* **Blocking visual feedback of movement**

Can increase the UC effect since participants will find it harder to correct mistakes in time?

But it becomes more difficult, thus less desirable than mousetracking.

* **What UC processing was it?**

Lexical – No, because it deals with word/nonword.

Phonological – No, because words are completely identical, instead of partial parts with similar sound.

Morphology – No, because it deals with suffixes, prefixes, stems…

Visual/shape – No, words are of different font.

Semantic – perhaps, because words are of different font, so their meaning has to be extracted to create facilitation/inhibition.

* **Velocity**

Can be used to estimate confidence (slow = less confident), or COM (sudden velocity changes).

Larger variability expected in incongruent (slow start when unsure, then large acceleration to compensate once answer selected).

Confound: changes in direction, regardless of confidence, can also cause changes in velocity.

To avoid confound, add num of direction changes to the regression analysis.

* **FDA**

ANOVA at each point along the trajectory.

Didn't produce significant results, thus excepted. Used other variables instead.

Should reimplement now with the large sample.

However, code changes, and data structure might not suit FDA.

* **Do you think motion tracking should be used?**

Currently, no.

Since it produces similar effect sizes to keyboard, but is more complicated to implement,

The main motivation for using it would be its ability to delineate the development of cognitive processes,

But in my data I did not find specific windows in which UC applies its influence.

To improve temporal deconstruction of processes:

* + Dynamic starting condition – Decreases noise, decreases excluded trials, evidence will take effect as soon as it is received.
  + Further investigate heading angle
  + Change SOA – does it affect the point in which conditions start to differ?
    - Static start –

if it changes the point at which congruency effect starts, it implies what is the delay until the prime starts to exert its influence.

if it doesn’t, then prime shift processing to a certain state, and the target takes constant time to exit this state.

* + - dynamic start – Hopefully longer SOAs will allow prime to exert its effect to higher degree.
* **Time analysis can be done with a keyboard by playing with the SOA, why use motion tracking?**

It tracks processes as they occur, instead of drawing conclusions retrospectively, this allows us to find the order in which cognitive processes occur.

We can probe the cognitive processes directly, not infer indirectly.

* **Inferring time of clusters**

Normalization returns time at each re-sampled point (separated for condition and side).

Average this time between trials.

* **Time analysis can be done with brain imaging.**

But motion tracking is less expensive. Especially if you use only 2d with a simple camera and image analysis.

Brain imaging doesn't measure the behavioral effect.

* **Why did you normalize in space? What artifact is created when normalizing in time? Explaine in detail.**

To get effect I need to average trajectories.

So trajs must have common Z/time values.

To do that, we normalize, by extracting 200 equally spaced points in time/space.

Be careful about your interpretation: now time/space represents proportion, instead of absolute value.

If one condition "started earlier", that means it started earlier relative to its entire duration / length.

E.g.

one traj takes 400ms and deviation starts at 300ms, other traj takes 800ms and deviation starts at 600ms. After normalization deviation seem to start at the same time, but it doesn't.

Two conditions have identical curve between 100-300ms, then 1st condition's traj ends at 400ms, 2nd condition traj's ends at 700ms. After normalization, 2nd traj seems to curve earlier, but it doesn't.

Also applies for space, but in space the path is relatively constant so these problems are minor.

Jason doesn’t normalize: Aligned trajs to onset

then extrapolated missing values for trajectories that ended early

Averaged each timepoint across trajs,

When reached a timepoint in which 10% of trajs have missing values, he terminated the averaging.

* **Averaging trials**

Do not treat average as an actual traj, rather as a bias.

If treated as traj, false effects might be present if trajs with different characteristics (larger/earlier deviations) are averaged together.

Solve with clustering similar trials (e.g., cluster with machine learning according to deviation).

* **Which statistical analysis did you use? Why?**

t-test - Congruency effect

Permutation - Violators of normality. Explain what is permutation.

Tree-BH – correction for multiple comparisons. Bottom up to fill p-values. Top down to test for significance.

Permutation + clustering – 1. compute t-value for each point along trajectory.

2. Cluster together significant points.

3. Shuffle signs of participant’s congruency effect at which point.

4. re-Compute t-value and cluster

5. take max cluster size and add to distribution.

Repeat 3-5 to build noise distribution

Divide Alpha by num of permutation procedures.

Check if original clusters are at a percentile further than new alpha.

Test for outliers – non found. If found, use robust t-test using R's WRS2 , and effect size “APK”.

Test for normality – if violated, replace t-test with permutation test.

* **How would you delineate the processes in time?**

By using SOA in dynamic and static conditions.

By investigating heading angle.

* **How does it relate to consciousness theories?**

Consciousness theories try to explain how consciousness is created in the brain.

I didn't touch upon conscious processing.

This supports theories that claim visual areas activation can spread to motor planning areas without evoking conscious perception. E.g., recurrent processing, in which a signal can be transferred in feedforward manner and thus not reach consciousness.