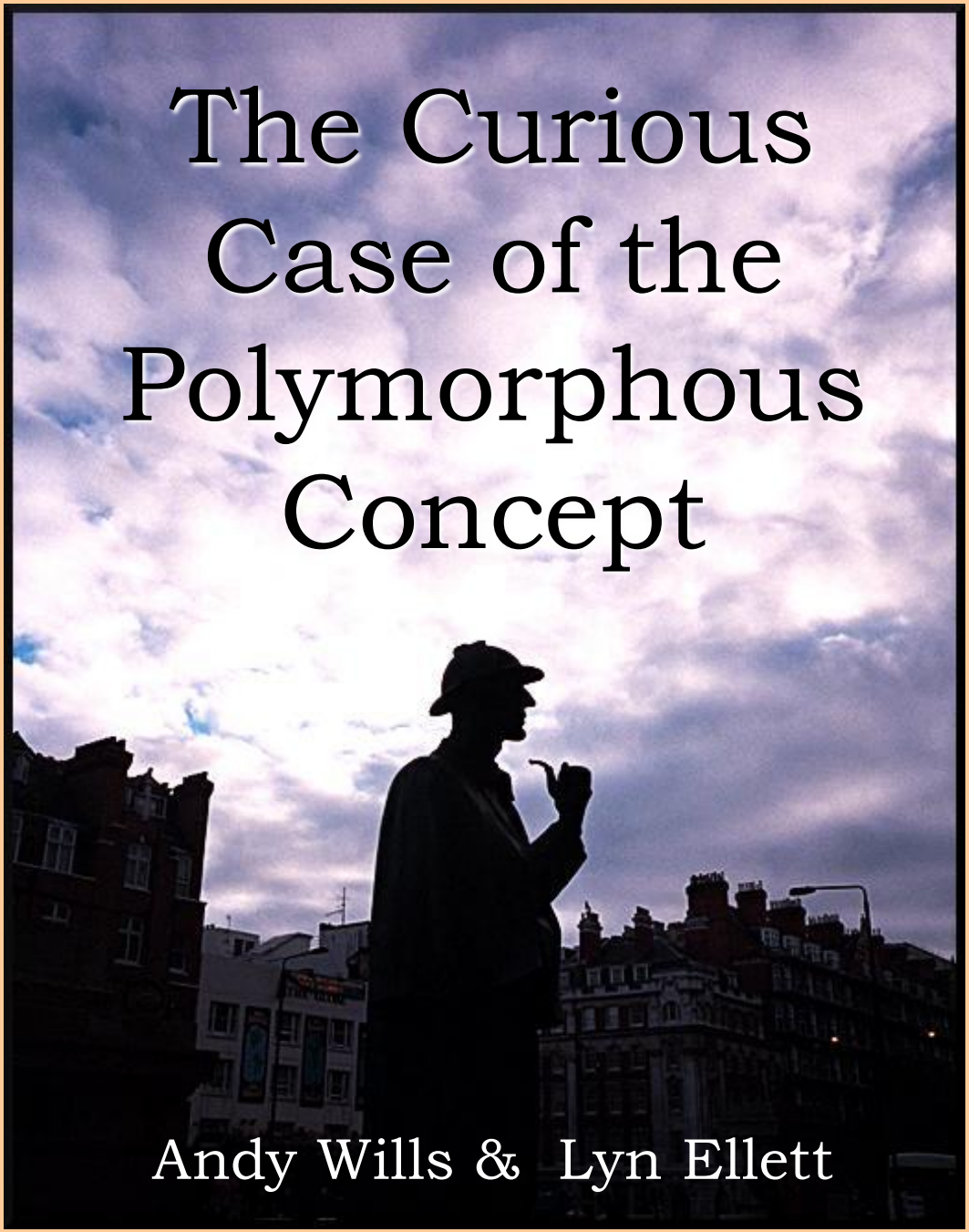
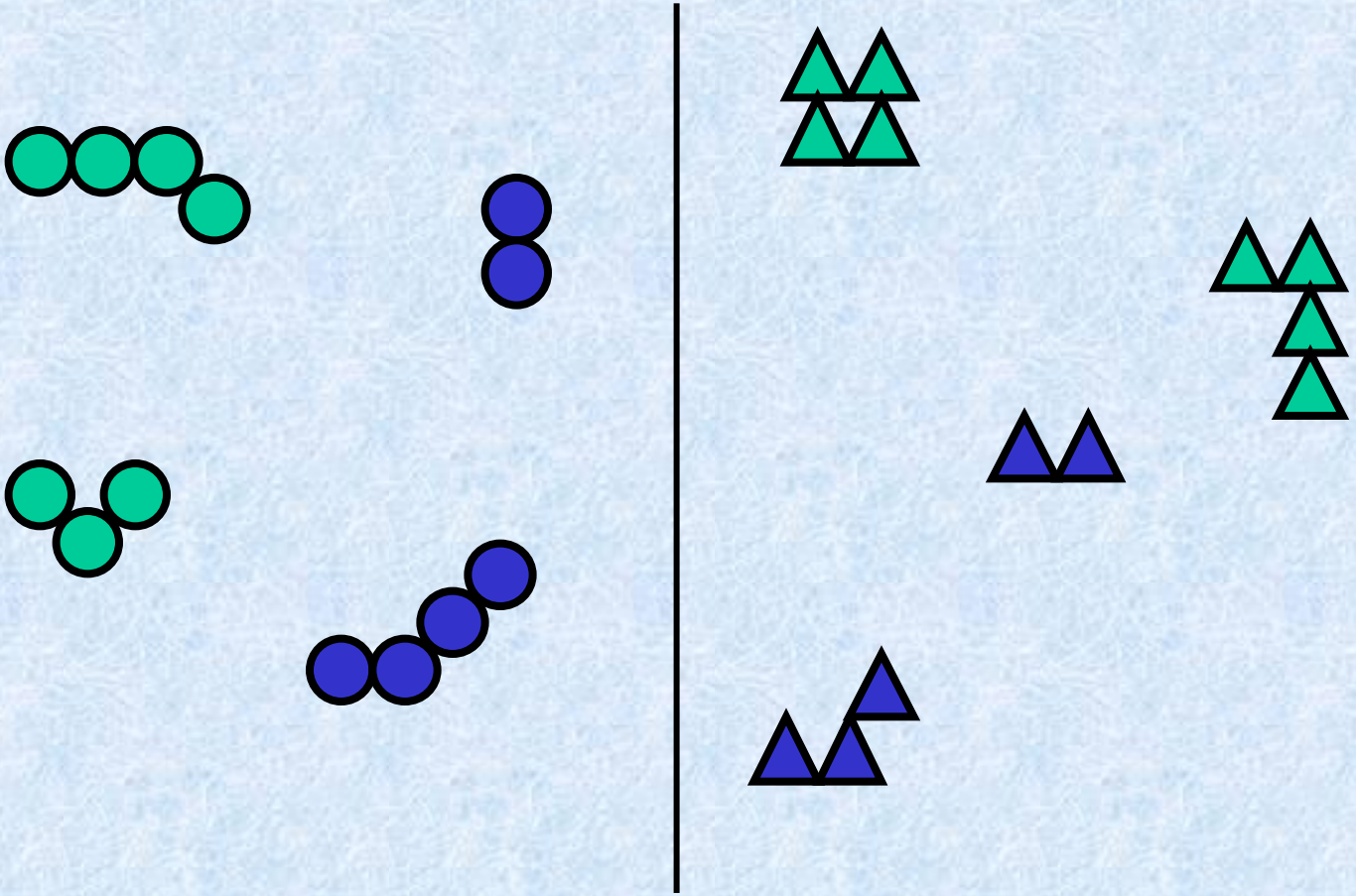

The Curious Case of the Polymorphous Concept
Andy Wills & Lyn Ellett

Cup or mug?

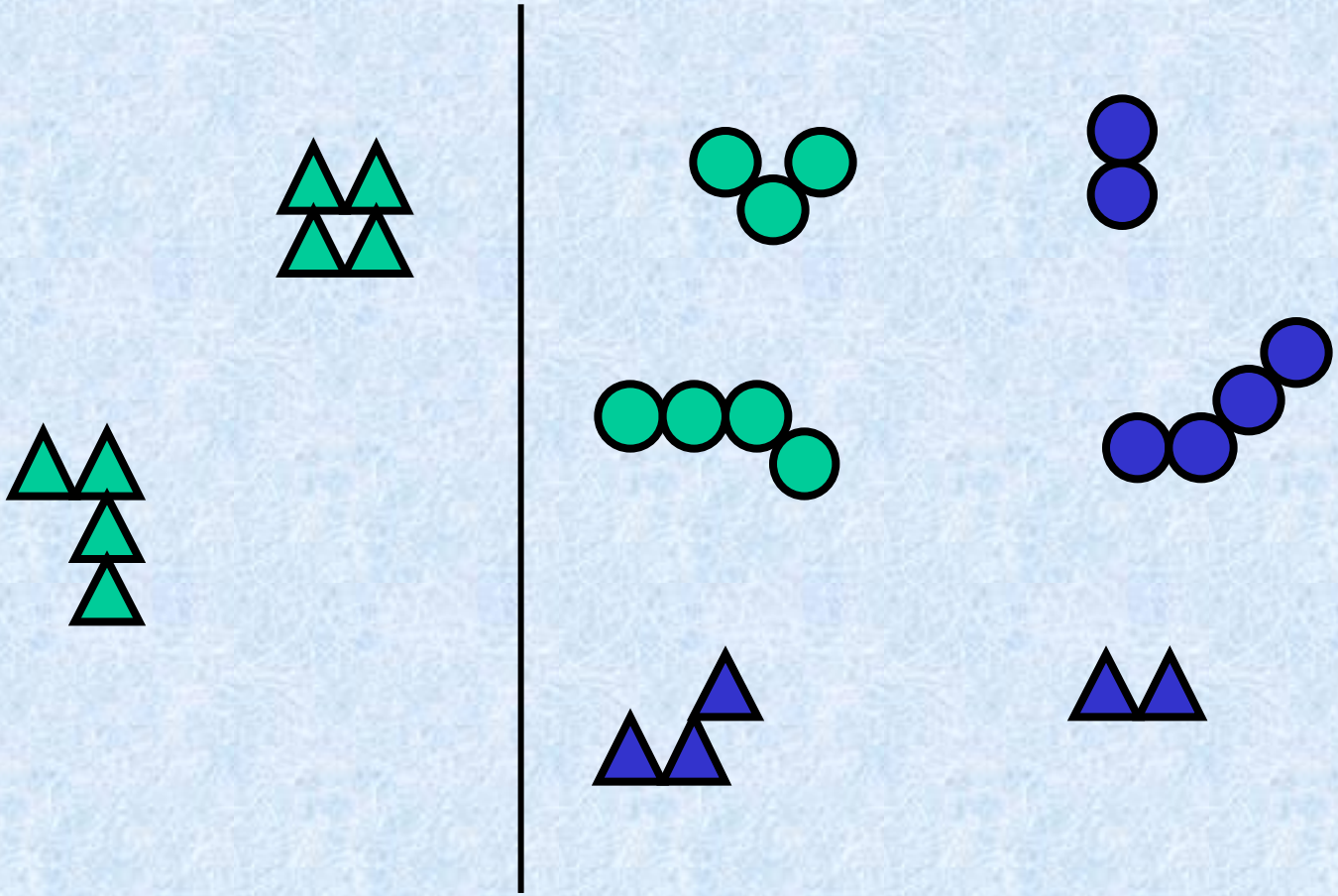
- How do we do this?

Game One



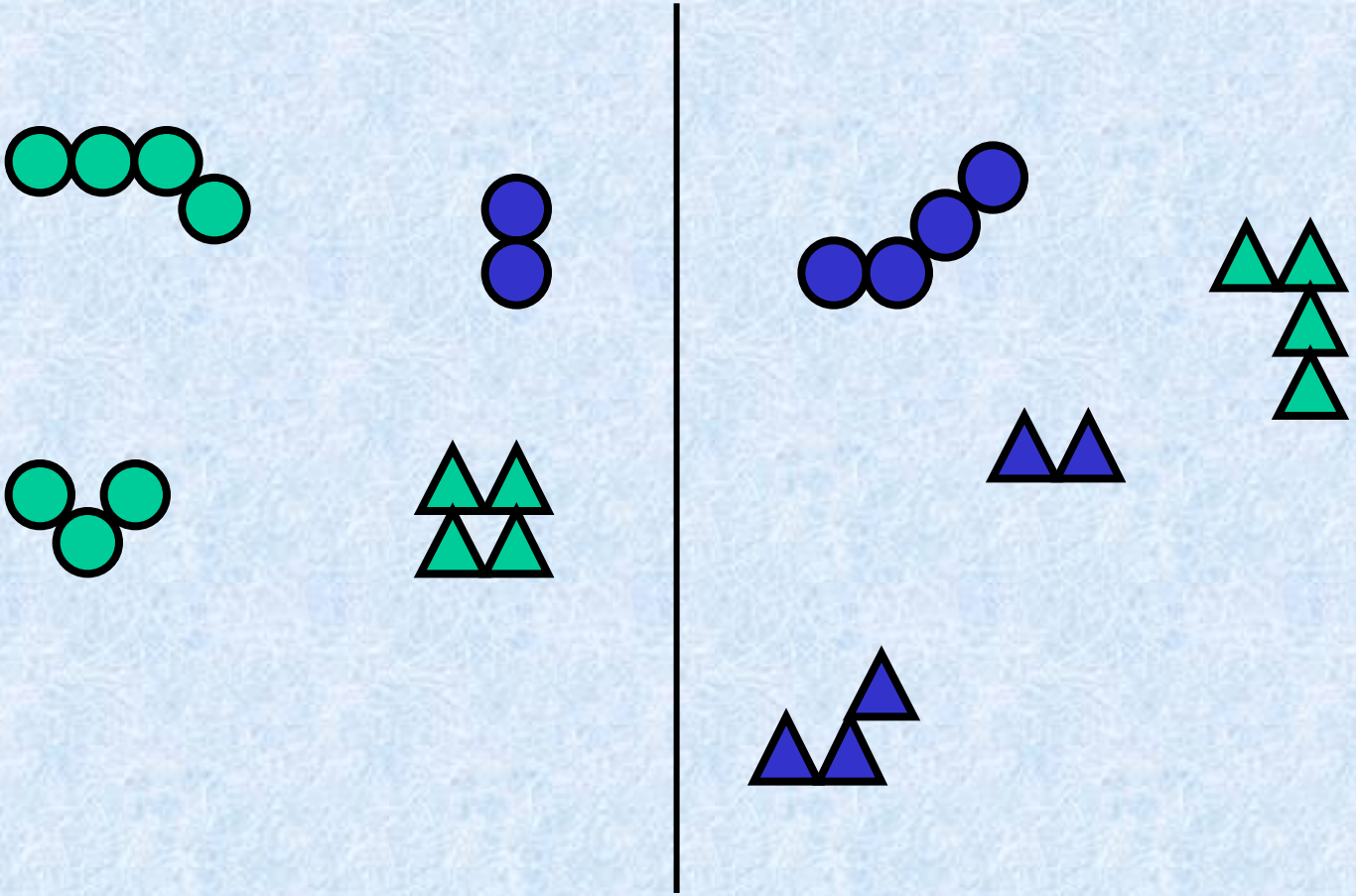
- Circles

Game Two



- Green and triangles

Game Three

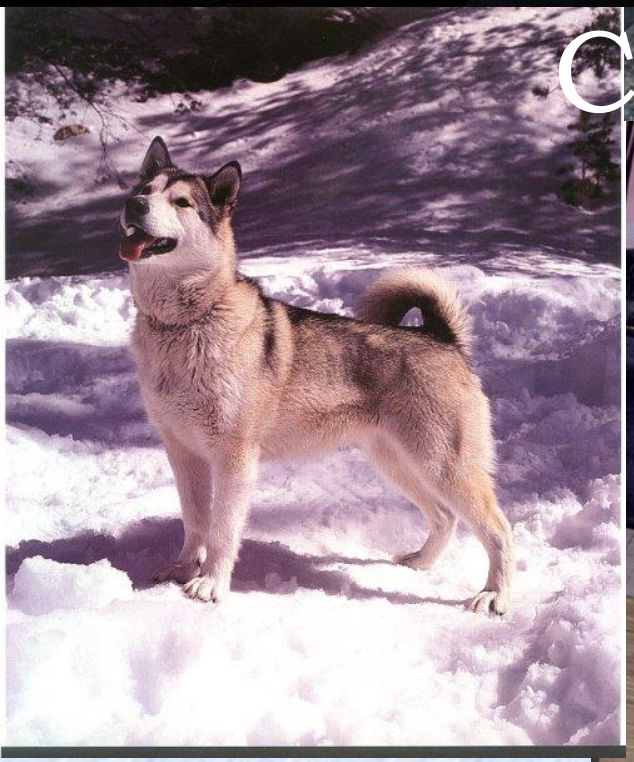


- At least two of green, symmetrical and circles.

Wittgenstein (1958)

"Consider for example the proceedings we call "games". I mean board games, card games, Olympic games, and so on. What is common to them all?-Don't say: 'There must be something in common, or they would not be called games - but look and see whether there is anything common to all. - For if you look at them you will not see something that is common to all, but similarities, relationships, and a whole series of them at that…I can think of no better expression to characterise these similarities than 'family resemblances'"



Cats and dogs

Schizophrenia

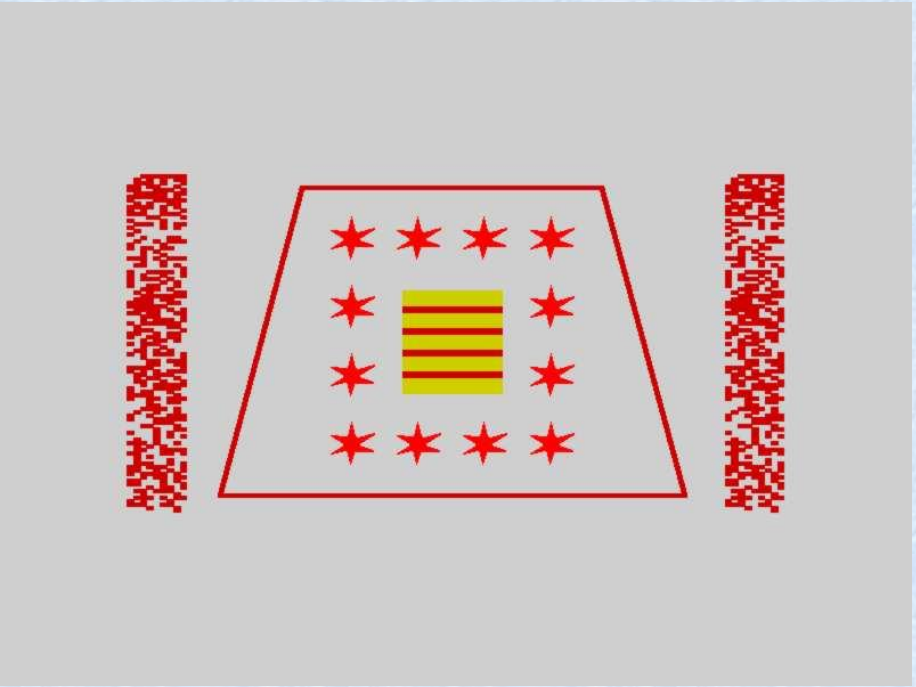
Extract from DSM III R

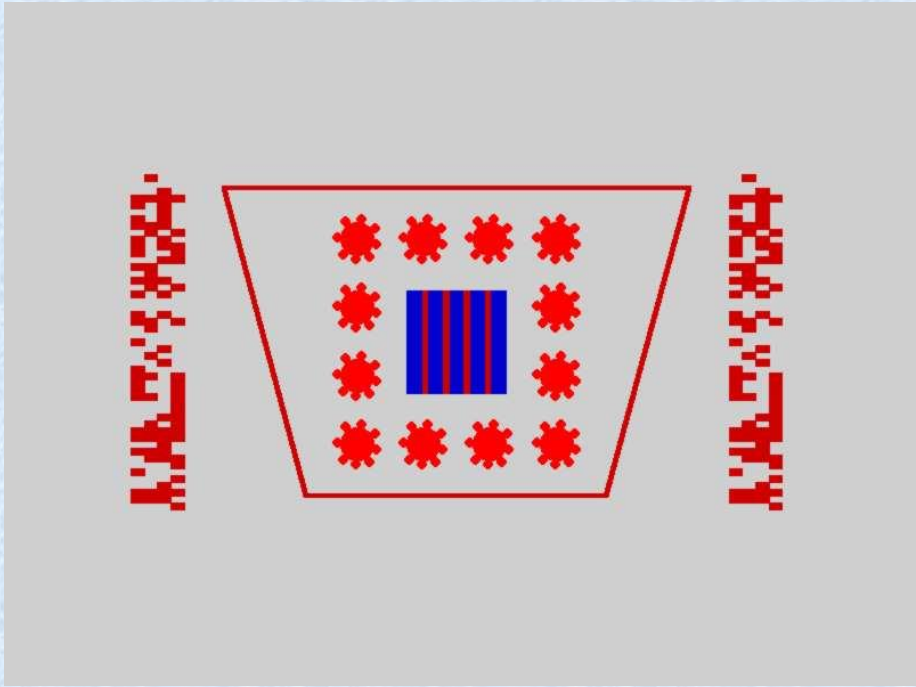
- At least two of:
  - Delusions
  - Hallucinations
  - Incoherence / loose associations
  - catatonic behaviour
  - flat / inappropriate affect

Research question

- What is it that makes polymorphous concepts so difficult?
  - **Load:** Lots of different things to learn at the same time.
  - **Conflict:** Feature->Category association is not reliable

The Concept

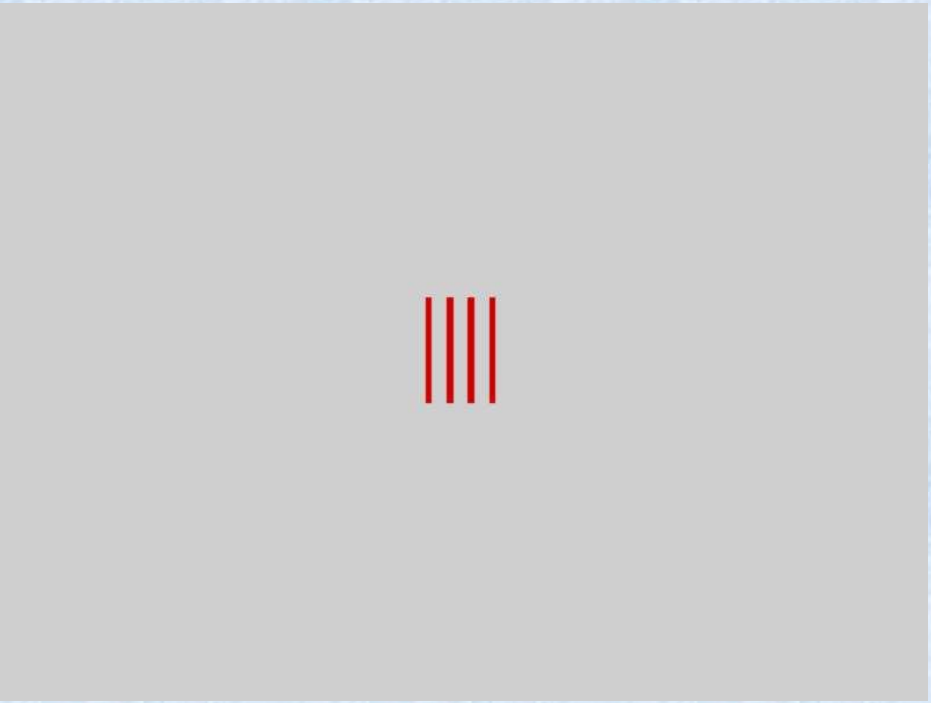


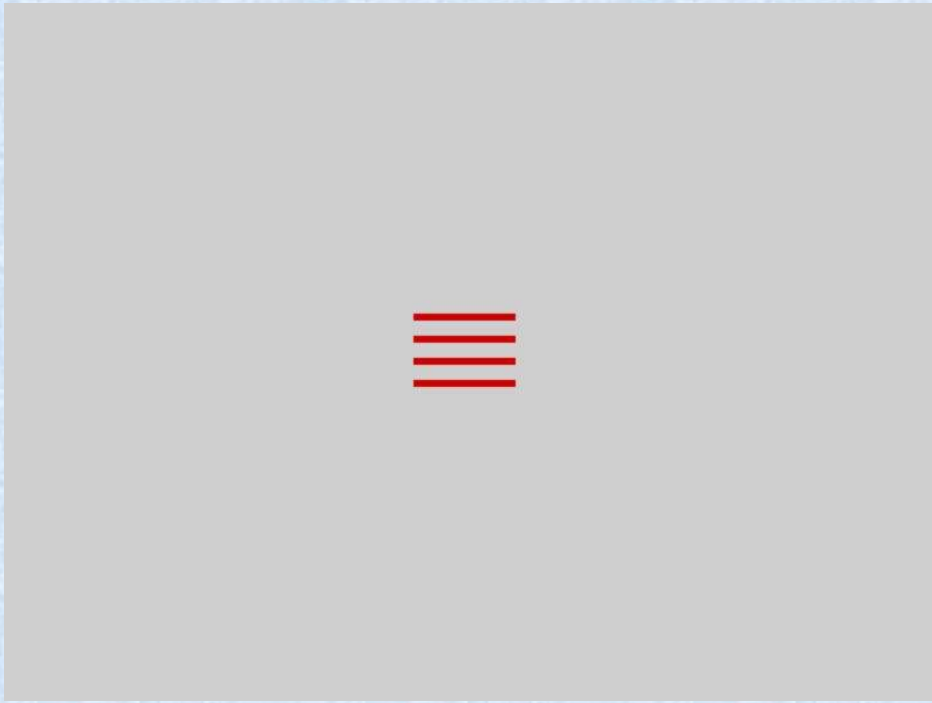


Correct.

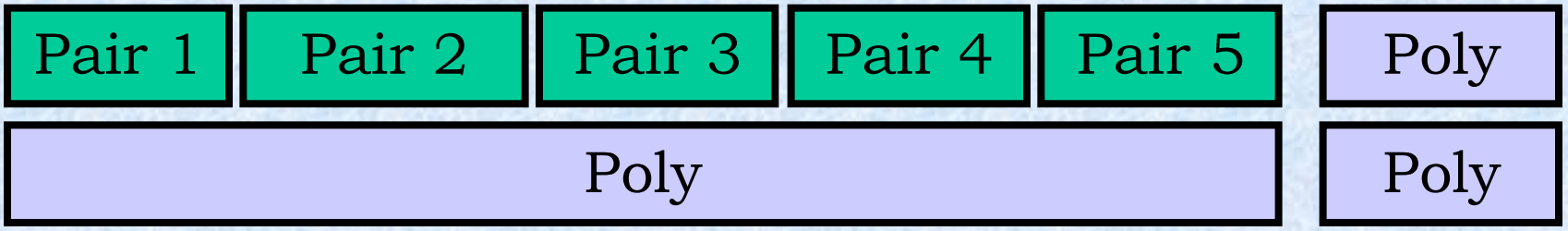
It was category B.

The pre-training



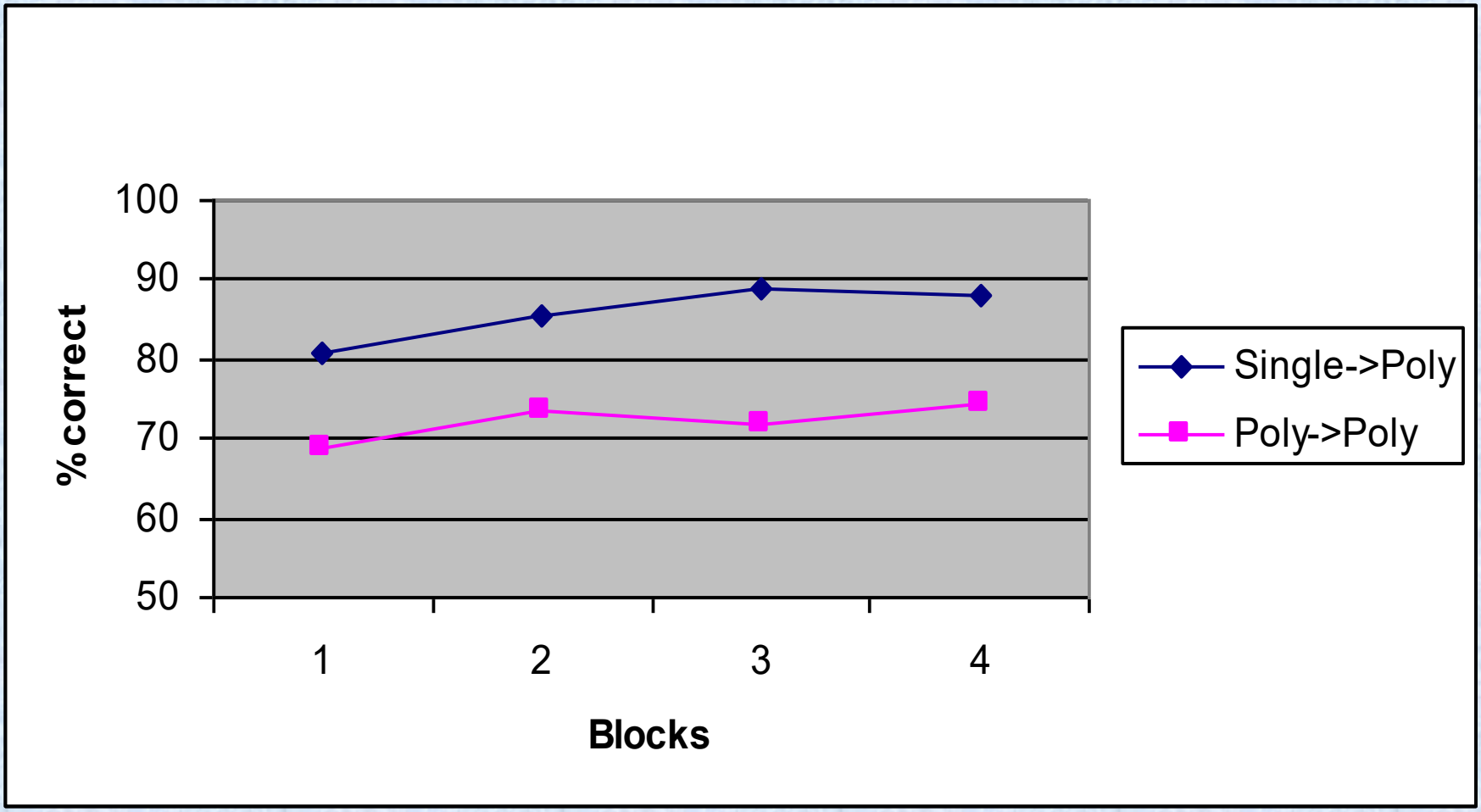


Experiment One

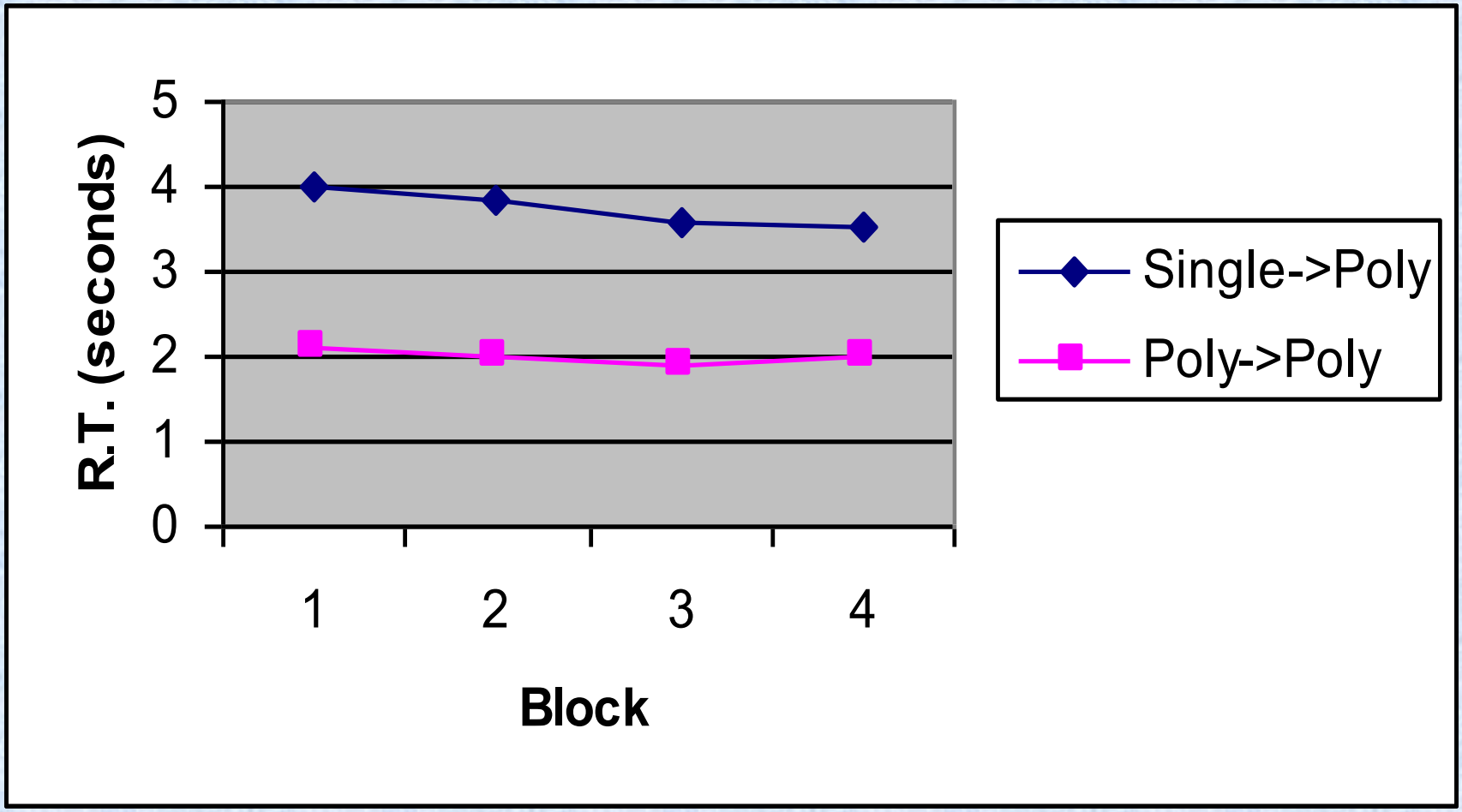


- “To criterion” training on each pair
- Transfer to the full concept
- Matched controls

Results



Results



Church effect

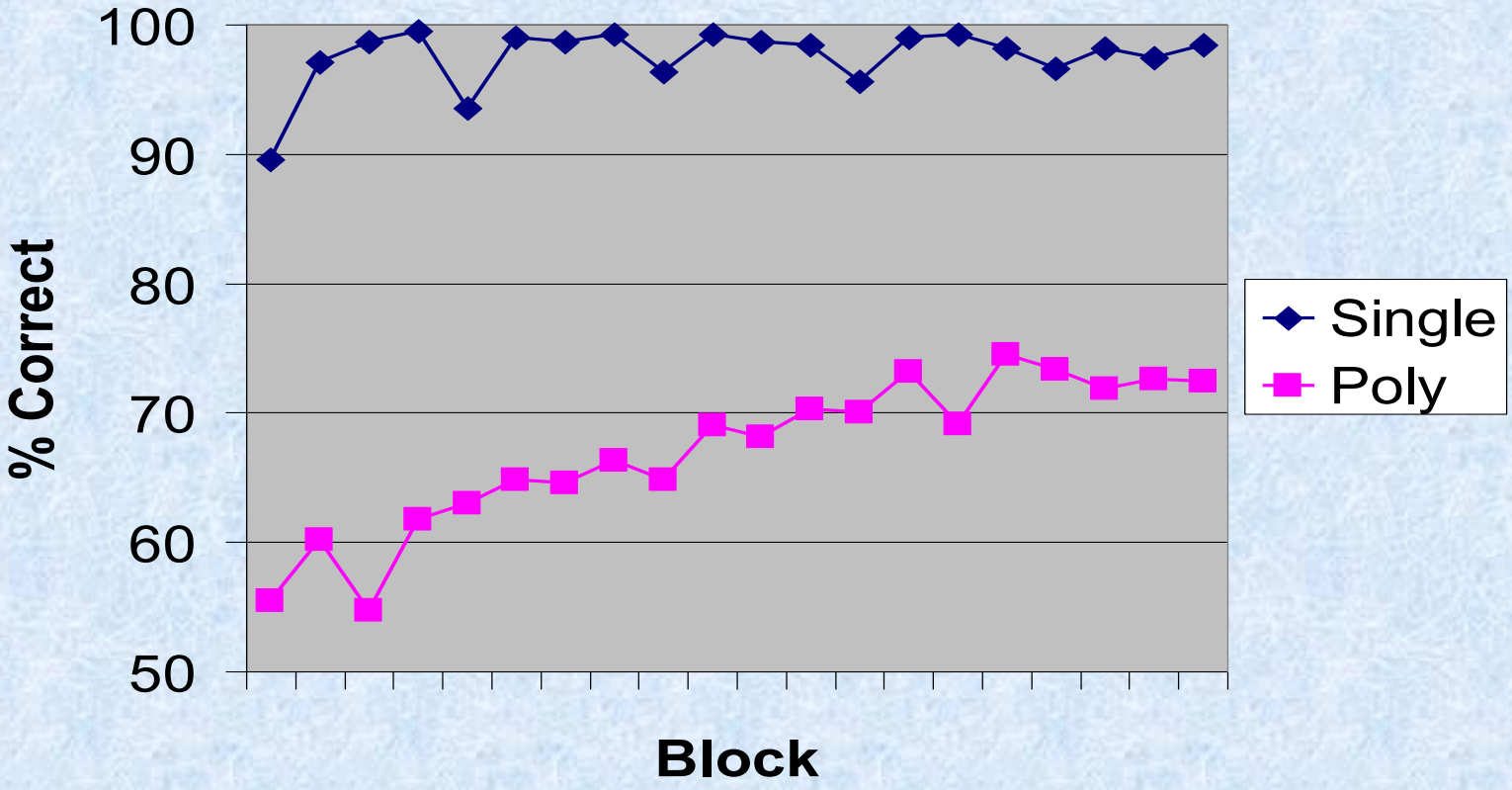
(You must be yoking)

- People differ
  - e.g. some are slow learners, others fast
- "Yoking" participant
  - Always gets the amount of training they need to reach 100% accuracy.
- "Yokee" participant
  - If *slower* than **yoking**, learns less.
  - If *faster* than **yoking**, learns more, but only a little more because of a ceiling effect.
- **Yokee** group will be worse the **yoking** group even if tasks are identical.

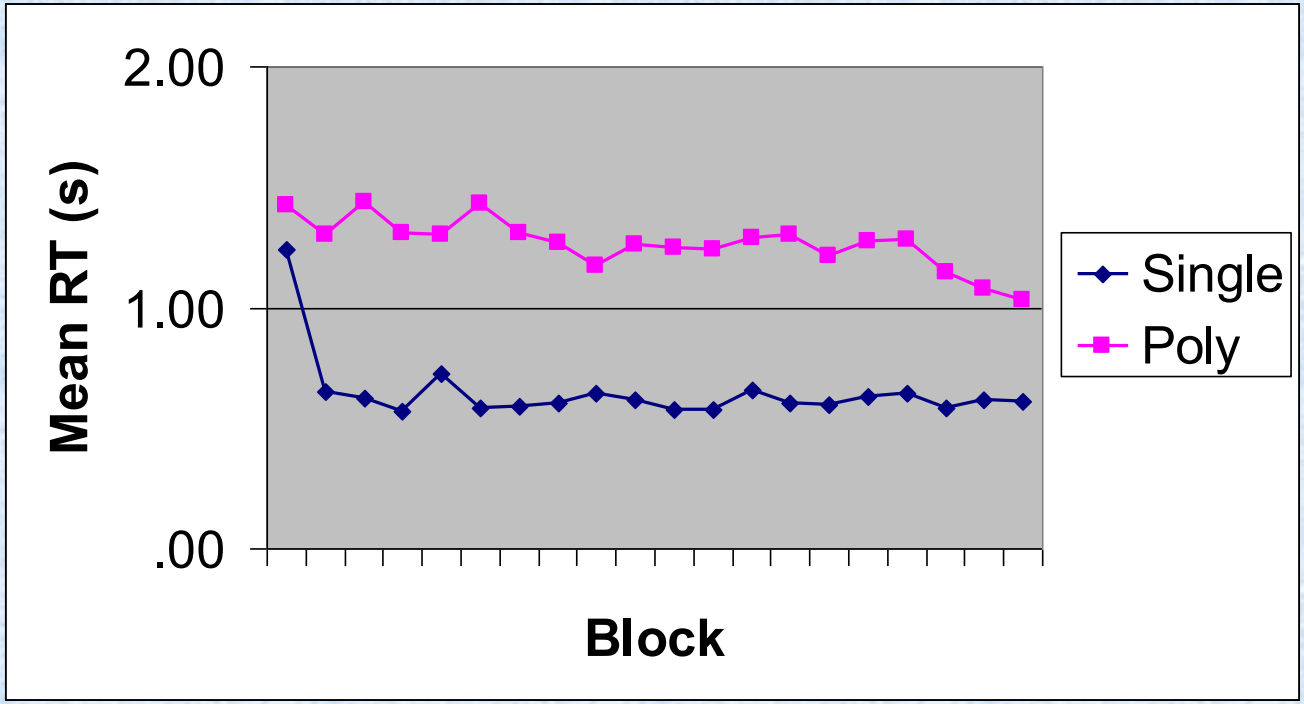
Experiment Two

- Fixed amount of phase one training
  - 4 blocks for each of 5 dimensions (estimated from Experiment One).
- Time pressure
  - Annoying “HURRY UP” sign flashes after 3000ms (estimated from Experiment One)

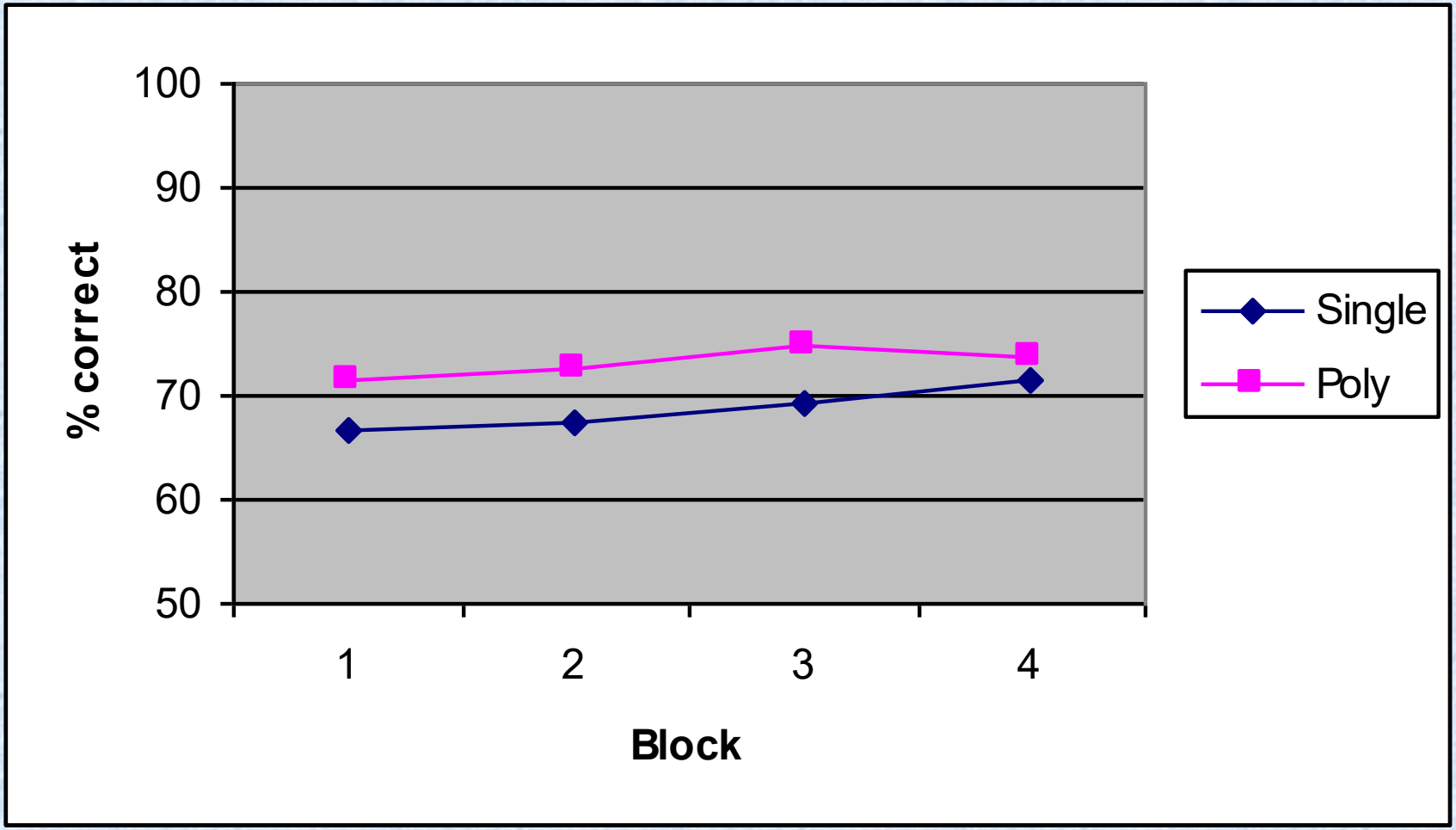
Experiment 2: Phase 1



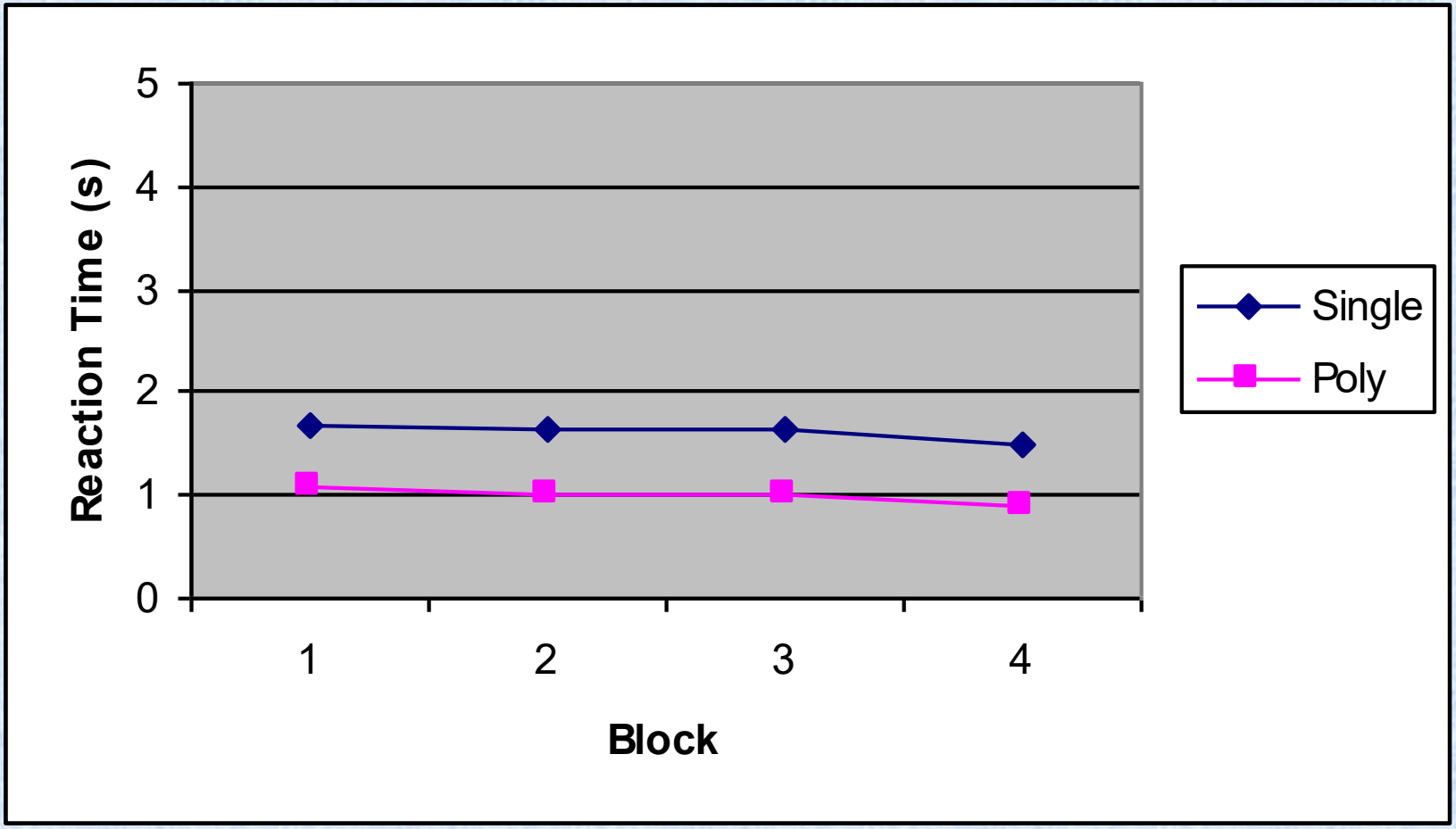
Experiment 2: Phase 1



Experiment 2: Phase 2



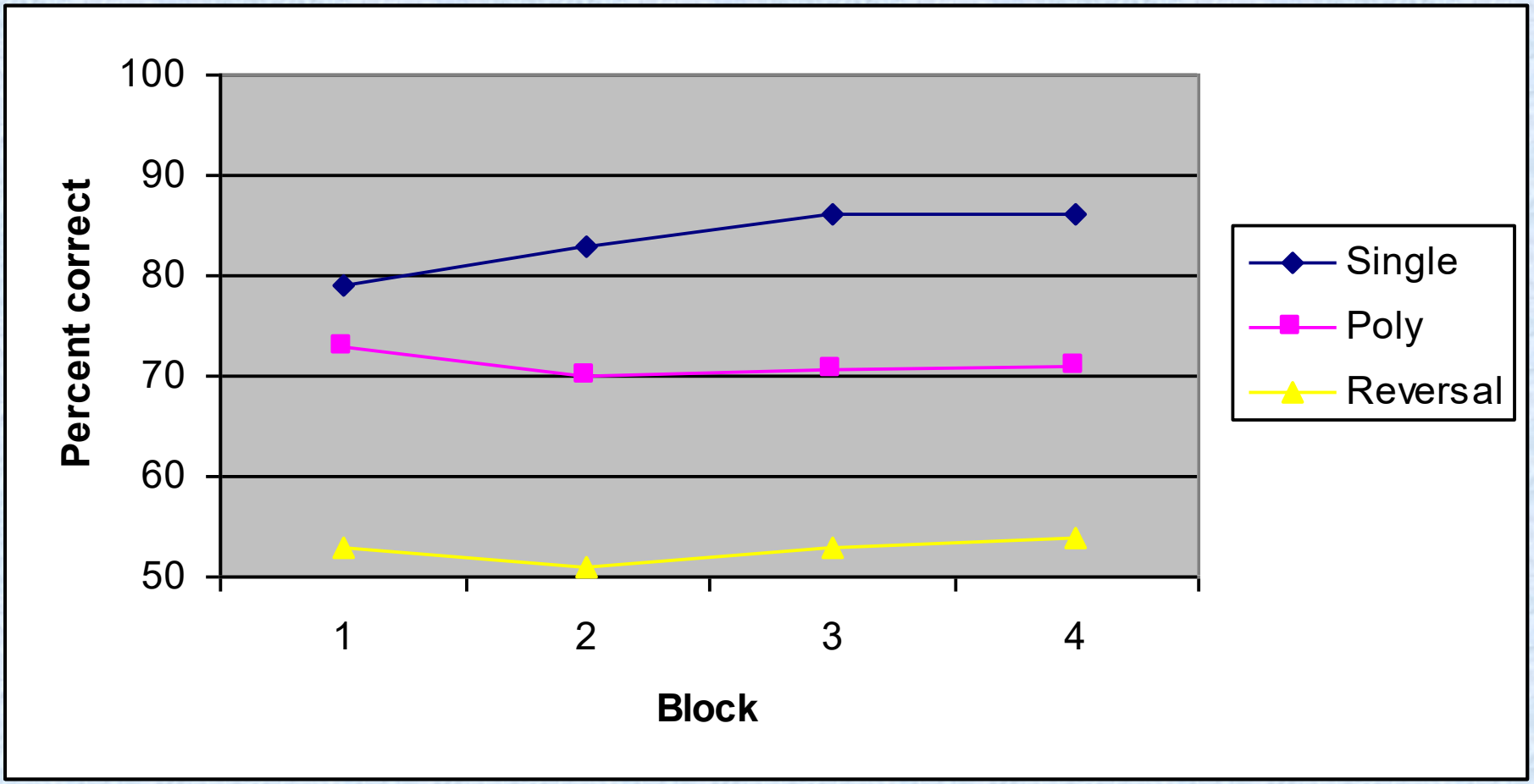
Experiment 2: Phase 2



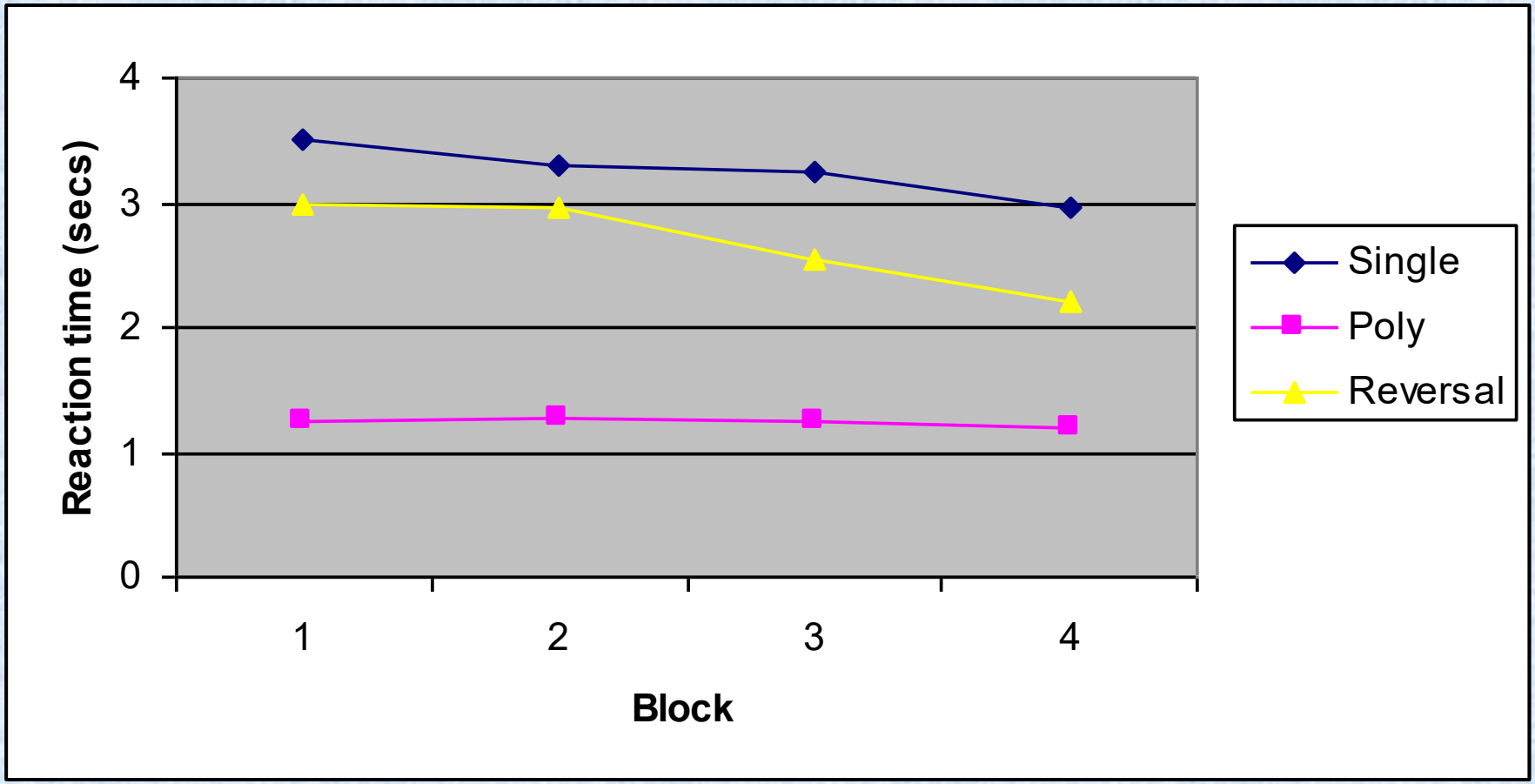
Experiment Three

- No time pressure
- Reversal condition
  - 3 out of 5 associations swapped.
  - e.g. Vertical stripes now = category A.

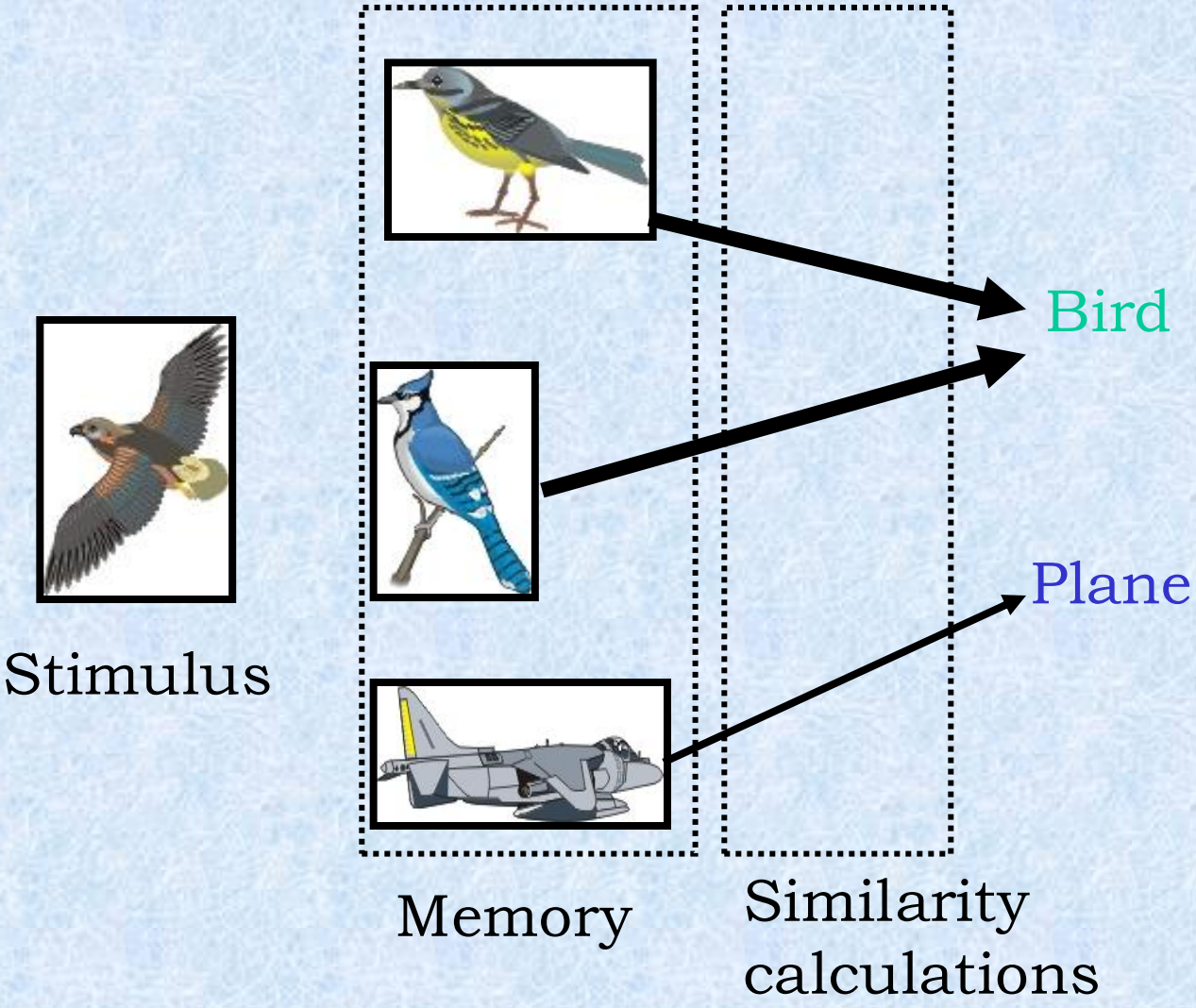
Experiment 3: Phase 2



Experiment 3: Phase 2

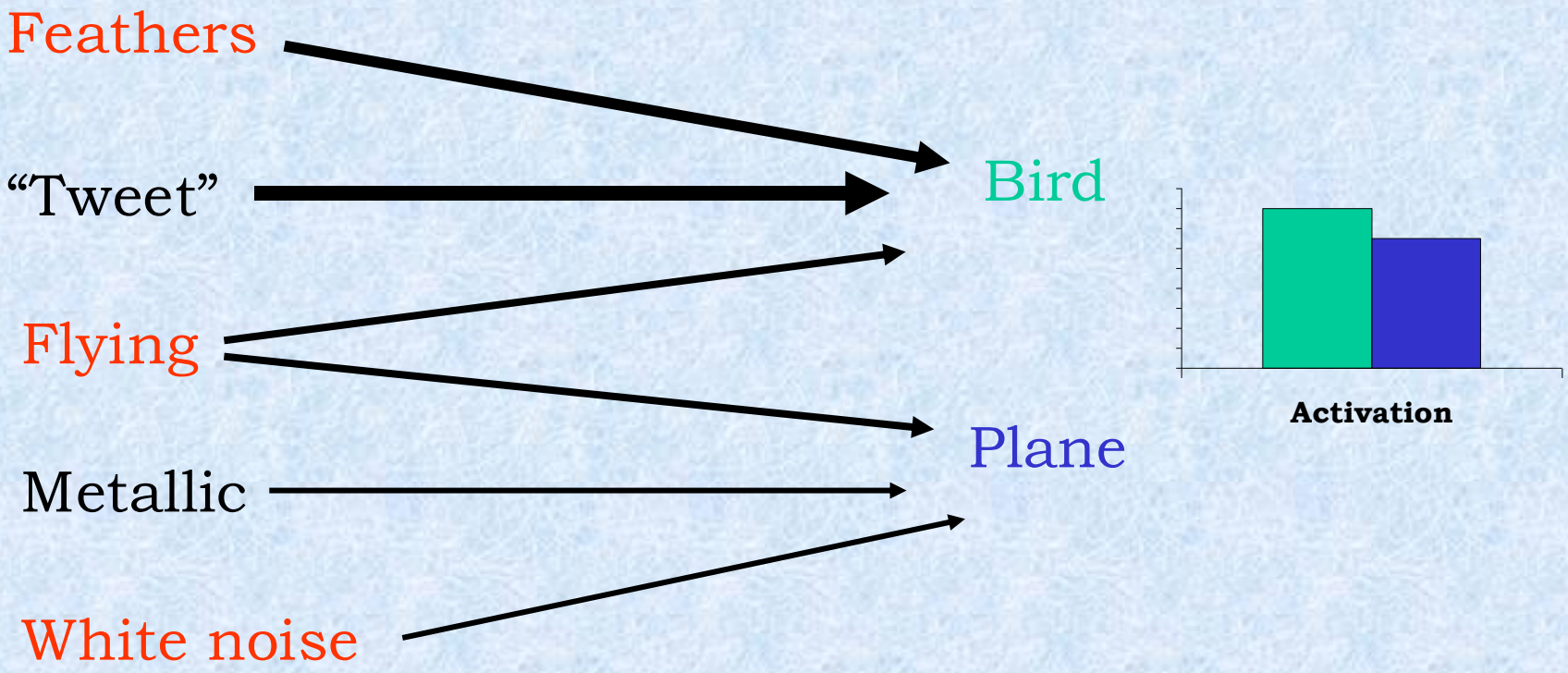


Instance-label theories



- Our pre-training should not be better than training on real items

Feature-label theories

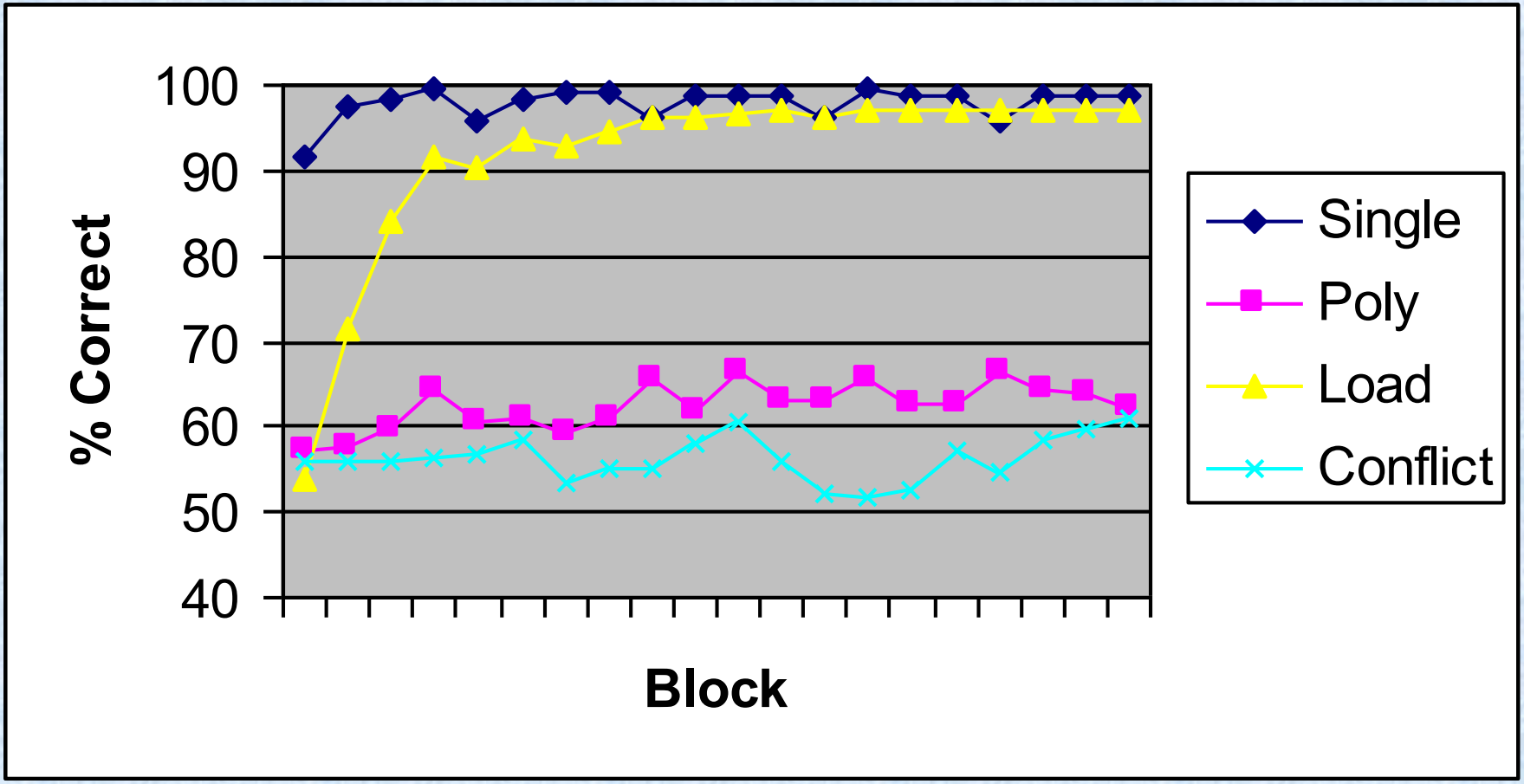


- Simulations indicate that results are not predicted.
- Single is better, but advantage declines over phase 2!

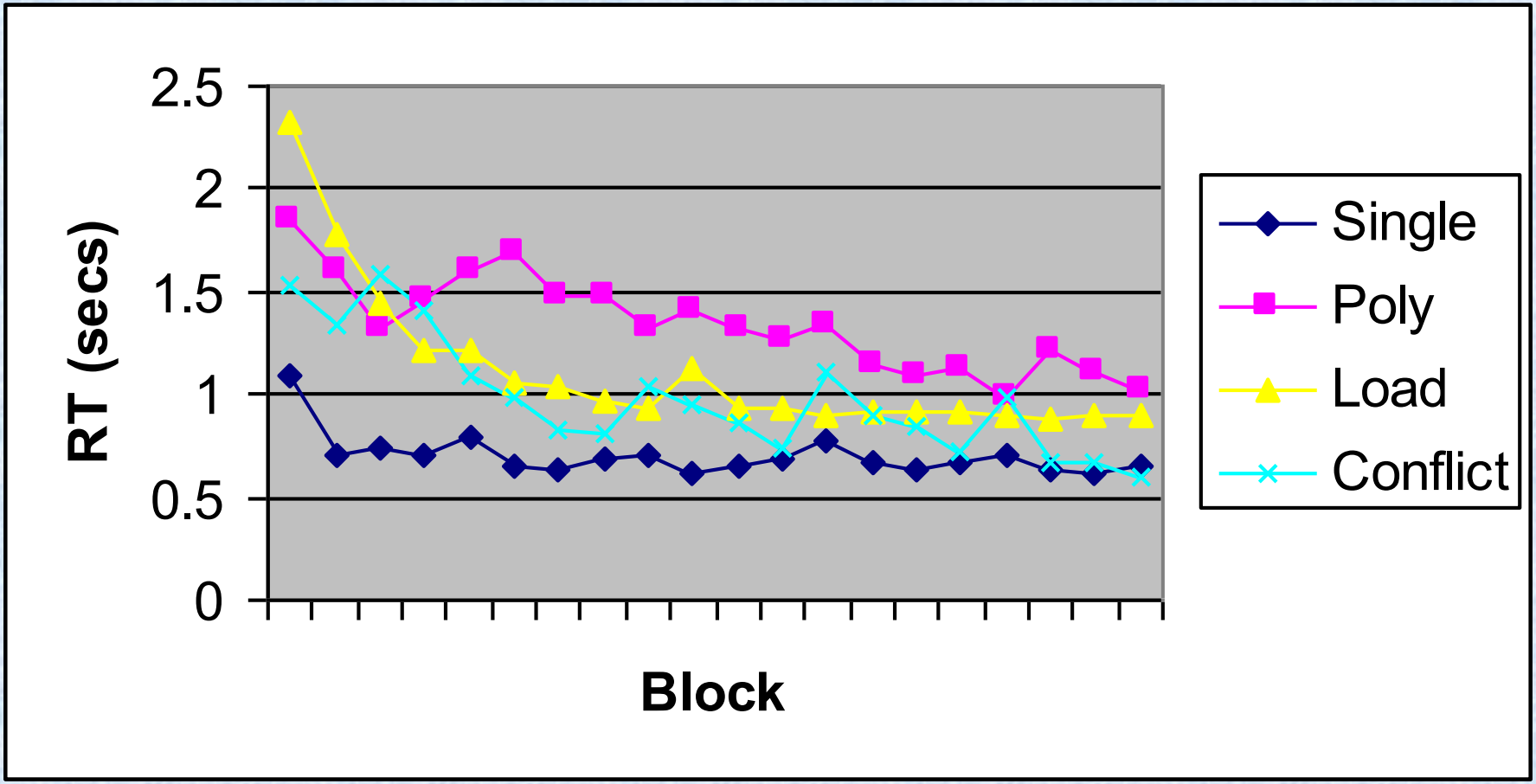
Experiment Four

- Load vs. conflict
  - Inter-mixed training
  - Unreliable training

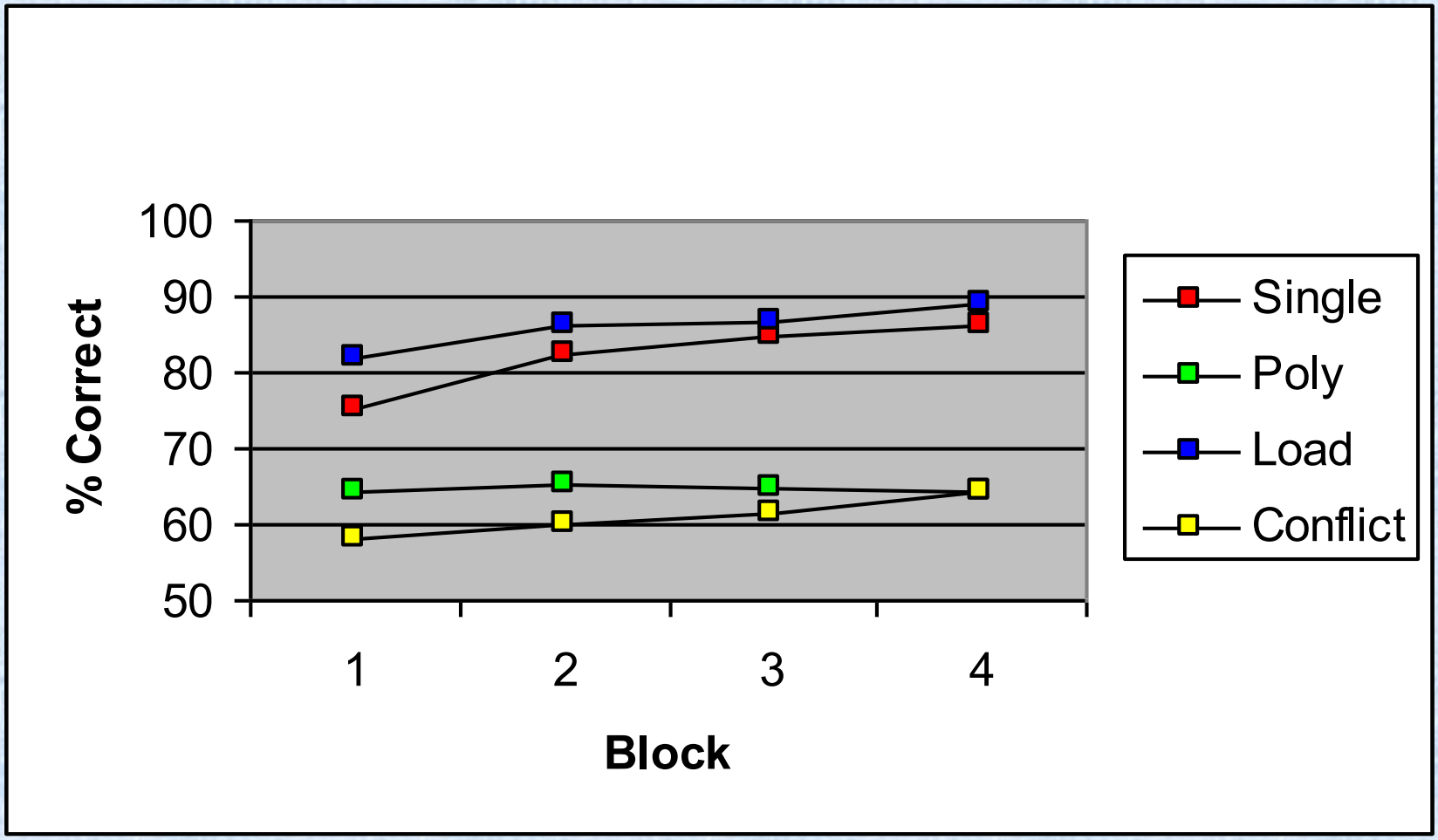
Experiment 4: Phase 1



Experiment 4: Phase 1



Experiment 4: Phase 2



Experiment 4: Phase 2