**TITLE:** Distancing Metacognitive and Perceptual Responses: Does Separation Improve Judgement

**AUTHORS:** Brooke N. Jackson, Auriana D. Roberts, Jeanette C. Valleau, Barbara A. Church, & J. David Smith

**FACULTY SPONSOR:** Dr. J. David Smith, Professor, Department of Psychology

**INTRODUCTION:** Metacognition is often tested by allowing for an uncertain response (UR) to opt out of difficult trials. When stimuli and the UR are presented simultaneously, there is doubt as to whether these responses are truly metacognitive. Being simultaneous could cause the formation of negative associations between punishment and difficult stimuli creating a desire to avoid those trials. Therefore, performance could be caused by associative-learning rather than metacognition (Hampton, 2009).

**PURPOSE:** To determine whether humans’ responses to uncertainty are affected by the timing of the perceptual responses and metacognitive decisions.

**METHOD:** Participants decided whether pixelated boxes were sparse or dense. If correct, they gained points. If wrong, they lost points. They omitted consequences by choosing the UR. We compared humans’ use of the UR in four conditions (retrospective, prospective, absent, and present). In the retrospective condition, participants first decided sparse or dense and were then able to choose the UR. In the prospective condition, participants had to decide to take the trial or select the UR before they could respond sparse or dense. In the present condition, participants saw the box on the screen and chose sparse, dense, or UR. In the absent condition, participants were shown the box, which then disappeared, and they chose between sparse, dense, or UR. In all conditions when UR was chosen the score was not recorded.

**RESULTS:** Results showed that people are more likely to use the UR for difficult trials in the prospective and retrospective conditions. Humans seem to find it easier to choose the UR if it is separated in time from the perceptual response. Future research will test whether this is also true for monkeys.

**CONCLUSION:** Human responses are affected by the timing of the perceptual response and metacognitive decisions. Prospective and retrospective conditions show greater appropriate uncertainty responding than either the present or absent conditions suggesting that further removing the uncertainty response from the primary perceptual response increase the ability to use metacognitive information adaptively.

**KEY WORDS:**
- Metacognition
- Uncertainty
- Comparative cognition
- Associative learning