



Curtin University

# ADULT WATER SAFETY PROGRAM ROYAL LIFE SAVING SOCIETY WA 2022 DISCRETE CHOICE ANALYSIS

COLLABORATION FOR EVIDENCE, RESEARCH & IMPACT IN PUBLIC HEALTH

# ADULT WATER SAFETY PROGRAM

## AN EXPLORATION OF DISCRETE CHOICE

### BACKGROUND

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Innovative approaches to engaging the target audience of the Adult Water Safety Program (AWSP) are vital to the program's success. However, at play are a complex set of social and behavioural factors that may impact the effectiveness of any program, including the AWSP. These factors exacerbate the challenge of designing an appropriate strategy mix that is salient and resonates with the target community. Incorporating older adult preferences in the planning and design phase may help enhance the uptake of and adherence to drowning prevention messages, policy and practice. DCEs may provide a novel investigation of interventions designed to reduce public health problems (Pechey et al., 2014), such as those encountered in the AWSP.

Discrete Choice Experiments (DCEs) involve generating and analysing data ('choice data') by creating hypothetical scenarios to suit relevant research questions (Lancsar & Louviere, 2008). DCEs mimic existing scenarios or elicit preferences and values for services for which markets currently do not exist. For example, a scenario could be:

*'whilst on holidays you were injured at the hotel swimming pool, the incident caused health problems that were temporary, you had to take an extra month off work, and you needed additional financial support as a result of the incident'* (Rowen et al., 2022).

Or the scenario may elicit preferences evaluating safety-related attributes when buying a new electric car, for example, make and model, price, performance, reliability, durability, comfort, style, and electric options (Daziano, 2012). DCEs can provide rich data sources for decision-making and economic evaluation and facilitate the investigation of questions that otherwise might go unanswered (Clark et al., 2014; Lancsar & Louviere, 2008).

Discrete choice analysis (DCA) is a quantitative approach that involves generating and analysing choice data by presenting participants with two or more competing hypothetical scenarios that vary by the attributes of each choice, such as differences in time and cost (Lancsar & Louviere, 2008). The attributes of each choice determine the value of each scenario. Therefore, it is expected that participants will choose their preferred scenario considering all the information provided (Ryan et al., 2007). Researchers can model the probability of each alternative being chosen as a function of the attributes, allowing an estimation of the desirability of each competing alternative.

#### Discrete Choice Experiments in research

DCEs have been implemented across a diverse range of issues to understand the preferences of individuals as participants, consumers, or clients (Lancsar & Louviere, 2008). Initially used in transportation economics, environmental economics and marketing/commercial contexts (Lancsar & Swait, 2014; Salampessy et al., 2015), DCEs have been applied in health economics to evaluate health care since the 1990s (Tinelli et al., 2016).

Application has:

- addressed policy questions (e.g. flavour bans for e-cigarettes) (van den Broek-Altenburg & Atherly, 2020);
- demonstrated value in health outcomes and patient experience (e.g. choice to make clinical negligence claims) (Rowen et al., 2022);
- assisted clinical decision making regarding chronic non-cancer pain management (Shanahan et al., 2019); and
- determined priority setting frameworks for restructuring health care delivery (Tinelli et al., 2016; van den Broek-Altenburg & Atherly, 2020).

More recently, DCEs have been applied in social care research to measure the value of a service or program. For example, to value carer tasks, support services to aid the development of end-of-life health care services and long-term care services for those living with and without partners (Tinelli, 2016).

### Use of Discrete Choice Experiments in public health

DCEs have been used infrequently in public health (Bahrapour et al., 2020). Some examples include:

- the use of choice tasks to determine which aspects of HIV testing marketing would impact on willingness to share specific HIV testing messages on social media platforms among men who have sex with men (Durvasula et al., 2019); and
- investigating the acceptability of different interventions (e.g. minimum unit pricing for alcohol; reducing numbers of alcohol retail outlets; and regulating alcohol advertising) to reduce alcohol consumption and the effect of information on expected effectiveness (Pechey et al., 2014).

Of interest, Stated Preference (SP) data is one option to assess 'hard to measure' choice attributes. SP data are commonly used in academic disciplines outside healthcare to measure choice attributes or choices that are not easily observed (van den Broek-Altenburg & Atherly, 2020). For example, stated preferences have assessed an individual's willingness to make trade-offs in terms of time-savings, safety or frequency and reliability of the transport service and price, and to analyse tourists' preferences for eco-efficient destination planning options (van den Broek-Altenburg & Atherly, 2020). SP data may have applicability to injury, explicitly drowning prevention, for informing program design and delivery. However, there is a shortage of evidence describing discrete choice experiments and/or SP data in injury prevention and none in drowning prevention.

## METHODS AND TECHNIQUES

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A DCE survey instrument explains both a situation and alternatives that the participant can choose. The survey may start with:

- a description of a health issue to be valued;
- the issue's cost (monetary or non-monetary) (Bahrapour et al., 2020);
- the value elicitation questions or discrete choice sets based on attributes and levels;
- potential follow-up questions (e.g. to check responses or to get information about the way participants processed the attributes); and
- additional questions (e.g. demographics).

A DCE assumes the health issue can be described by its attributes and that an individual's choice valuation depends on these attributes' levels. DCEs can be administered online without an interviewer, allowing quick and affordable data collection (Bahrapour et al., 2020; Rowen et al., 2022).

### Research Question

RLSSWA and CERIPH will generate a specific research question to garner data to inform the next phase of the AWSP. Preliminary discussions have led to the formulation of the following draft research question(s) based on the 'geographic destination choice' for older adults travelling in and around Western Australia:

- *To determine Western Australian older adults' stated preferences regarding factors influencing their choice of water-based holiday locations in Western Australia.*
- *To elicit how older adults weigh up their choices and consider trade-offs between different destinations (coastal v inland) options.*
- *To determine whether preferences of older adults vary across metropolitan and rural regions related to holiday preferences, aquatic activity etc.*

### Choice sets, attributes and levels, wording and scenarios

Selecting attributes and their levels is a core step in a DCE. There is a need to balance the number of attributes, as specifying too many attributes may hinder participant decision making. Attribute number will vary according to the issue's complexity, but studies typically include four to eight attributes (Shanahan et al., 2019). In a standard DCE, participants answer DCE tasks. In each task, the respondent is presented with a set of alternatives (typically 2 or 3) from which they select their preference. This has the advantage of enabling participants to consider several attributes simultaneously.

Instead of asking a participant, "would you prefer destination A = the beach or B = an inland waterway", a DCE asks "imagine you have the choice between A and B. A and B differ in the following ways ( ....) Would you choose A or B?". The second format allows the researcher to tease out the relative utilities of the attributes of the destination. Alternatives may be labelled (patrolled waterway, unpatrolled waterway) or unlabelled (Beach A, Beach B and Beach C). The number of alternatives usually varies between two and six, depending on the choice scenario. In some cases, a "no choice" or "status quo" alternative may be offered.

Once RLSSWA and CERIPH refine the research question(s), the attributes and levels can be determined and finalised. The most recent literature would be re-visited to determine the

attributes and levels used in the DCE. These would be workshopped by the DEEP team in conjunction with RLSSWA project staff, followed by refinement and final selection. Selected attributes and levels will need to meet the following suggested criteria: appropriate, relevant, and informative for practice and or policy; independent and assessing a different concept to all other attributes. Scenarios provide a context for the participants to respond to and be crafted and chosen to reflect the spectrum of waterway destinations observed in real life. The characteristics of different scenarios make it manageable for the participants to make their choice and potentially avoid complicating the survey (Rowen et al., 2022). Scenarios would be co-designed with the RLSSWA team, pilot tested and refined.

### Recruitment, Implementation and Analysis

A commercial company would recruit participants stratified by demographics (e.g. age and location). The literature states there is no agreement on the correct sample size required for a DCE. However, the precision of the modelling increases rapidly at sample sizes greater than 150 and then flattens out at around 300 (Shanahan et al., 2019). Consultation with a health economist with extensive experience in the design, analysis and publication of DCEs has indicated a sample size of 300 would be appropriate for drowning prevention and older adults because of the population size of Western Australia and the statistical power required for regression analysis.

Pilot testing of choice sets and scenarios will examine whether participants correctly understand the meaning of the tasks and attributes using online interviews with a convenience sample (n=10). Feedback would be sought on the wording of attributes, including levels, introduction, scenarios, example DCE questions, and formatting and framing of the DCE tasks. The DCE would be administered using an online survey format, e.g. Qualtrics online survey software. Upon completion of data collection, data will be collated, extracted and sent to CERIPH via e-store/transfer for cleaning and analysis.

The DCE's opportunity is to gather data and create content for the consideration of the RLSSWA when designing the strategy mix for the AWSP to examine choice in the context of end-of-trip destinations and appropriate prevention strategies for the target group.

## Contact

### **Collaboration for Evidence, Research & Impact in Public Health**

Curtin University  
PO Box U1987  
Bentley Western Australia 6845  
Tel: +61 8 9266 7988  
[www.wader-n.org](http://www.wader-n.org)  
[www.ceriph.org.au](http://www.ceriph.org.au)

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