**IBM Parameters**

**Definitions:**

Poisson Lambda – number of events/number of units in the data, the mean of the data

Binomial Probability – Probability of success or a case of 1

Beta Shape 1, a, and Shape 2, b – mean of beta distribution = 1/1+(b/a)

**Population Level Parameters:**

* h - increase in probability of death for uninformed
* nl - naive learning probability
* si - maximum mean (i.e., lambda of poison distribution) number of interactions per pair (if animal has 1 boldness, it interacts with an animal with 1 boldness, and population is at or above K, this is the lambda of the interaction distributions)
* infotransfer - given an interaction, what is the probability that information is transferred (min=0, max=1)
* sex.ratio - what is the sex ratio of of the population/births?
* K - carrying capacity
* N0 - starting number of individuals
* t - time of simulation, turns in simulation
* age.distr.lamba - lambda value for starting age distribution based on poison distribution
* informed.distr.beta - probability of knowing information, beta distribution ranges from 0 to 1 (vector of 2 values: shape1 and shape2)
* bold.distr.beta - probability of being bold, beta distribution (vector of 2 values: shape1 and shape2)
* birthdeath.file && d - dataframe of age based birth and death rate. The columns should be age, ageClass, birthRate, and survivalRate, in that order.
* result.folder - an empty folder where results will be saved.
* set\_seed - want to make results reproducible? Then set as TRUE
* save\_at\_each\_iter - should it write all results to file at each time step?
* maxAgeClass - max age class in order to get a proportion of age class for age class based rates of naive learning, older individuals learn better than younger
* vertTransmission - 0 if false, 1 if true, vertical transmission of info status
* densityDependType - density dependence of interactions, set to 1 for positive density dependence, 0 for none, -1 for negative density dependence
* locationLearnFunction – file location of the Learn function
* familiarBias – positive modifier given to interactions of familiar individuals i.e. individuals that interacted the timestep before. If 0, past interactions are not considered

**Individual Level Parameters:**

* alive – status of living of individual, 0 if false, 1 if true
* sex - coinflip for sex of individual, 0 = male, 1 = female, Distribution: binomial with probability of success or female = sex.ratio
* age – age of individual drawn from poisson distribution centered around age.distr.lamba, Distribution: poisson with lambda of age.distr.lamba
* informedProb - probability of knowing information drawn from beta distribution ranging from 0 to 1, Distribution: beta distribution of informed.distr.beta, ranging from 0 to 1
* informed – 0 if false, 1 if true, modified by age class proportion (we standardize so the values range from 0 to 1, based on the range could be 0 to 2), Determining equation: round((informedProb + informedProb \* (ageClass/maxAgeClass))/2)
* boldness - boldness of individual, probability of interacting with another individual, Distribution: beta distribution of bold.distr.beta, ranging from 0 to 1
* mother - number of mother of individual, allows tracking of heredity
* birthYr - turn in simulation that the individual was born
* ageClass <- age class of individual given age based on birthdeath.file
* birthRate <- birth rate of individual given age based on birthdeath.file
* survivalRate <- survival rate of individual given age based on birthdeath.file