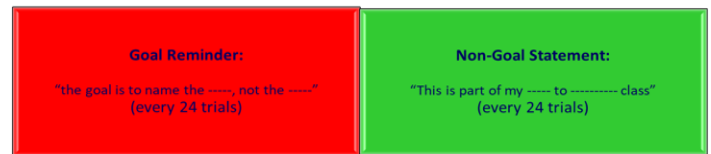# Providing External Support for Task Goals Boosts Selective Attention
for Lower Working Memory Capacity Individuals

Keith A. Hutchison (Montana State University)

- Attentional Control is the ability to orchestrate thought and action in accord with internal goals *in the face of distraction.*
  - Individuals lower in attentional control, such as those lower in working memory capacity (WMC), have difficulties in selective attention tasks such as Stroop, Flanker, Antisaccade, etc…
  - These WMC differences are larger in lists with mostly congruent items (green, blue, red, etc…).
  - The main explanation is lower WMC individuals have difficulty maintaining tasks goals.
    - Encountering frequent incongruent items (e.g., blue) in mostly incongruent lists helps remind them of the task goal to name the color not the word.
  - However, list-wide effects might reflect more than goal-maintenance abilities such as…
    - Item-specific effects: Mostly congruent lists contain mostly congruent items and vice-versa.
    - Sequential conflict adaptation: Other "reactive" explanations for less Stroop following incongruent trial.
    - Temporal Learning: People get in habit of responding faster in easy (e.g., mostly congruent) list.
 - Therefore, need more straightforward manipulation of goal maintenance…

- **Current Study**
  - Auto-ospan task to measure WMC and then Stroop task with goal reminder or non-goal statements every 24 trials.
 - Goals manipulated within-subjects (Exp 1) or between-subjects (Exp 2)

  Goal Reminder:
  "the goal is to name the -----, not the -----"
  (every 24 trials)

  Non-Goal Statement:
  "This is part of my ----- to ---------- class"
  (every 24 trials)

  - **Exp 1 (within-groups)**
    - Overall Stroop x WMC interaction.
    - But no effect of goal manipulation.
    - Suggests either (1) goals not effective or (2) carry-over effect of intermixing non-goal statements diluting effectiveness of goals.

  Red = goal, Green = non-goal
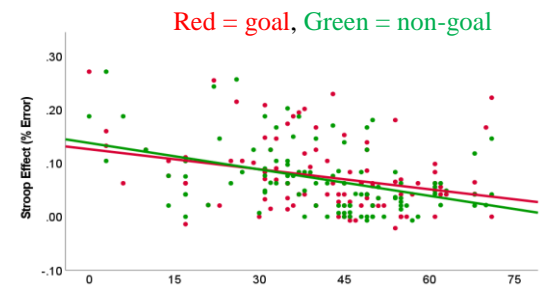
  - **Exp 2 (between-groups)**
    - Overall Stroop x WMC interaction.
    - Goal x Stroop x WMC interaction.
    - Goal reminders help lower WMC more than higher WMC.
   - Eliminate WMC difference in Stroop.
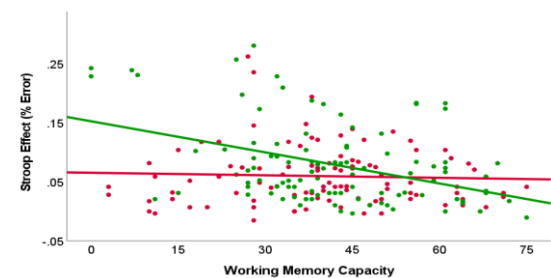
    - 4-way interaction with trials
      - Lower WMC in non-goal condition increase Stroop errors across each set of 24 trials, those in goal reminder condition did not. (i.e., goal differences increase across trials).

Trials 1-6 following goal/non-goal

Trials 13-18 following goal/non-goal
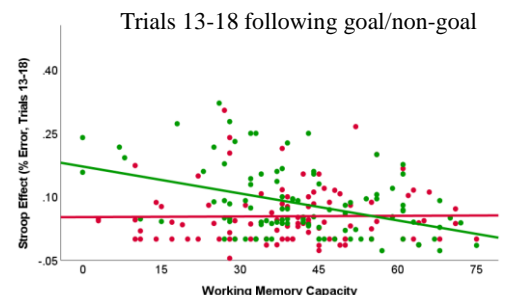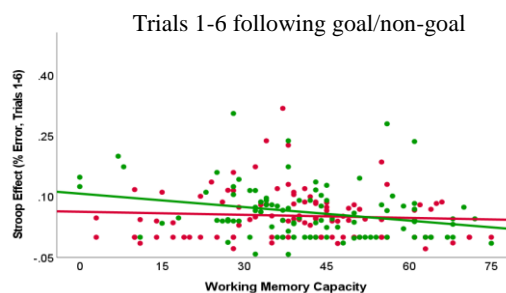
- o Examining time-course of goal effects.
  - ▪ Examined Goal x WMC x Stroop interaction after every 24 trials.
    - • WMC continuous in analysis, but WMC Tertile groups shown below for illustration.
  - ▪ Goal reminders accumulate in strength over time.
    - • Pattern stabilizes after 4-5 reminders.
    - • Lower WMC under goal condition eventually resemble high WMC under normal conditions.
    - • Goals help those lower in WMC stay focused throughout experiment.
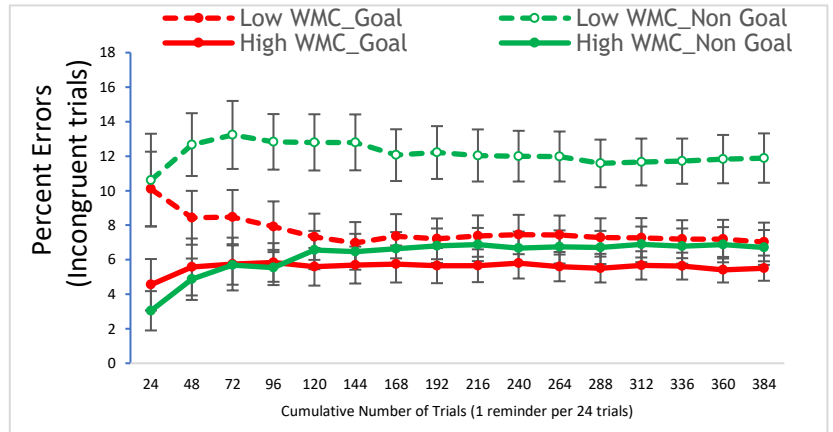
- o **Conclusion**
  - ▪ Goal reminders eliminate the relation between WMC and Stroop effects.
  - ▪ But…
    - • Must be firmly established, without disruption from non-goal statements (i.e., between-group manipulation).
    - • WMC continuous in analysis, but WMC tertile groups shown below for illustration.
    - • Goal reminders are long-lasting and accumulate in strength over the course of the experiment.