**Title**

Participant Recruitment Strategies and Perceptual Task Performance

**Project Team Roles & Responsibilities**

* *Lead Investigators*Dr Timothy Ballard (Post Doctorate Research Fellow, The University of Queensland)  
  Responsibilities: Project design, supervising research students and other personnel, data analysis, and mathematical modelling.

Dr David Sewell (Lecturer, The University of Queensland)

Responsibilities: Project design, supervising research students and other personnel, data analysis, and mathematical modelling.

* *Researcher*   
  Ms Gina Fisher (Research Assistant, The University of Queensland)

Responsibilities: Study Piloting, participant recruitment, data collection.

**Resources**

Participant remuneration at a rate of $20 per hour for 120 participants completing one 30-minute session: $600. Remuneration for online participation through Amazon Mechanical Turk at $5/hour for 120 participants completing one 30-minute session: $300.

**Background**

A widely studied phenomenon in experimental cognitive psychology is the speed-accuracy trade-off.

Typically, if a person responds quickly, they cannot process all of the information required to make a fully informed decision, sacrificing accuracy. On the other hand, if people focus on gathering information to make a more accurate decision, they sacrifice response time (Forster, Higgins & Bianco, 2003). Understanding the cognitive processes that underpin time-pressured decision-making has important implications for optimising performance on difficult, time-critical tasks.

Task motivation has been identified as a factor that may play a role in the strategies individuals use to make speeded decisions (Eubanks, Wright & Williams, 2002). Different methods of participant recruitment are accompanied by different incentives for participation (i.e. course-credit, monetary remuneration). It is important to consider whether these incentives play a role in participants’ attitudes towards participation, and the way they perform in experimental cognitive tasks. Recruiting from student samples is a widely used method among psychological researchers. Another important consideration is whether the time-point of semester (beginning vs. end) influences participants’ perceptual task performance. During high-stress times (i.e. final assessment at the end of semester), participants may not be as motivated to exert cognitive effort on a perceptual task as they otherwise would be. Another recruitment strategy is to advertise studies online for participants to complete via the web with financial remuneration. Outside a research lab environment with a sense of anonymity, participants may perform differently than those who are recruited with a financial incentive and are overseen by an experimenter.

This study aims to investigate performance on a perceptual discrimination task as a function of task instruction (speed vs. accuracy emphasis), participant recruitment method (course-credit, paid or online-paid), and time-point (start vs. end of academic semester). Analyses for this study involve fitting a mathematical model to response time and accuracy data to gain insight into the temporal components of decision-making. Applying a formal model of the decision-making processes allows us to disentangle the time costs associated with the quality of information driving the decision process (i.e., decisions based on low-quality information or difficult stimuli tend to take longer), or time-costs associated with the decision threshold (i.e., the amount of evidence accumulated before reaching a decision; i.e. may increase under accuracy emphasis). A robust account of decision-making processes can be achieved through modelling, allowing us to investigate whether cognitive processes may differ depending on participant circumstances (participation incentive and time-point).

The participants’ time and effort will provide data able to assist in the fine-grained investigation of motivation and the speed-accuracy trade-off using a novel model-based approach. This study is the first to investigate whether recruitment-based factors influence cognitive processes and performance on a perceptual task. Findings will contribute to a scarcely studied area of research that will help to inform researchers’ future recruitment choices, and may provide relevant insight in which to interpret other findings.

**Project Design**

*Research Project Settings*

The project will be completed in the School of Psychology at the University of Queensland, or via the web through online recruiting platforms.

*Methodological Approach and Statistical Power Issues*

This study uses a 2 (start vs. end of semester) by 3 (recruitment method; paid, course-credit, online-paid) by 2 (emphasis; speed vs. accuracy) mixed design, with recruitment method and time-point as between-subject factors and instruction/emphasis as a within-subject factor. Participants will complete a perceptual discrimination task with response time and accuracy measured on each trial. Half of the blocks of trials will instruct participants to respond with an emphasis on speed, and half will instruct participants to emphasise accuracy.

360 participants will be recruited for this study. Sixty from each recruitment platform will undertake the perceptual task within the first three weeks of the academic semester, and another sixty from each recruitment platform will undertake the perceptual task in the last three weeks of semester (a standard semester is typically 13 weeks long).

Participant groups being tested in person (paid and course-credit) will be alternated after each 30-minute session to counter-balance any effects due to time-of-day. Groups of participants will also be tested in separate sessions to avoid possible conflicts associated with providing different remuneration to participants (i.e. if course-credit participants witness paid-pool participants receive cash while they do not). In every testing session, half of the participants will complete one perceptual task and the other half will complete an equivalent version of the perceptual task with different stimuli for generalisability. Pilot testing will be conducted to confirm that the tasks are equally and appropriately difficult.

*Research Activities*

A representative example of the type of discrimination task participants will complete is the random dot motion task. Participants are required to indicate via a button-press whether dots are streaming towards the left or the right. The stimulus is a circular cloud of 40 white dots on a black background. Difficulty for this task is manipulated by having either 5%, 10% or 20% of the dots moving in a particular direction. The levels of the difficulty and direction manipulations occur in random order, with each unique difficulty and direction combination occurring 15 times per block.

Participants will read instructions on screen and complete 10 practice trials before beginning the experimental blocks. At the start of each trial, participants view a fixation cross for 250ms, followed by a blank screen for 250ms, and then the stimulus is presented. The trial terminates when the participant makes a response. If a participant does not respond within 2 seconds, a “TOO SLOW” message will appear and the trial is recorded as a non-response. The fixation cross for the next trial appears immediately after the previous trial is complete.

The experiment will be broken down into X blocks of XX trials. Blocks will alternate between a speed emphasis and accuracy emphasis; the starting instruction being randomised for the first block. Under a speed emphasis block, participants will be instructed to respond as quickly as possible and prioritise response times over accuracy. If a participant does not respond within 800ms, a “TOO SLOW” message will appear. Before an accuracy emphasis block, participants are instructed to respond as accurately as possible, and prioritise correct responses over speed. On completion of each block, participants are instructed to initiate the next block via a button press, which allows the opportunity for a self-paced break.

*Rationale for Choice of Methods*

The reason for opting for a modelling analysis of the participant data is that it provides a way of decomposing choice behaviour (i.e., decision outcomes and their associated response times) into separable components relating to (1) the time course of processing information form a stimuli and (2) the time required to make a decision, given the information that has been considered. This property of the model-based analysis overcomes key limitations in applying conventional statistical analysis to traditional measures of performance (e.g., accuracy and mean response time). For example, conventional methods of analysis cannot distinguish time costs associated with the quality of information driving the decision process, or time-costs associated with the degree of decision-caution – both relevant factors for investigating the speed-accuracy trade-off.

*Participants, Description and Number, and Inclusion/Exclusion Criteria/Recruitment Strategy*

The sample will be recruited via either a) the UQ first year psychology research participation scheme, whereby students enrolled in first year psychology courses sign up on up on a website and receive course credit for participation, b) the UQ paid research participation scheme, whereby members of the UQ local community sign up on a similar website and receive financial remuneration ($20 per hour) for their travel and time spent participating, or c) crowdsourcing platforms such as Amazon Mechanical Turk and recruitment services such as Crowdflower or Qualtrics whereby participants sign up to complete the study via the web and receive financial remuneration ($5 per hour) for their time spent participating. 120 participants from each platform will be recruited, with half participating in the first 3 weeks of semester and half participating in the last 3 weeks of semester. It is expected that participants will range in age from 18-60, with an equal distribution of males and females, and who will have no significant health issues that would affect their ability to provide voluntary, informed consent.

*Participant Commitment*

When participants begin the experimental session, they will read an information screen that describes the task. Participants will then be asked to click a button indicating that they have read and understood the information form, and agree to participate in the research. Participants will be informed at the start of the experiment that they have the right to withdraw from the study at any point in time without repercussions or penalty. They will also be informed that should they feel uncomfortable completing a particular question or task, they are permitted to not respond. All participants will receive a computer information debrief sheet at the completion of the study explaining its purpose.

*Project Duration*

The project is expected to take no more than 1 year to complete (i.e., including data collection and model-based analysis of all relevant data).

*Data Collection/Gathering and Techniques*

Demographic information (i.e., participant age and gender) will be collected. All other information collected will comprise button-press responses to a computer-based perceptual task, where people will report a feature of the stimulus (e.g., whether dots are moving towards the left or right). The button press responses, summarizing decision outcomes and RT, will be stored in a de-identified manner (i.e., by participant number).

*Participant Withdrawal*

Participants are free to withdraw from the study at any time. Should this occur, all data collected up to that point will be destroyed and all remuneration owed to the participant will be paid.

*Data Management*

All information collected from participants will be anonymised. Participants will be given a subject identification number and all identifying information about the participant will be removed. This ensures that it is impossible for participants to be identified with any documentation or reporting from the study. Once the study has been completed, the data will become “open data”. This means the data will be made available, free of charge to anyone interested in the research or who wants to analyse the data themselves. Once it becomes open data, we will not have control over how the data are used, however, prior to becoming open data, all data will be anonymised and therefore all participants will maintain confidentiality and anonymity.

*Outcome Measures*

The outcome measures from this experiment will be the pattern of best-fitting parameter estimates from model-fitting and results of model selection for each condition of the study.

**Results, Outcomes and Future Plans**

*Plans for Return of Results*

Results from the study will be disseminated via scholarly publications. For participants who do not have access to potential publication outlets, they will be provided with an opportunity to have the experimenter forward on a summary of the key findings upon completion of data collection.

*Plans for Dissemination/Publication*

Results of the study will be presented at academic conferences and scholarly journals. Likely outlets include *Journal of Experimental Psychology: General*, Journal *of Experimental Psychology: Human Perception & Performance*, *Psychonomic Bulletin & Review*, and *Attention, Perception, & Psychophysics*.

*Plans for Sharing Data*

Upon request, de-identified data will be shared with other researchers who are interested in modelling the data from this project.