Research Plan: Is there a lower visual field preference for object affordances? A series of online reaction time studies.

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Background

- Reaction times (RTs) are faster when the hand used to respond to an irrelevant task (e.g. is the object upright or inverted) is the same side as the handle[1]. This has been attributed to **affordances.**
- Some argue that the speeded RTs are a result of spatial compatibility rather than affordances[2]
- To separate spatial compatibility from affordances, researchers have added a condition where participants judge colour, as the judgement relies on low-level processing which should not trigger affordances.[3,4]
- Humans are more efficient at reaching and grasping in the lower visual field[5], however whether there is a lower visual field (VF) advantage in affordances remains to be tested.

Aims

- Assess the contribution of affordances to the handle compatibility effect in a well-powered pre-registered online study.
- Investigate whether affordances differ when objects are in the lower or upper VF.

Analysis Plan and Expected Results

✗ Timeout ✗ Incorrect responses ✗ RTs > 2SD ✗ <75% accuracy

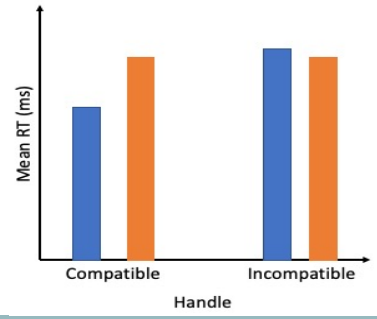
2 (handle: compatible, incompatible) x 2 (task: orientation, colour **OR** visual field: upper, lower) RM ANOVA on mean RTs.

Study 1 and 2
- Orientation
- Colour

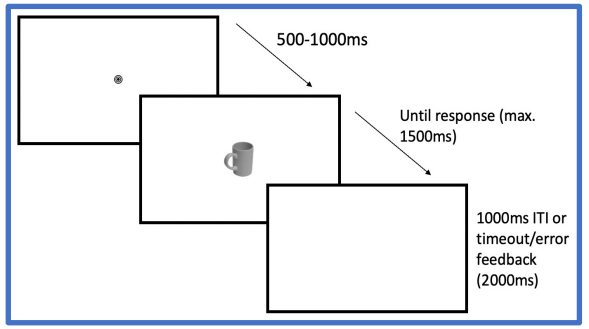
Study 3
- Lower VF
- Upper VF

We expect:

- Significantly faster RTs in compatible conditions when task is to judge orientation, and when objects are in the lower VF.
- No significant difference between compatible and incompatible conditions when responding to colour, and when objects are in the upper VF.

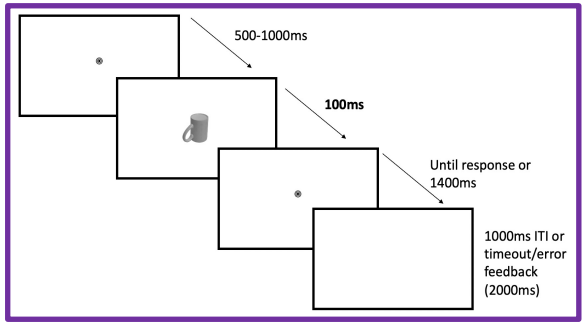


Method



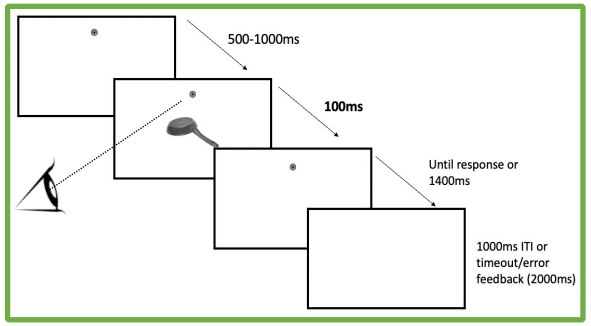
Study 1 (N = 68)

- Participants judge whether the object is upright or inverted by pressing ‘q’ or ‘p’.
- In separate blocks, participants judge whether the object is green or red.
- The hand used to correctly respond will be **compatible** or **incompatible** with the handle.



Study 2 (N = 68)

- Participants respond to upright or inverted and green or red in separate blocks.
- Stimuli appear centrally for 100ms, then replaced with fixation.
- This is to ensure the effects are observed when stimuli are briefly presented, and prevent eye movements in Study 3.



Study 3 (N = 68)

- Participants only respond to orientation (upright or inverted).
- Fixation appears above or below the centre, stimuli appear for 100ms centrally.

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References:

[1] Tucker, M., & Ellis, R. (1998). On the relations between seen objects and components of potential actions. *Journal of Experimental Psychology: Human Perception and Performance*, 830–846.

[2] Proctor, R., Lien, M.-C., & Thompson, L. (2017). Do silhouettes and photographs produce fundamentally different object-based correspondence effects? *Cognition*, *169*, 91-101.

[3] Saccone, E., Churches, O., & Nicholls, M. (2016). Explicit spatial compatibility Is not critical to the object handle effect. *Journal of Experimental Psychology: Human Perception and Performance*, *42*.

[4] Tipper, S. P., Paul, M. A., & Hayes, A. E. (2006). Vision-for-action: The effects of object property discrimination and action state on affordance compatibility effects. *Psychonomic Bulletin & Review*, *13*(3), 493–498.

[5] Danckert, J., & Goodale, M. (2001). Superior performance for visually guided pointing in the lower visual field. *Experimental Brain Research*, *137*, 303–308.

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Full stimuli set available here: https://osf.io/bp8kq/