Tasks for Hala

# Estimate the variability in the performance of models

## Task

Run 10 simulations with the default parameters and then look at the variability in their performance. The only difference between different simulations now is the random initial weights of the model. This should not make a huge difference in the performance. If the models learn the vocabulary in approximately in the same numer of epochs, or if they reach the same performance in the same number of epochs, then you might not need to run more than one repetitions of typically developing models. If performance is variable then you need to run more repetitions to have a representative sample. (Note, that for atypical models, that involve probabilistic deficits, like connection density < 1, you will need to increase the number of repetitions)

## Results

# Decide which semantic representation to use

## Task

Run the same model with sem\_bin and sem\_ana semantic representations and compare.

## Results

# Decide which frequency measure to use

## Task

Try different frequency measures from D to I. Some of them might not work. Look at the effect they have on the performance of the model.

## Results

# What is a TD model?

## Task

To go from TD to atypical, you could decrease the size of hidden layers, the learning rate, the connection density, the temperature of the sigmoid transfer function or increase the noise. The default parameters are probably okay for the TD models in case of these parameters, except for the size of the hidden layers. The optimal size of the hidden layers depends on the lexicon, so you have to find it experimentally.

First, run the model only on the SS task, and then only on the PP task (set P.trainingtype to ’fourphase’ and set P.nbof\_R\_epochs and P.nbof\_L\_epochs to 0). Run different models with different SH and PH sizes. Find the smallest hidden layer size with which the model can learn all the words. If the model can learn all the words with a range of hidden layer sizes, then choose one, with which learning time is almost the fastest, but not the fastest (those would be the geniuses). After deciding SH and PH size, do the same for the AR and AL size based on the SP and PS tasks.

## Results

# Try different kinds of deficits

## Task

Experiment with different kinds and seriousness of deficits. Choose those where the deficit is apparent enough, but also not too serious, so that behavioural intervention could help.

## Results

# Try different kinds of interventions