

Variation of Motor Control Strategy and the Number of Movements Per Condition

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INTRODUCTION

- According to the stochastic optimized submovement model (see Figure 1 left model):
 1. Movement endpoints should be planned to reach the center of a target
 2. Movement endpoint distributions should be normal and scaled to the size of the target region, without exceeding target's boundaries
- Slifkin and Eder (2017) results
 1. As target width increased, movement endpoint distributions shifted to the inner edge of the target region (see Figure 2).
 2. Results (Figure 2) possibly due to a change in movement strategy
 - *Speed maximization* – aiming to the center of the target – small target widths
 - *Distance minimization* – aiming to the inner edge of a target – large target widths

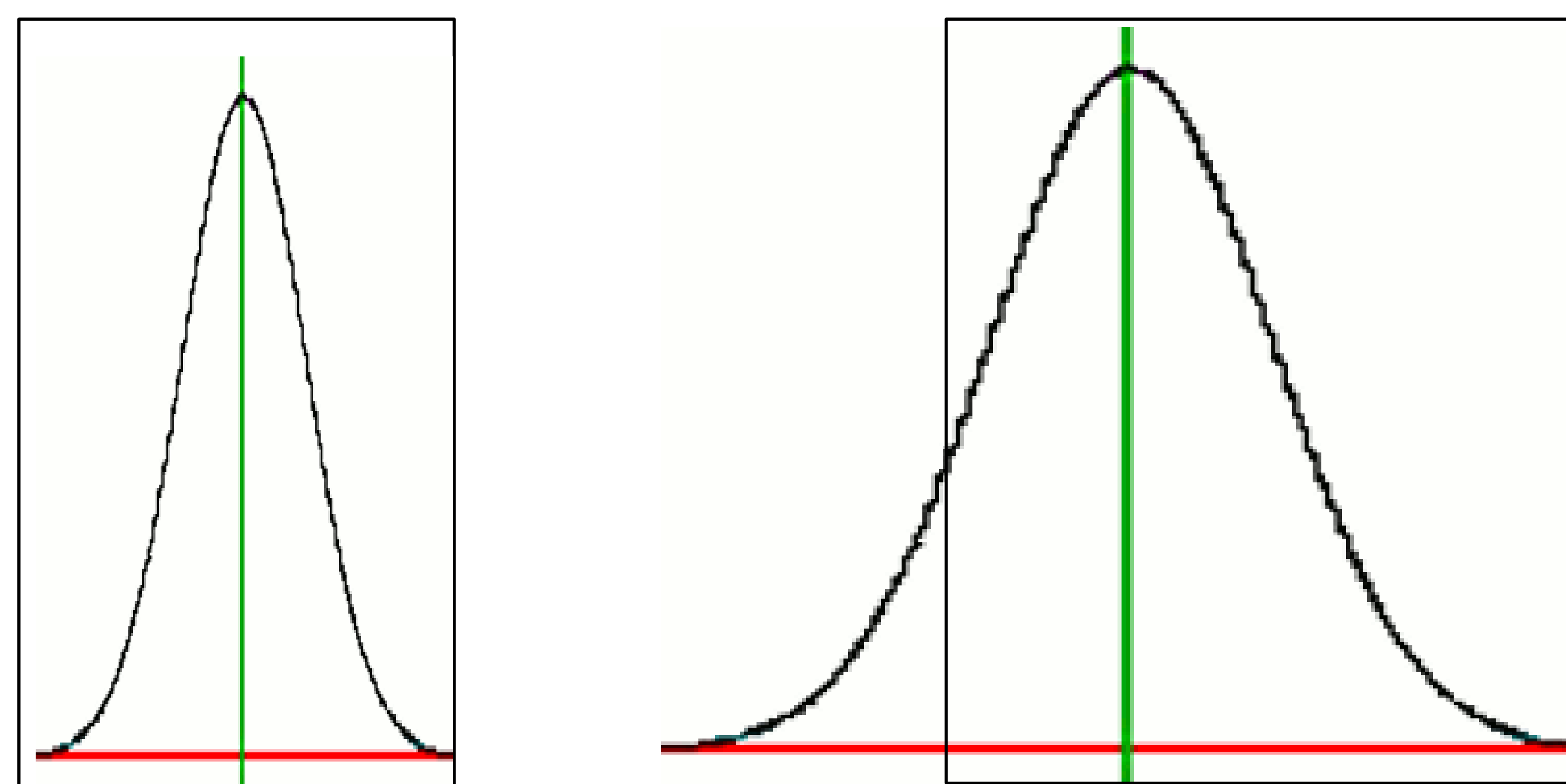


Figure 1. The model on the right offers just one example that does not reflect the predictions of the model (*distance minimization strategy*)

METHODS

- There will be two groups of participants:
 - One group not knowledgeable of the number of required mouse movements per condition;
 - One group knowledgeable of the number of required mouse movements per condition;
- There will be two manipulated variables, resulting in four conditions:
 1. One variable will be the *Target Width*
 - 5mm, 80mm
 2. One variable will be the *Number of Required Mouse Movements*
 - 5 movements, 80 movement
- Each participant will be randomly assigned to the knowledge or no knowledge group. Within each group, each participant will complete each of the four conditions (5mm, 5 moves; 5mm, 80 moves; 80mm, 5 moves; 80mm, 80 moves)

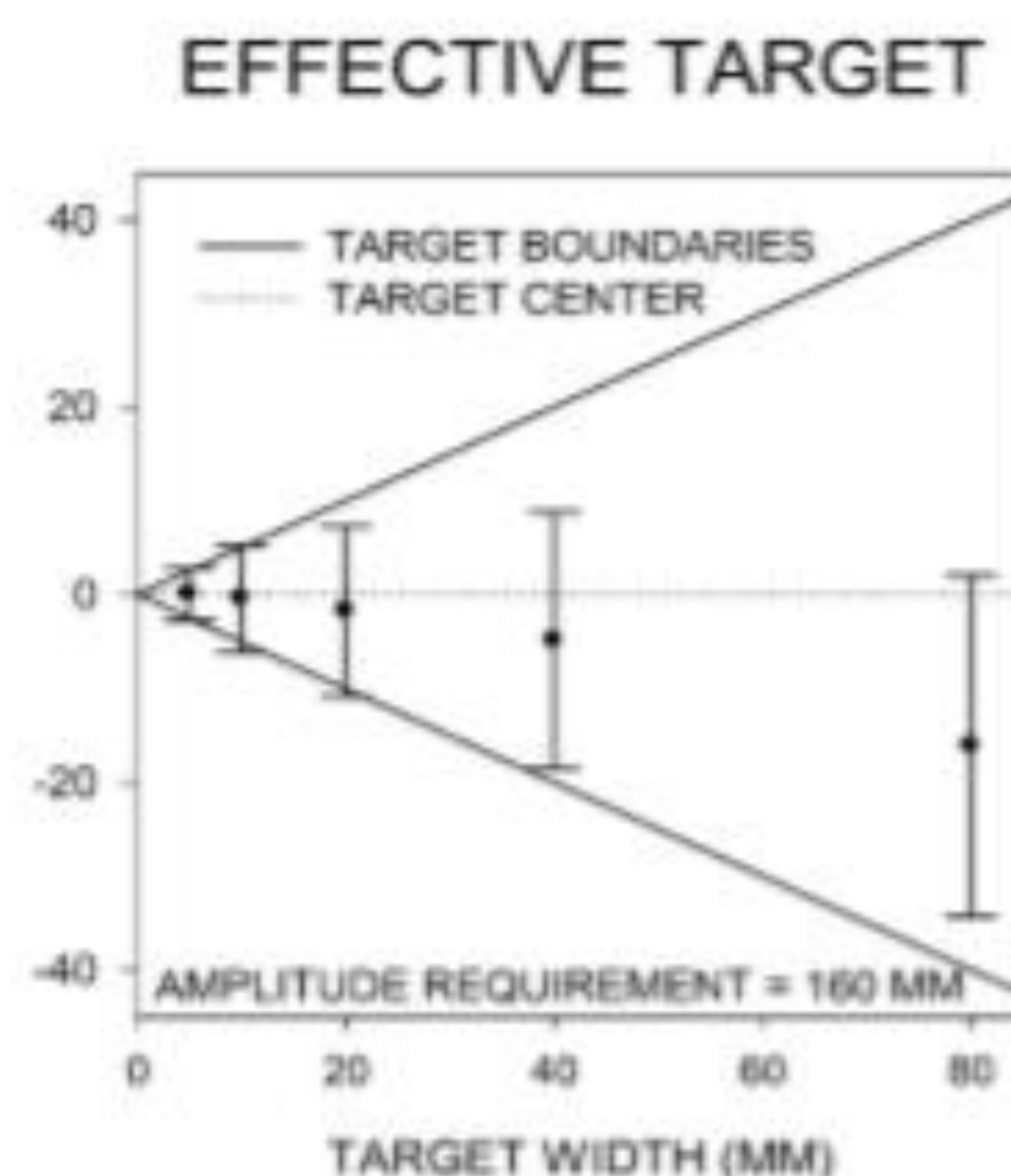


Figure 2. (taken from Figure 4 in Slifkin & Eder, 2017).

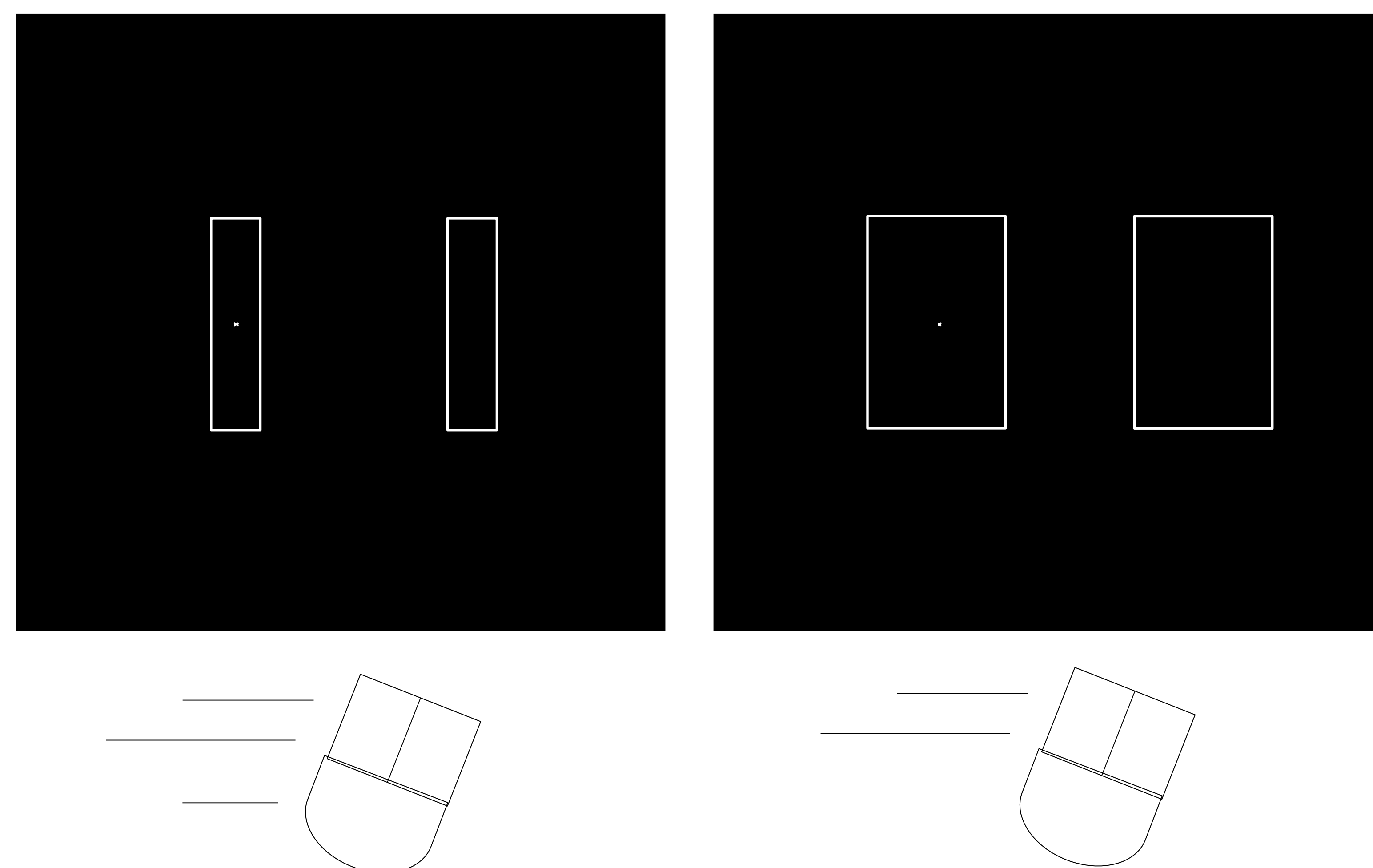


Figure 3. Illustrates how participants will perform the experimental task. The screen on the left reflects the 5mm target width and the screen on the right reflects the 80mm target width

OBJECTIVES

- We will investigate what movement strategy participants adopt when under various target widths and mouse movement numbers
- We will also investigate whether there is an observable difference between the two study groups, knowledge of mouse movements and no knowledge of mouse movements

Hypotheses

NUMBER OF MOUSE MOVEMENTS

- As the required mouse movement number decreases, we expect movement endpoint distributions to remain at the target center (*speed maximization*)
 - Participants will behave in a less “risky” fashion
- As the required mouse movement number increases, we expect movement endpoint distributions shift to the inner edge of the target (*distance minimization*)
 - Participants will behave in a “riskier” fashion

TARGET WIDTH

- Small and large target width results will generally remain consistent with the results found in Slifkin and Eder (2017).

GROUPS

- There will be a difference in adopted strategy between the “knowledge” and “no knowledge” mouse movement groups

References

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Slifkin, A.B. & Eder, J.R. (2017). Degree of target utilization influences the location of movement endpoint distributions. *Acta Psychologica*, 174, 89-100.

Acknowledgments

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