Comment concerning 1st and 2nd order transition performance
1st order transition probability (fix gamma to 0 and alpha to 1)

Training R2 2 comps

1st order component manipulation (max N_comp=20, instead of 12)
1 comp: R2 = .15  cvR2 = .01
2 comp: R2 = .29  cvR2 = .01
3 comp: R2 = .40  cvR2 = .024
4 comp: R2 = .51  cvR2 = .071
5 comp: R2 = .60  cvR2 = .10

PCA Variance
5 comps = .479
10 comps = .681
12 comps = .737
20 comps = .891

1st order Summary
- Training R2 components are more splintered, but do show some systematicity and toggle being captured.
- First order TM does not generalize well particularly with low N_comp values.
New functions
- `count_2nd_transitions` = produces 2nd order transition probability vector
- `TM_learn_batch` = the TM probability equivalent of `successrep_learn_batch`
- `LRaven1_goalfun_TM` = the TM probability equivalent of `LRaven1_goalfun`

New scripts
- `LRaven1_TM_optim` = computes R2 and produces weight, PC, and pred vs obs figures
- `LRaven1_TM_cvR2` = computes cvR2 for 1st or 2nd order transition probabilities

R2 Results
- Below is a figure of the weights for 2nd order with 5 comps (R2=.56)
- The figure takes the 1000 weight vector and turns it into a 100x10
- In general the PC and weights suffer from a lack of clear interpretability!

2nd order transition probability

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*Image of a graph showing 2nd order transition probability with 5 components.*

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2nd order transition probability cont.

2nd order component manipulation
1 comp:  R2 = .34  cvR2 = .117  
2 comp:  R2 = .42  cvR2 = .188  
3 comp:  R2 = .51  cvR2 = .228  
4 comp:  R2 = .57  cvR2 = .256  
5 comp:  R2 = .61  cvR2 = .252

PCA Variance
5 comps = .286  
10 comps = .469  
12 comps = .533  
20 comps = .744

2nd order Summary
- 2nd order info (and likely beyond 3rd order ect.) is more important and is being utilized by the SR more than 1st order info for score prediction.  
- 2nd order transition probability components and weights do not produce components or weights that are very interpretable which is a big weakness.