

CHOICE MODELLING

OPTIMISING PARTNERS AND PRODUCTS

We the deciders.

Humans are the ultimate decision makers – we make countless decisions daily – some more profound than others.

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We decide what to wear, what to eat, which smart phone to use (on a contract or pre-paid), whether to rent or buy property, whom to date, and, dare we say it, whom to marry. The truism across these choices is that we are forced to make trade-offs. Perfect, universally utilitarian choices are rare enough not to hope for.

Measuring trade-offs

So, if we can't have it all, how do we decide? In the last half-century, decision science has burgeoned into a rich field of interdisciplinary research. Consumers are, more than ever, spoiled for choice – and information. That elusive economics assumption of 'complete information' in decision making is now a consumer reality. Research shows that in several product categories consumers are faced with too much product information – adversely affecting their judgement.

For a marketer, the abundance of choice and freely available (if at times overwhelming) information puts a greater premium on knowledge of consumer trade-offs. Successful products and services must be optimised for market appeal and profitability. While the cost to develop and deliver a product feature can be estimated in-house, how to maximise consumer uptake and tailored marketing efforts must be derived through research – or from the intuition of the soothsaying manager.

The market knows what it wants – can't we just ask?

When it comes to knowing how people are deciding, the way we ask them determines a great deal of what we learn. To illustrate, let us consider the following scenario. As an astute Brand Manager, you are using market analytics to guide the development of a new frozen meal. Strategically, this new product development has the potential to fill a gap in your portfolio. Whilst the brand and ingredient formulation are finalised, you have two serving sizes, three packaging variations, three positioning statements and four price points to decide on. To aid the decision process, you survey the addressable market and ask them how important each of these product attributes are. Here is what you can expect to find...

How important is the retail price? Hugely important! How important is the serving size? Very important! How important is the packaging? Pretty important! Everything is important. What you really want to know is, would they pay more for the resealable packaging? How much more are they willing to pay for the twin serve size? Do the positioning statements add any equity? The research has determined that every product feature is important. Alas, you are no closer to understanding trade-offs between features to enable you to optimise the product for demand and revenue.

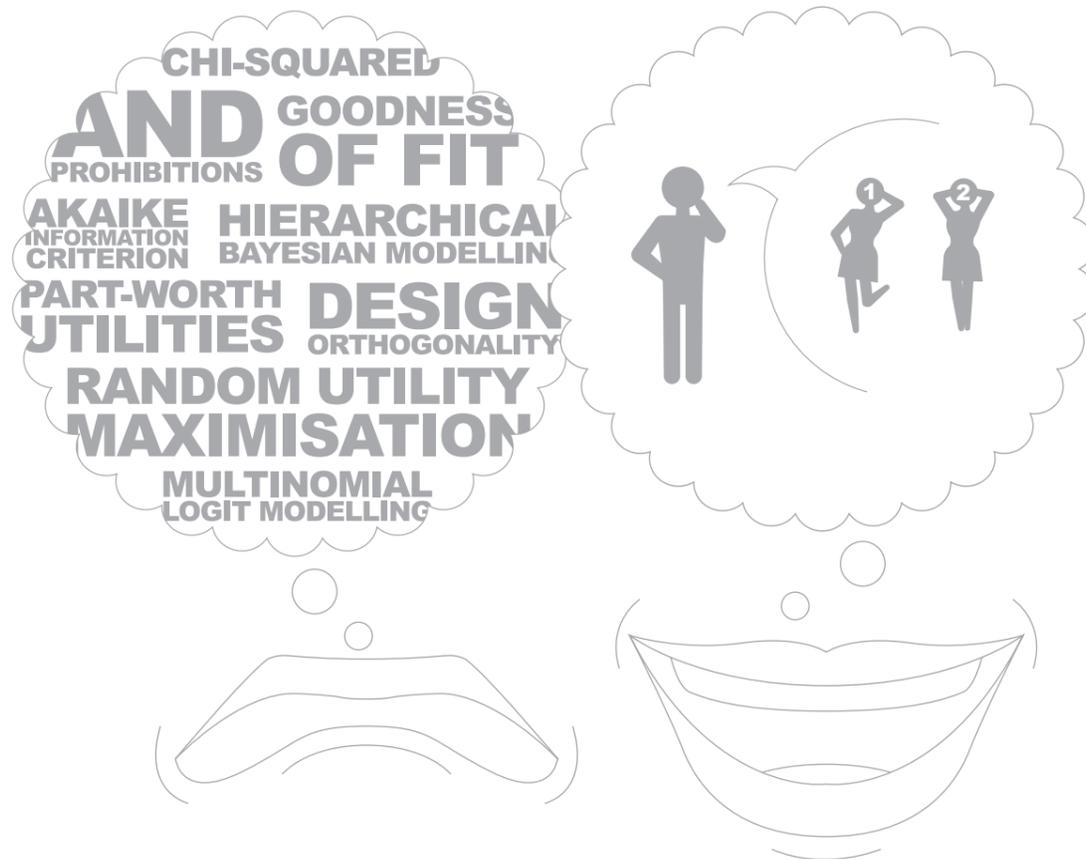
To understand trade-offs, our questioning method needs to analogue, as closely as possible, the actual purchase decision. When choosing from a range of different cameras, breakfast cereals or frozen dinners, we cannot choose a product which has all the features we want for the lowest price. Rather, we trade off product features based on what is important to us, and inevitably choose one product. That is to say, we make discrete choices.

Discrete Choice Modelling (DCM)

Of the numerous techniques researchers use to understand importance and trade-offs, Discrete Choice Modelling (DCM) is widely accepted as the most suited to product optimisation and market sizing objectives. DCM owes its genesis to Luce and Tukey (1964). Commercial application of DCM was popularised following Professor Daniel McFadden's Nobel Prize winning work using DCM in decision-making. Its success is attributed to its ability to analogue the purchase decision and scalability in market research.

Most critically, the Forethought approach to this methodology, Prophecy Choices, determines precise utilities (preferences) for all potential product features – which allow researchers to optimise products for uptake and revenue and to project sales.

Notwithstanding its methodological superiority, choice modelling is esoteric, to the statistically disinterested. A working explanation of the method involves navigating through the thorniest of statistical nomenclature. Let's keep a wide berth of statistics, and use an instinctively interesting example to explain how Prophecy Choices works.



Hard wired choices

Hundreds of empirical studies have found that when choosing partners, men value physical attractiveness more than women and women value social status more than men. According to evolutionary psychologists, this gender difference evolved because of the adaptive problems these preferences solved. Summarising decades of research in two sentences, in evolutionary biology, physical attractiveness is what's called an 'honest' signal of fertility. So, men who could attract (fertile) attractive women had better reproductive outcomes than those less fortunate. In contrast, children of women who could attract men with resources and secure their long term 'investment' were more likely to survive.

Romance is well and truly monetised. There are billion dollar industries around Valentine's Day, anniversaries, marriage, romance and self-help novels, television programs... the list goes on. Online dating alone is a four billion dollar industry in the USA (Marketdata), and growing rapidly in Australia. A recent survey sponsored by RSVP Australia found that 40% of adults knew someone who had married someone they met via online dating site.

How to choose a partner

Understanding the trade-offs men and women make when choosing potential partners in online dating can save both sexes some time alone. A Prophecy Choices: Partner Selection survey involves showing respondents (typically) two partner profiles and having them choose their preferred one. The partner profiles are described in terms of a number of attributes hypothesised to be important to the chooser, such as Physical attractiveness, Personality, Age, Income and City. Each attribute is comprised of several possible 'levels' (e.g. levels of Physical attractiveness are Above average looks, Average looks, Below average looks). Respondents are required to make a series of choices between randomly generated partner profiles.

Respondents' choices are collated and analysed using multivariate modelling. The choice model determines two things: how important the partner attributes are to choices, and preferences for the 'levels' within these attributes. Figure 1 shows the relative importance for the attributes in our partner choice model. The results show the attribute Personality has the strongest influence on decision-making, with 33% contribution. Figure 1 also shows the relative preference of the different levels for the attribute Personality.

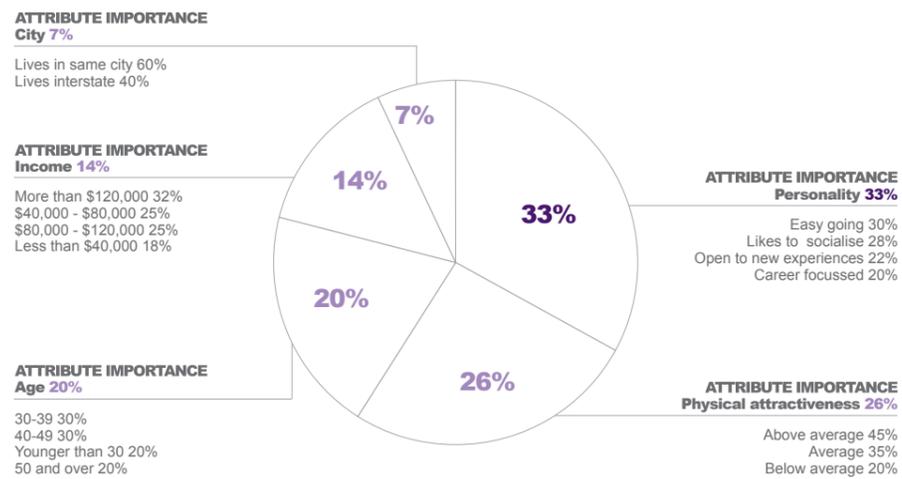
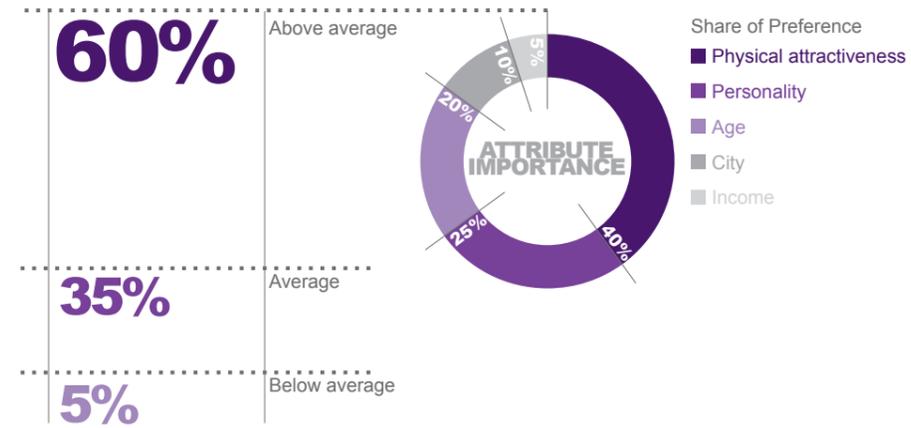


Figure 1

But do we all want the same qualities in a partner? We have a couple of options for understanding heterogeneity in choices. Firstly, we can produce unique models for a priori segments. For example, we absolutely want to understand men's choices and women's separately, and we might want to know how choices differ across age groups. Figure 2 shows that physical attractiveness has the strongest influence on partner choice amongst men while women are most influenced by personality.

The second option for understanding heterogeneity is to identify and group people into naturally occurring segments defined by their similarity in choice profiles. This is done using Hierarchical Bayesian (HB) modelling which derives preference results for each individual. Latent class analysis is then used to tag respondents into groups such that within-group difference in choice is minimised whilst across-group difference in choice behaviour is maximised.

Relative importance: Men



Relative importance: Women

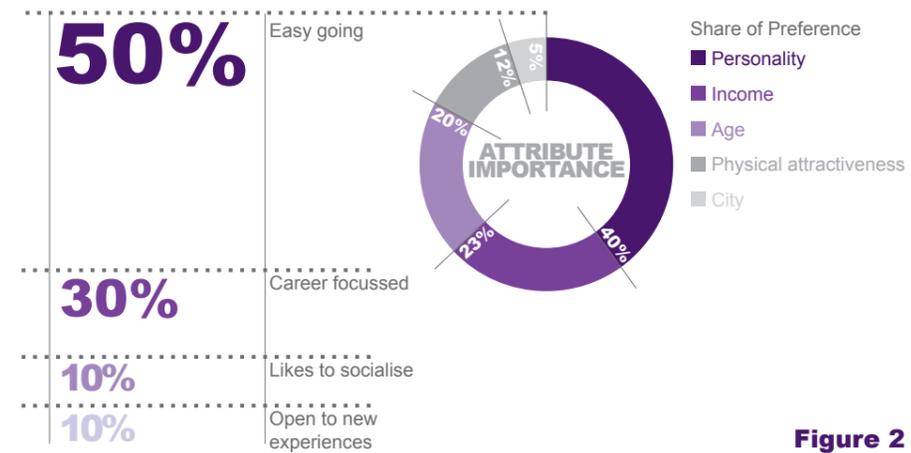


Figure 2

Commercial applications of Prophecy Choices

So, returning to our commercial reality, it is clear that Prophecy Choices answers some BIG questions. Which product or service attributes are really driving people's choices? What are the trade-offs people are making between product features? What are the unique needs of market segments? Which segments in the population are amenable to your product?

Adding price as an attribute addresses questions of price elasticity and willingness to pay for product features – leading to optimal price setting (Figure 3).

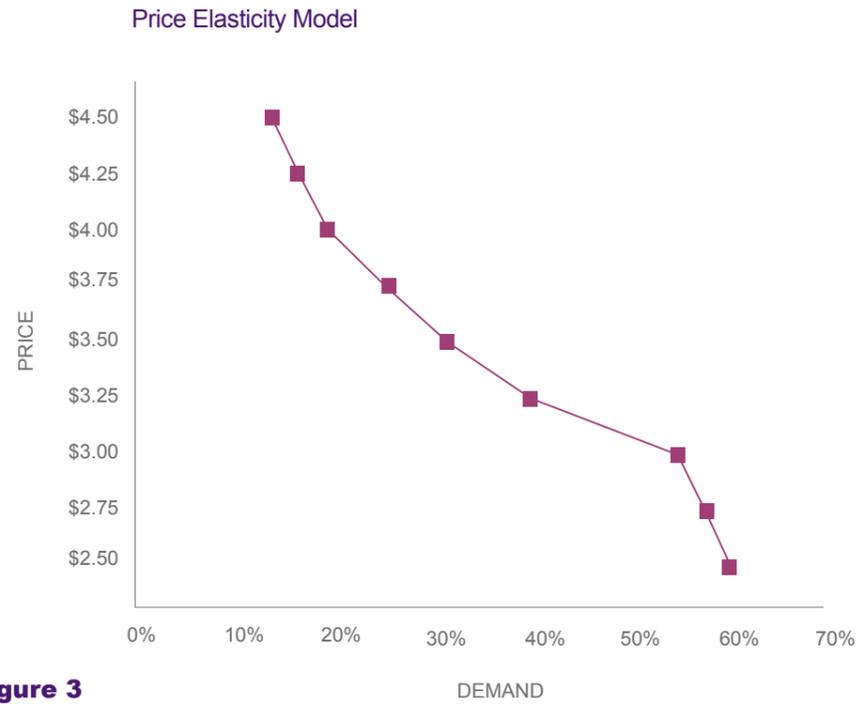


Figure 3

Decision Support Tool (DST)

The algorithms behind choice models can be used to build Decision Support Tools.

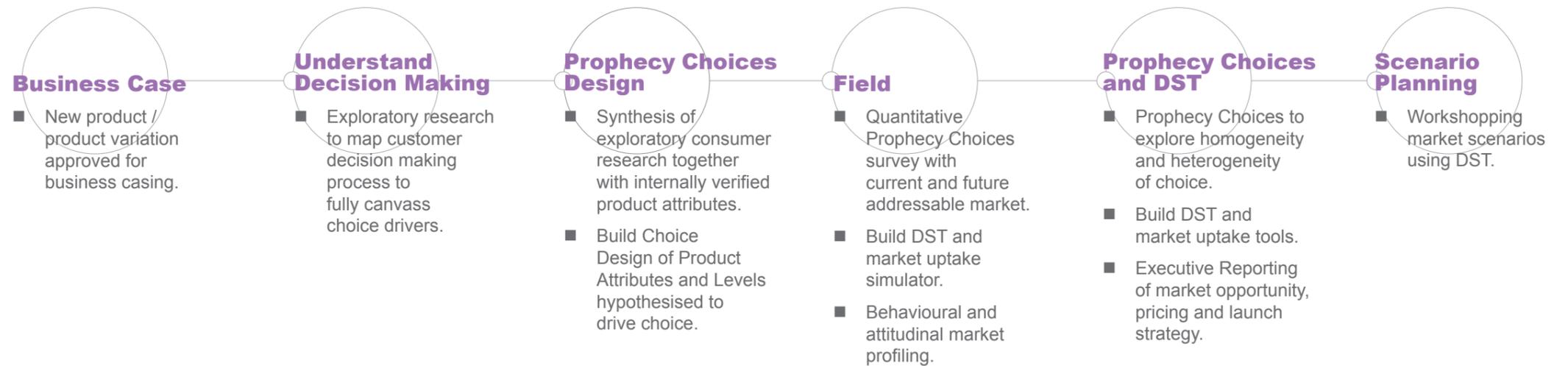
These tools enable managers to run countless scenarios, at no additional cost, by changing product features and simulating what the impact would be on product uptake and forecasted market share.

Link to Business Outcomes

Prophecy Choices models market share, making it a powerful sales projection tool. Individual purchase probabilities, when weighted for sales volumes and frequencies and aggregated over the customer base, form an estimate for market share. At Forethought, the results of choice modelling in new product contexts are linked with likely product uptake.

This approach has been shown to be highly accurate, where projected and actual uptake have been compared following product launches. When used with existing customer bases, choice probabilities are linked with likely spend and defection outcomes, so that changes to existing products can be quantified in these terms.

Prophecy Choices Project Milestones



Prophecy Choices solutions delivered by Forethought include:

Optimised rewards program, interest rate and issuer partnership for Australian department store loyalty card.

Forecasted student demand for first year enrolments into an Australian first doctoral program.

Developed segment-driven design strategies to improve member engagement with online wealth portal.

Identified product features with the greatest impact on driving uptake of online education tools with secondary education teachers.

Built pricing strategy for tiered NRL club membership packages.

Optimised discount airline product bundling whilst minimising cannibalisation of full fee services.

Designed new logo for second tier bank with national footprint.

Simulated healthcare patient profiles that best suited the client's market assets.

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