**Conclusion: Learning can happen non declaratively** and translates to different stimulus types

-**Simon effect** (stimuli in right direction work better)

--Modally (spatial) valid cues better than abstract/symbolic

-Speed/accuracy trade-off was present.

**Discussion**: Does reflection lead to noticing pattern?

**Fig. 4**: Individual data: **Less pronounced hierarchy** between fixed and random in digits -> **main effect may be modally translating** regardless of training

-Much messier than average -> individual experiences differ

**Fig. 2:** Does **order** of completion matter?

-Main effect of stimulus, no effect of order: **RT is lower in position-condition regardless of order** of completion

-Interaction stimulus and order: **general practice/training effect** (how much lower RT is in positions depends on the order of completion)

**Fig. 2: Practice effect**: test of only novel/random blocks

-Repeated measures ANOVA with only novel blocks (includes first block as it is effectively random)

-Main effect of stimulus: **Position still has lower RT**

-Not including first block gives effect of block: training effect -> better performance at later blocks

-Interaction stimulus and block: effects combine to make the first block in the digits condition have highest RT (not just additive)

-**Slope is steeper for digits condition** (larger difference between order groups) -> **training in the positions condition may have greater effect**

**Perspective:** Grounded cognition (Barsalou), SNARC effect, HM (hippocampus dmg but intact skill learning), conditioning

**Other tasks testing implicit memory:** mirror drawing, Tower of London (non-declarative patients improve), Priming tasks (speed of recognition for previously seen material),

o Repetition priming in fMRI: When the task has been done before, the brain will complete the task faster and with less effort the second time around

 Repetition of the same stimulus: weaker signal in viewpoint-specfic areas -> When the task has been done before, the brain will complete the task faster and with less effort the second time around

**Fig. 3**: Accuracy confirms findings + speed/accuracy trade-off

-Main effect of stimulus: **position has fewer errors** -> positions are easier (**lower RT as well**)

-Main effect of sequence type: fixed sequences have fewer errors -> **sequence learning**

-Positive correlation between RT and ACC -> **Both conditions have speed/accuracy trade-off**

**Individual differences**

-Positive correlation between performance in both conditions: P’s who did well in one did well in the other, regardless of which block was measured

-The effect is **stronger for random** blocks suggesting **individual differences** (talent…)

**Fig. 1**: sequence learning as determined by RT

-**Positions have lower RT** than digits

-**Fixed sequences have lower RT** than random sequences

-Looks like RT for fixed sequences **decreases** (and is lower than random) -> **sequence learning**

**Statistics**:

-Main effect of **stimulus**: RT for **positions lower**

-Main effect of **block**: Difference in RT across blocks -> may be caused by **contrast between fixed and random**

-Interaction stimulus and block: initial learning may be less effective for positions (floor/ceiling effect?)

**Method:** Computer-based reaction-time experiment

-**20 blocks of 24 trials**, of positions or digits (1-4) 500 ms

-Response indicated **by key press with corresponding finger**

-**Counterbalancing** between positions or digits first between subjects

-**Fixed sequence** of cues/responses except every 5th block

**RTPD:** implicit memory and skill learning

**Hypotheses**

-Participants are expected to become **faster at fixed sequence** blocks but maintain **steady RT for random** blocks

-**Positions will produce lower RT** than digits as digits must be **modally translated** to provide spatial cue (Simon effect)

-Faster RT equals learning

-Speed/accuracy trade-off