**Are older adults’ actions guided by their perceptions during aperture crossing?**

**Purpose**
Are the actions of older adults guided by their perceptions when walking through apertures?

**Hypothesis**
Age-related differences in actions will be attributed to differences in dynamic perceptions.

**Findings**
Individuals’ actions are guided by their dynamic perceptions.

**Introduction**
- Perceptions and actions are coupled [1] such that instantaneous changes to action capabilities affect perception [2].
- Dynamic perceptions can accurately predict actions when stepping over obstacles [3].
- Age-related differences exist in aperture crossing (i.e. Critical Points of young adults (YA) = 1.3, older adults (OA) = 1.6 [4,5]).
- Our purpose was to determine if these differences in action were due to differences in perception.

**Methodology**
- 10 Young Adults (M= 22.9 yrs), 6 Older Adults (M= 69.8 yrs), 3 active Older Adults (M= 71.3 yrs).
- 3 tasks (2 perceptions & 1 action):
  1. Static perception: stood 5m from aperture & decided if passage without shoulder rotation was possible.
  2. Dynamic perception: approached aperture from 10m & made same perceptual judgement at 5m mark.
  3. Action: approached aperture at self-selected pace & passed through the aperture in an appropriate way.
- Aperture width varied from 1-1.8x shoulder width.

**Results**

**Fig 2.** Static perceptions are not different across groups.

**Fig 3.** OA have different dynamic perceptions than YA (p<0.01) & active OA (p<0.01).

**Fig 4.** OA have a larger Critical Point (1.6) than YA (1.4) & active OA (1.4).

**Fig 5.** OA have more variable shoulder rotations than YA & active OA (p<0.01).

**Dependent Variable**

- Initiation of shoulder rotation.
- Shoulder rotation occurred if angle > 5° above baseline.

**Fig 6.** Ariel view of shoulder angle measurements.

**Conclusions**
- Older adults rotate shoulders at larger aperture widths than both young adults and active older adults when passing through apertures (Fig. 4).
- Group differences in actions cannot be detected through static measurements of perception (Fig. 2).
- Dynamic perceptions are in line with the actions produced when walking through apertures (Fig. 3).
- Dynamic perceptions appear to be related to differences in stability across the groups.
- Older adults compensate for decreased stability by employing actions that are more cautious.
- Active older adults act similar to young adults.
- Physical activity may help slow the age-related differences in actions as seen in shoulder rotation variability (Fig. 5).
- Age-related differences in actions are affected by perceptions during dynamic stability.

**References**