational Learning Theory

Vsevolod (Volya) Kapatsinski

Class time: 11:10-12:35 TF

Location: **118**

Office hours (**105**):

T 6/15 1-2

F 7/5 1-2

M 7/8 11-12

M 7/15 11-12

T 7/16 1-2

Course requirements:

- Discussion participation (including online discussion)
- Find a contingency structure for which NDL, or Rescorla-Wagner, fails or makes counter-intuitive predictions (code and one-pager)
- Project proposal (1-2 pages; could be based on the NDL assignment)

Schedule and Readings

(Parentheses indicate optionality)

Date	Topic	Readings	Assignments
6/25	Introduction: Learning mechanisms	Kapatsinski, 2018, Ch. 1 (Kapatsinski, 2018, Ch. 2)	Discussion board: introduce yourself
6/29	Error-driven learning: Rescorla-Wagner model and NDL	Rescorla & Wagner, 1972 Ramscar et al., 2013 (Olejarczuk et al., 2018)	Discussion board: Summary and questions
7/2	Configural learning models	Kapatsinski, 2018, Ch. 3 (Kapatsinski, 2009) (Ellis, 2006)	Discussion board: Summary and questions
7/5	Falsifying Rescorla-Wagner	Harmon et al., 2019 (Kruschke, 1992)	Discussion board: Summarize a problem
7/9	Bayesian learning	Kapatsinski, 2018, Ch. 4 (Anderson, 1991) (Powell et al., 2016)	Discussion board: Differences between associationist and Bayesian models
7/12	To be rescheduled: Bayesian language learning	{Xu & Tenenbaum, 2007; Regier & Gahl, 2004} (Xu & Tenenbaum, 2007b) (Kleinschmidt & Jaeger, 2016)	Discussion board: Identifying unique predictions

7/16	Learning in production	Kapatsinski, 2018, Ch. 9 (Bryan & Harter, 1897)	Discussion board: Combining learning mechanisms
7/19	Comparing models of learning in production	Harmon & Kapatsinski, under review	Discussion board: Summary and questions

Readings:

- Anderson, J. R. (1991). The adaptive nature of human categorization. *Psychological Review*, 98(3), 409-429.
- Bryan, W. L., & Harter, N. (1897). Studies in the physiology and psychology of the telegraphic language. *Psychological Review*, 4(1), 27-43.
- Ellis, N. C. (2006). Selective attention and transfer phenomena in L2 acquisition: Contingency, cue competition, salience, interference, overshadowing, blocking, and perceptual learning. *Applied Linguistics*, 27(2), 164-194.
- Harmon, Z., Idemaru, K., & Kapatsinski, V. (2019). Learning mechanisms in cue reweighting. *Cognition*, 189, 76-88.
- Kapatsinski, V. (2018). *Changing minds changing tools: From learning theory to language acquisition to language change*. MIT Press.
- Kapatsinski, V. (2009). Testing theories of linguistic constituency with configural learning: The case of the English syllable. *Language*, 85(2), 248-277.
- Kleinschmidt, D. F., & Jaeger, T. F. (2016). Re-examining selective adaptation: Fatiguing feature detectors, or distributional learning?. *Psychonomic Bulletin & Review*, 23(3), 678-691.
- Olejarczuk, P., Kapatsinski, V., & Baayen, R. H. (2018). Distributional learning is error-driven: The role of surprise in the acquisition of phonetic categories. *Linguistics Vanguard*, 4(s2).
- Powell, D., Merrick, M. A., Lu, H., & Holyoak, K. J. (2016). Causal competition based on generic priors. *Cognitive Psychology*, 86, 62-86.
- Ramscar, M., Dye, M., & Klein, J. (2013). Children value informativity over logic in word learning. *Psychological Science*, 24(6), 1017-1023.
- Regier, T., & Gahl, S. (2004). Learning the unlearnable: The role of missing evidence. *Cognition*, 93(2), 147-155.
- Rescorla, R. A., & Wagner, A. R. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In A. H. Black & W. F. prokasy (Eds.), *Classical conditioning II: Current research and theory*, 64-99. Appleton-Century-Crofts.
- Xu, F., & Tenenbaum, J. B. (2007). Word learning as Bayesian inference. *Psychological Review*, 114(2), 245-272.
- Xu, F., & Tenenbaum, J. B. (2007b). Sensitivity to sampling in Bayesian word learning. *Developmental Science*, 10(3), 288-297.