# Creating questionnaires



Key concepts & study plan

Experimental design

**Data collection & processing**

Model specification & estimation

Interpretation & application

# Creating questionnaires

## Outline

- Structure of questionnaires
- Structure of choice experiments
- Testing questionnaires
- Conducting surveys
- Online survey tools

# Structure of questionnaires



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# Structure of questionnaires

## Structure of questionnaire

### Part I

- Study explanation
- Eligibility
- Consent

### Part II

- Warming up questions
- Revealed choices
- Choice environment

### Part III

- Explanation alternatives
- Explanation attributes
- Choice experiment

### Part IV

- Attitudes
- Socio-demographics
- General survey feedback

# Structure of questionnaires

## Structure of questionnaire

### Part I

- Study explanation
- Eligibility
- Consent

This study is about last-mile parcel delivery.

Did you make an online purchase in the past month?

Do you give consent to have your data used in our study?

### Part II

- Warming up questions
- Revealed choices
- Choice environment

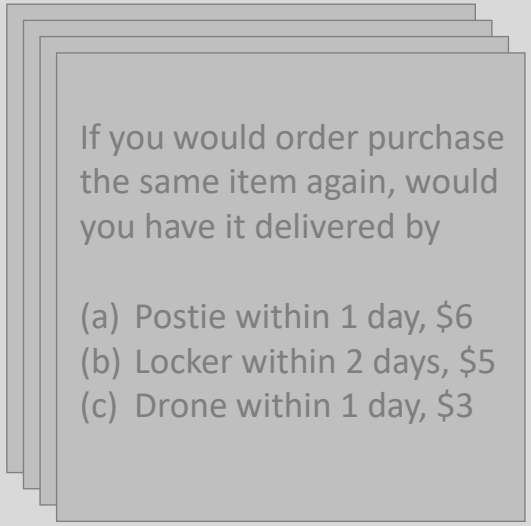
What type of product did you purchase online last month?

Did you ask for delivery via postie or parcel locker?

In what type of dwelling do you live?

### Part III

- Explanation alternatives
- Explanation attributes
- Choice experiment




### Part IV

- Attitudes
- Socio-demographics
- General survey feedback

Do you consider drone delivery safe?
1=very unsafe ... 5=very safe

What is your household income?

What is your age?

# Structure of choice experiments



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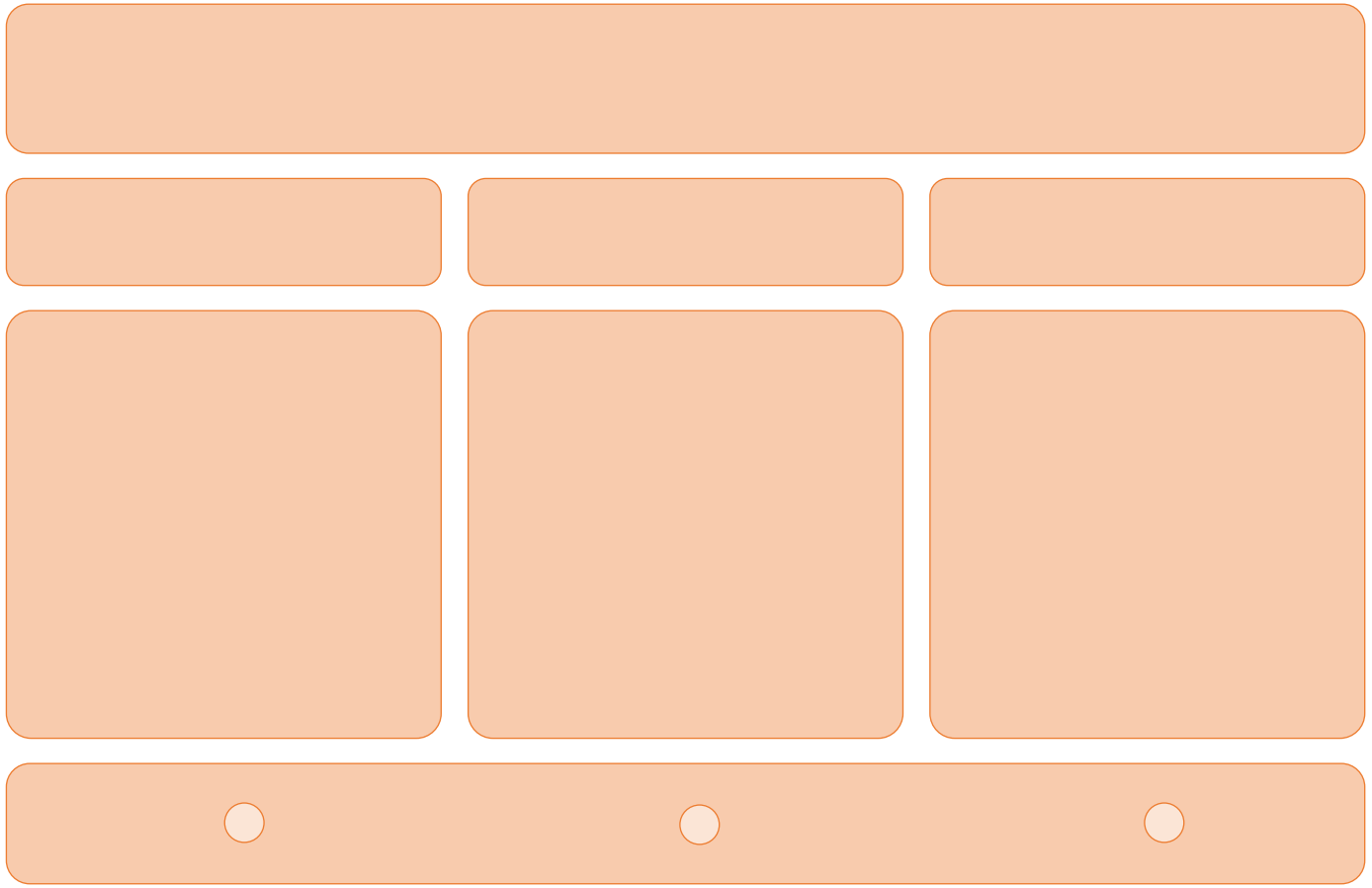
# Structure of choice experiments

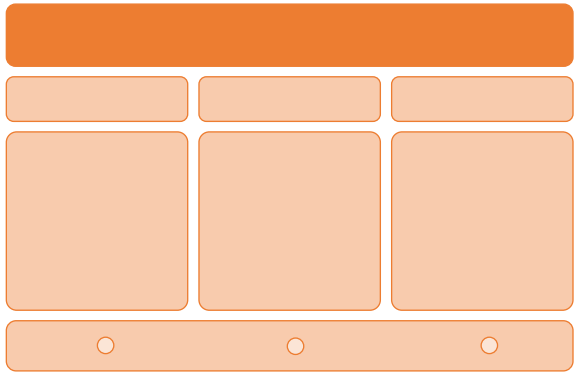
## Choice task

- Scenario
- Alternatives
- Profiles (combination of attribute levels)
- Response



# Structure of choice experiments

## Scenario



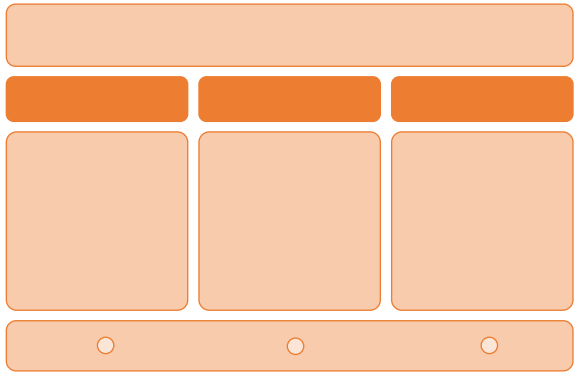
- Describes choice context
- Often constant over choice tasks (but may vary)
- May vary across decision-makers

- Examples
  - Travel mode choice – Consider travelling from home to work
  - Laptop choice – Consider purchasing a laptop for personal use
  - Treatment choice – Consider a patient with lung cancer
  - Environmental policy choice – Consider ecological restoration for parks in Sydney

# Structure of choice experiments

## Alternatives

- Describe choice options (can include Opt-out, Status quo)
- Typically fixed across choice tasks (but may vary)
- May vary across decision-makers

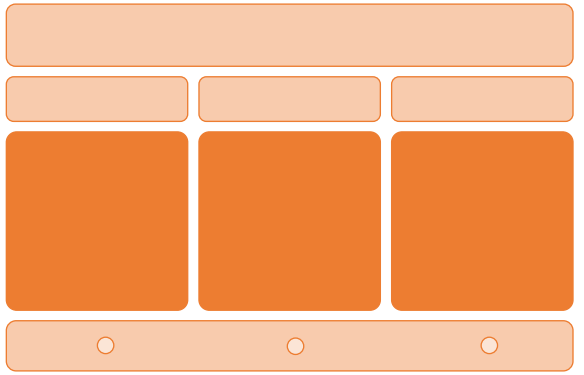


- Examples
  - Travel mode choice – Car, Bus, Train, Walk, Bicycle
  - Laptop choice – Laptop A, Laptop B
  - Treatment choice – Medication, Surgery, Neither
  - Environmental policy choice – Current policy, Policy I, Policy II

# Structure of choice experiments

## Profiles

- Describe characteristics of alternatives
- Attribute levels vary across choice tasks
- Attribute levels may vary across decision-makers

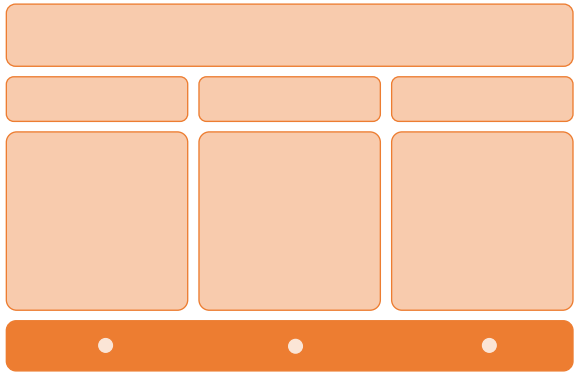


- Examples
  - Travel mode choice – 20 minutes travel time, 1 transfer, $5 bus fare
  - Laptop choice – 15” screen, 16 GB memory, 512 GB hard disk, $1800
  - Treatment choice – 80% effectiveness, 10% risk of severe side effects, one biopsy per year
  - Environmental policy choice – use of natural fertilizer, low level of pest control, 10% more trees, $10 tax

# Structure of choice experiments

## Response

- Choice mechanism
- Typically single best choice
- Alternative response mechanisms exist

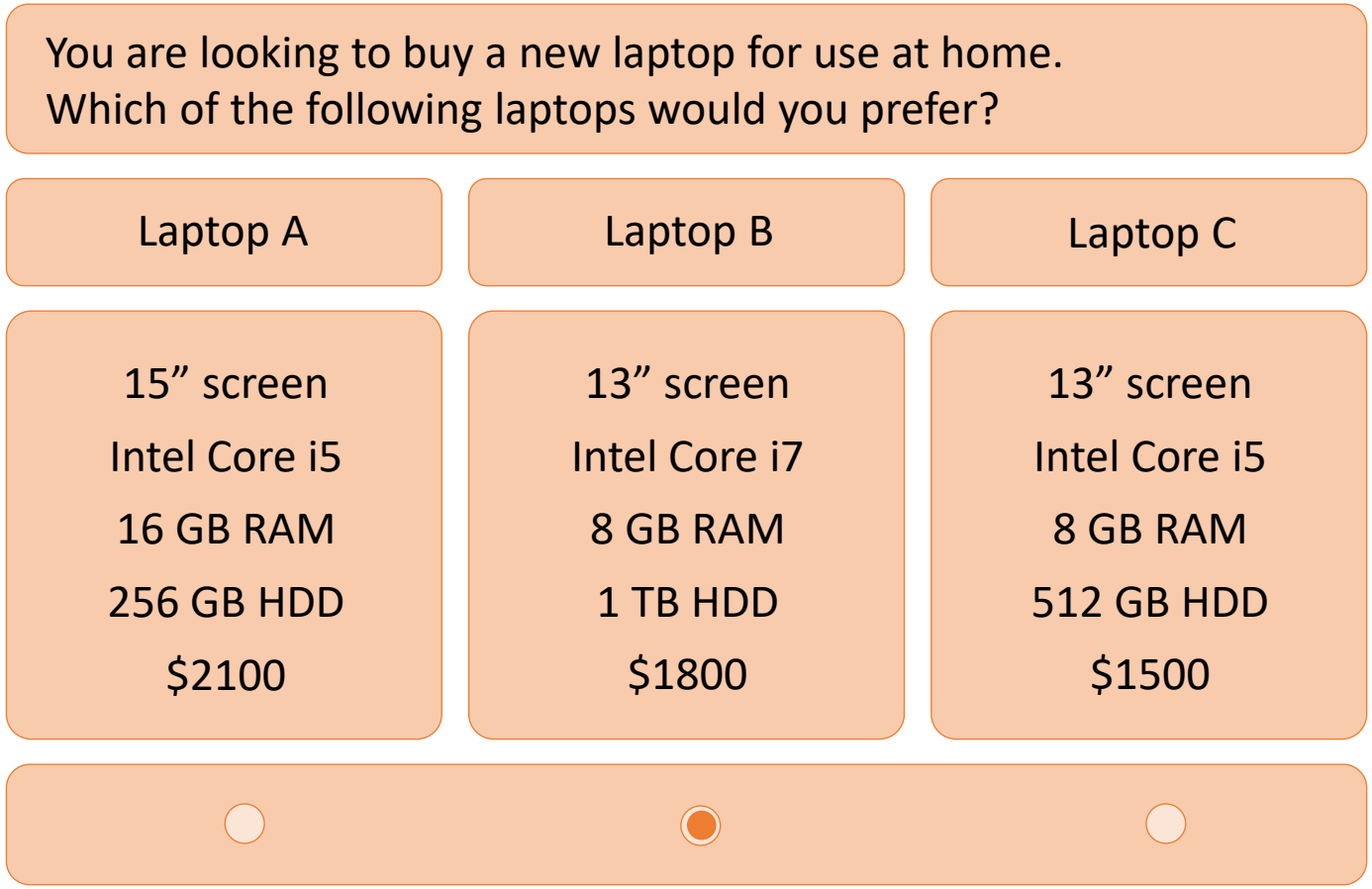


- Examples
  - Travel mode choice – choose best and worst alternative
  - Laptop choice – choose best alternative
  - Treatment choice – choose best alternative, and if selected Neither then force choice
  - Environmental policy choice – choose best alternative and second-best alternative

# Structure of choice experiments

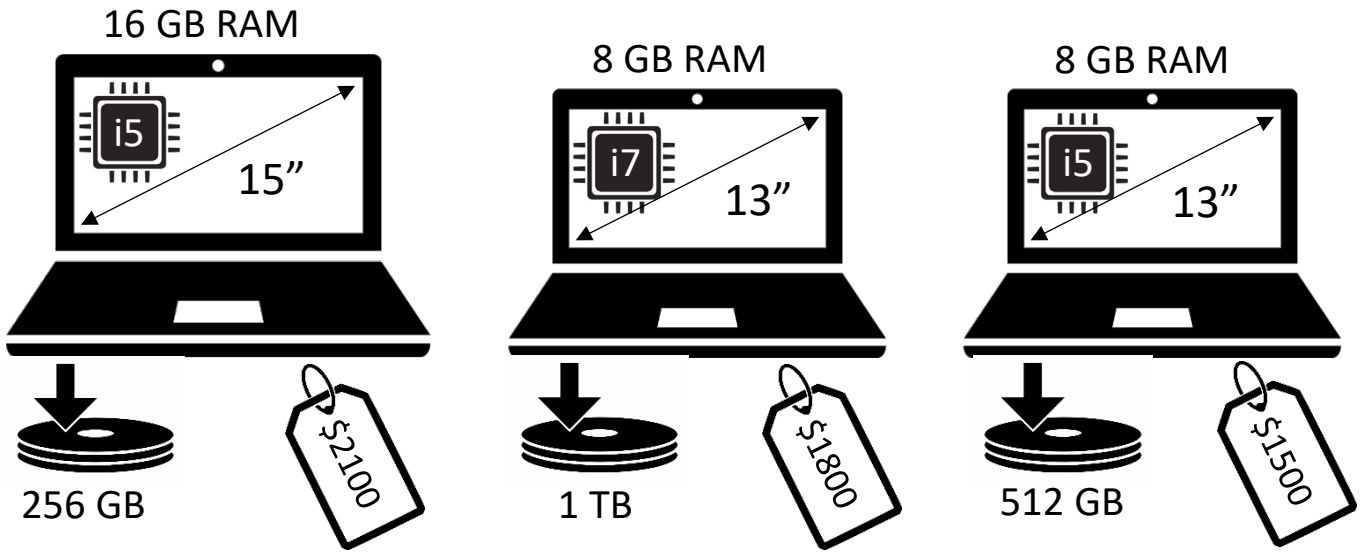
## Example experiment with unlabelled alternatives

- Scenario
- Alternatives
- Profiles (combination of attribute levels)
- Response



# Structure of choice experiments

## Example experiment with unlabelled alternatives



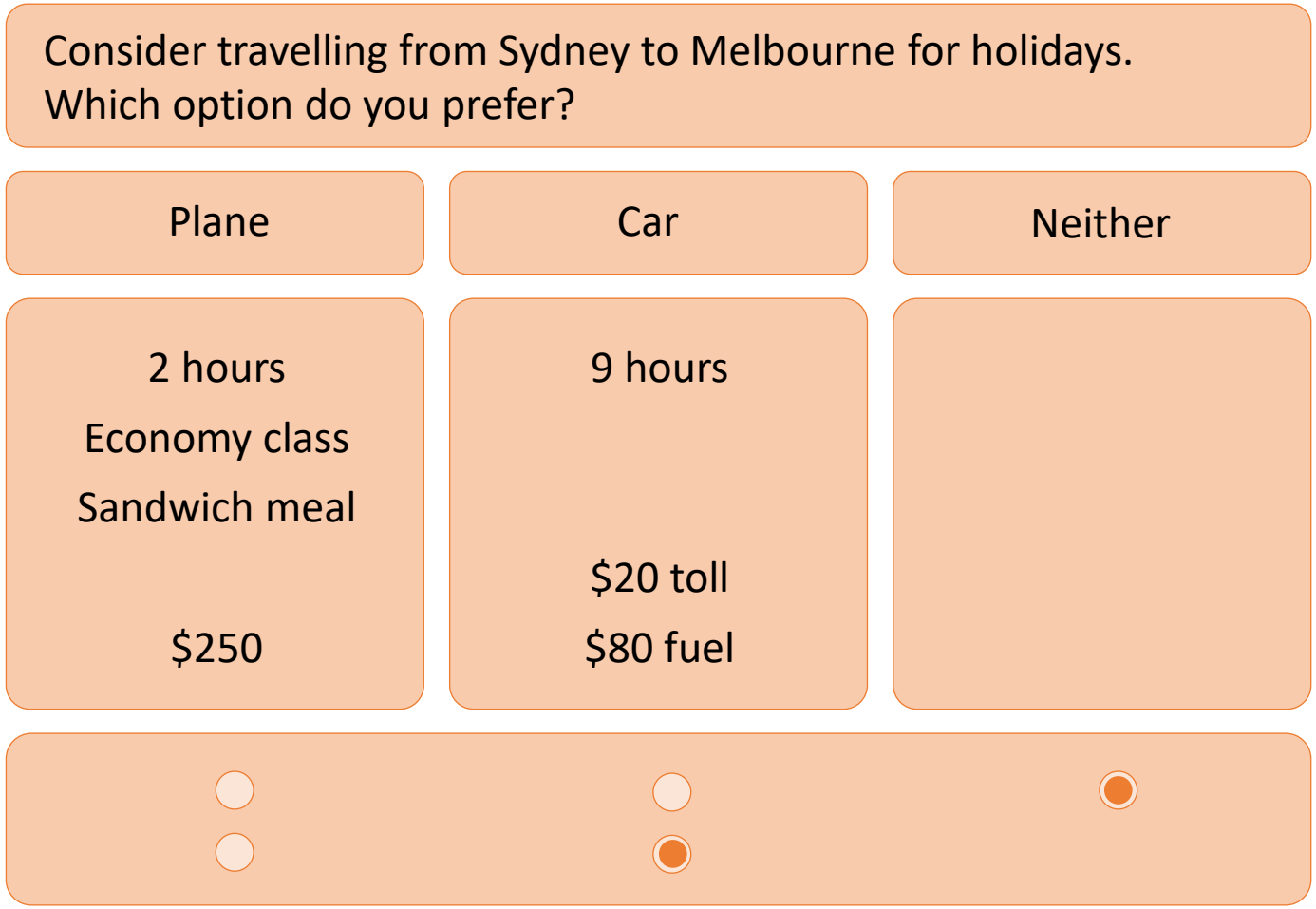

I would choose the following laptop for use at home:

○ ◉ ○

# Structure of choice experiments

## Example experiment with labelled alternatives

- Scenario
- Alternatives
- Profiles (combination of attribute levels)
- Response



# Testing questionnaires



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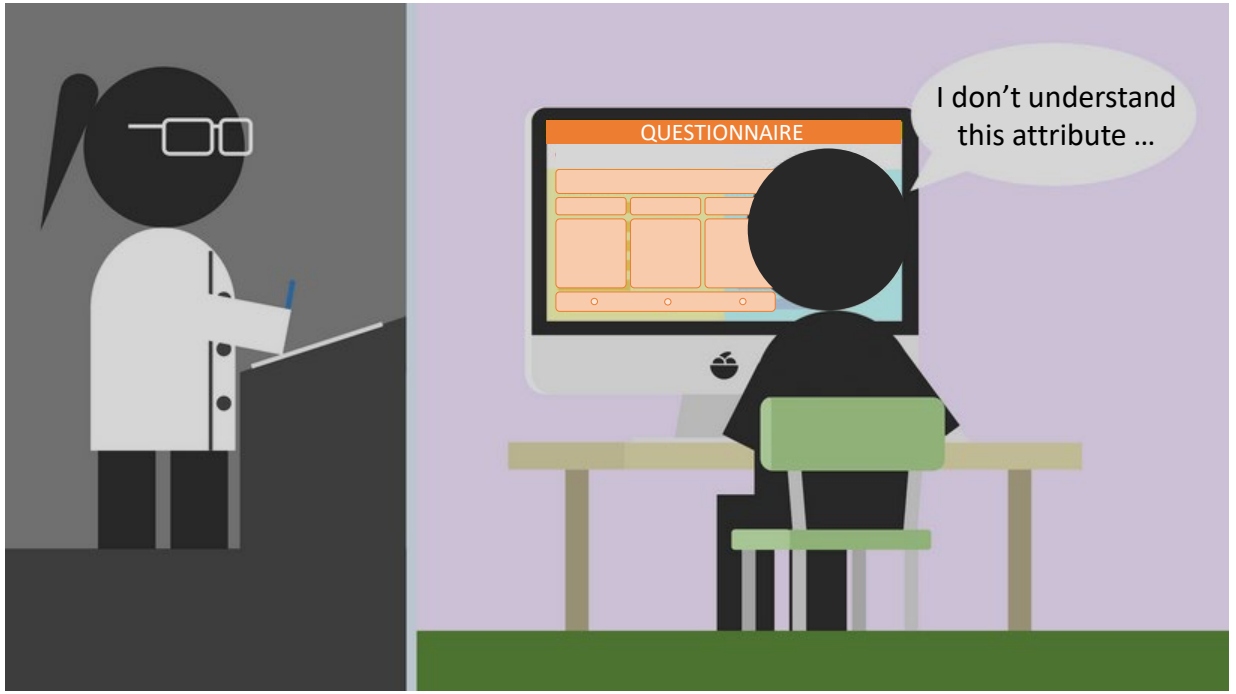
# Testing questionnaires

## Pre-testing

- Qualitative assessment of questionnaire
- Small number of think aloud sessions
- Can still make major changes
- Objectives:
  - Test comprehension
  - Test cognitive burden



# Testing questionnaires

## Pilot testing

- Quantitative assessment of final questionnaire
- Collect data from ~10% of total sample
- Expected to make only minor changes
- Objectives:
  - Ensure that models can be estimated based on data collected
  - Provide parameter priors for efficient experimental design

# Conducting surveys



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# Conducting surveys

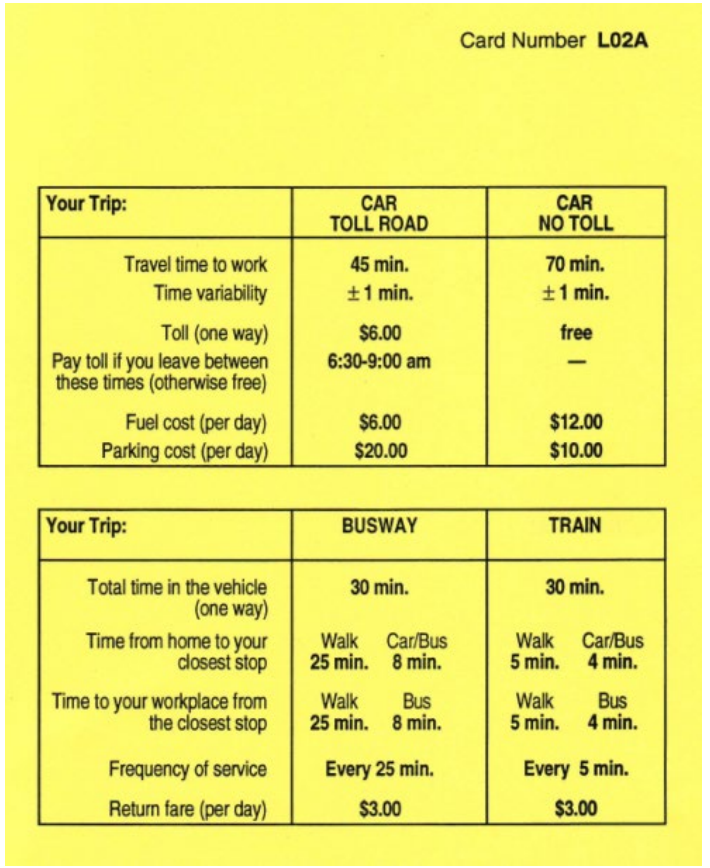
## Modes of administration

- Pen-and-paper
- Computer-aided personal interviewer (CAPI)
- Online / web-based

# Conducting surveys

## Pen-and-paper

- Advantages
  - Cheap
  - Wide reach
- Disadvantages
  - Low response rate
  - Manual data entry (prone to error)



Card Number **L02A**

| Your Trip: | CAR TOLL ROAD | CAR NO TOLL |
|---|---|---|
| Travel time to work | 45 min. | 70 min. |
| Time variability | ±1 min. | ±1 min. |
| Toll (one way) | $6.00 | free |
| Pay toll if you leave between these times (otherwise free) | 6:30-9:00 am | — |
| Fuel cost (per day) | $6.00 | $12.00 |
| Parking cost (per day) | $20.00 | $10.00 |

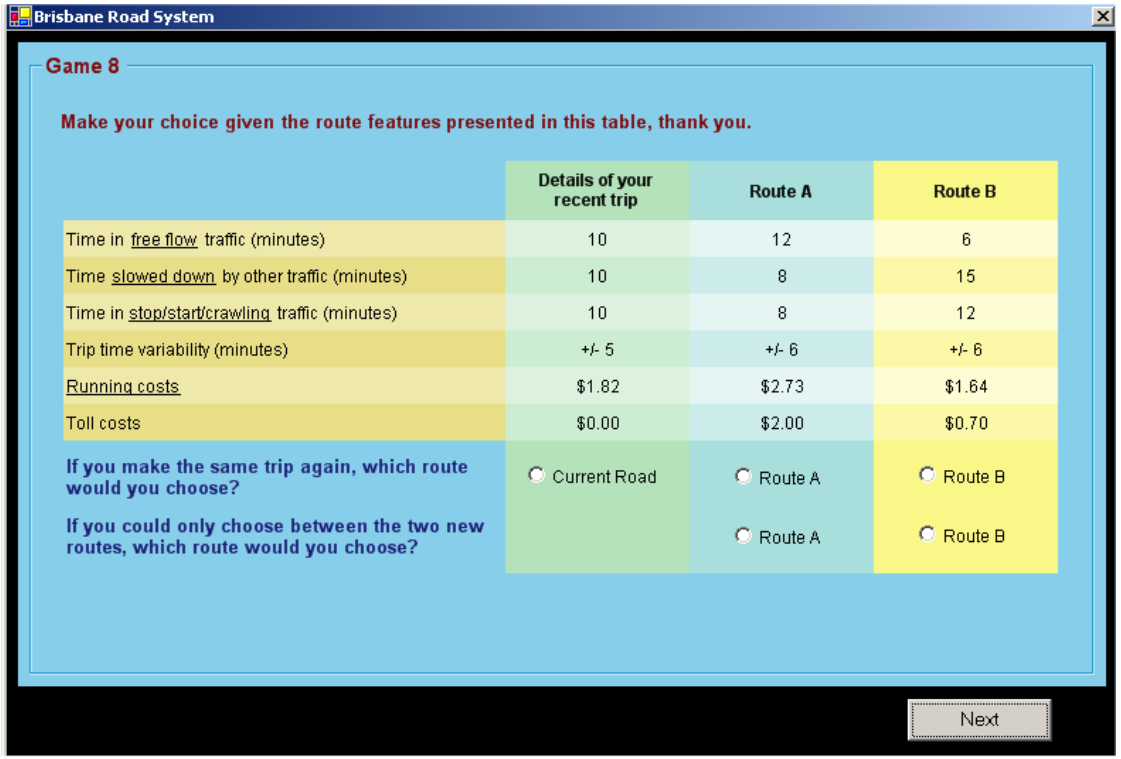
| Your Trip: | BUSWAY | TRAIN |
|---|---|---|
| Total time in the vehicle (one way) | 30 min. | 30 min. |
| Time from home to your closest stop | Walk 25 min. Car/Bus 8 min. | Walk 5 min. Car/Bus 4 min. |
| Time to your workplace from the closest stop | Walk 25 min. Bus 8 min. | Walk 5 min. Bus 4 min. |
| Frequency of service | Every 25 min. | Every 5 min. |
| Return fare (per day) | $3.00 | $3.00 |

# Conducting surveys

## Computer-aided personal interviewer (CAPI)

- Advantages
  - Personal interviewer can assist with more difficult choice experiments
  - High quality data (decision-makers take questionnaire more seriously)

- Disadvantages
  - Expensive
  - Limited sample size
  - Potential privacy issues and socially desirable responses



# Conducting surveys

## Online / web-based

- Advantages
  - Affordable
  - Allows large sample size
  - Online panels available in all countries
- Disadvantages
  - Online panels vary greatly in quality, possibility of bots
  - Preferably limited number of alternatives and attributes (should fit on mobile phone)

| | Drone | Locker | Postie |
|---|---|---|---|
| |  |  |  |
| **Speed** | 2 business days | 3 business days | 5 business days |
| **Delivery method** | Leave in a safe place | Secure in locker | Leave at front door |
| **Time window** | 9am - 5pm (30 minutes) | 24/7 (kept for two days) | 6pm - 9pm (no choice) |
| **Cost** | $2 | $6 | $8 |
| **Which would you choose?** | ○ | ○ | ○ |

# Conducting surveys

## Randomisation in choice experiments

- Randomise order of labelled alternatives
  - Disentangle label-specific constant from left-to-right bias
  - Only randomise across respondents, keep fixed within respondents
- Randomise order of attributes
  - First/last attributes are often perceived more important
  - Only randomise across respondents, keep fixed within respondents
- Randomise order of choice tasks
  - Earlier choice tasks suffers from learning effect, last choice tasks suffers from fatigue

| | Drone | Locker | Postie |
|---|---|---|---|
| |  |  |  |
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# Online survey tools



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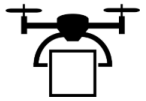
# Online survey tools

## SurveyEngine

- Easy to use software
- Specifically designed to conduct choice experiments
- Experimental designs can be imported or generated with Ngene

www.surveyengine.com

| | Drone | Locker | Postie |
|---|---|---|---|
| |  |  |  |
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| **Cost** | $2 | $6 | $8 |
| **Which would you choose?** | ○ | ○ | ○ |

# Online survey tools

## Other tools

- Qualtrics
  - requires purchasing Choice Based Conjoint add-on module
- Confirmit
- Nebu
- LimeSurvey (free)
  - requires javacript programming
- SurveyMonkey (free)
  - requires inserting choice tasks as images

| Motorway | Urban road |
|---|---|
| Speed limit of **90 km/h**, **no traffic lights**. | Speed limit of **50 km/h**, **four traffic lights**. |
| The travel time is **6 minutes** every day. **6** **6** **6** **6** **6** | The travel time varies. You will experience one of the following **travel times (in minutes)** with equal probability: **4** **6** **12** **12** **12** |
| Toll cost: **$ 1.00** | Toll cost: **$ 0.00** |