Necker Cube Reversals: A test of Inhibitory Efficiency in Aging
Sheree T. Kwong See, Charles Bourassa, & Michelle Tsutsumi, Department of Psychology

INTRODUCTION

- Decline in inhibitory efficiency is hypothesized to underlie age-related decrements on a number of cognitive tasks including language and memory (e.g., Hasher & Zacks, 1988; Kwong See & Ryan, 1995; Waldie & Kwong See, in press).
- Existing evidence for the inhibitory deficit hypothesis has been critiqued on a number of fronts (Burke, 1997; McDowd, 1997).
- The studies presented here examine age differences in inhibition using reversals of a Necker Cube (see Figure 1) as a new measure of inhibitory efficiency in aging.

STUDY 1

- Do older adults shift perspectives less frequently than younger adults?
- What is the nature of the age difference in frequency of reversals?

METHODS

- PARTICIPANTS
  - 28 young adults (32% male), aged 18-32 years (M= 19.5, SD= 2.9 years)
  - 25 older adults (20% male), aged 61-79 years (M= 68.7, SD= 3.7 years)

- PROCEDURE
  - Necker cube is presented on a computer screen (see Figure 1).
  - Participant indicates when perspective spontaneously changes using arrow keys:
    - if perspective changes to left
    - if perspective changes to right
  - 10 trials, 30 seconds per trial
  - Number of shifts in a trial and duration to each reversal measured

- RESULTS

  - 2 Age Group (young, old) x 10 Trials mixed ANOVA on time to first reversal showed an effect of Trial only, F (9,459)= 7.5, η² = .13, p < .0001. The nonsignificant effect for Age Group suggests young and old inhibit the first perspective at an equal rate (see Figure 3).

STUDY 2

- Do older adults exert less conscious control over inhibition involved in perspective shifts (reversals)?

METHOD

- PARTICIPANTS
  - 50 young adults (28% male), aged 18-28 years (M= 19.0, SD= 1.7 years)
  - 38 older adults (34% male), aged 63-87 years (M= 73.3, SD= 7.0 years)

- PROCEDURE
  - Same as STUDY 1 but:
    - ½ participants told to initiate shifts as frequently as possible
    - ½ participants told to hold a perspective as long as possible

- RESULTS

  - 2 Age Group (young, old) x 2 Instruction (initiate, hold) x 10 Trials mixed ANOVA on number of reversals showed an effect of Trial, F (9,747)= 5.9, η² = .07, p < .0001, Instruction, F (1,83)= 19.8, η² = .19, p < .0001, and an Instruction x Trial interaction, F (9,747)= 5.4, η² = .06, p < .0001. There were no effects of Age Group and no interactions with Age Group.

CONCLUSIONS

- Older adults engage inhibition as effectively as young adults to the first reversal.
- Older adults shift perspectives less frequently than young adults across trials because inhibition is engaged less effectively over the duration of a trial.
- Older adults can exhibit some conscious control over inhibition involved in perspective shifts.