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by

Sue O'Keefe, Lin Crase and Brian Dollery

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Abstract

The provision of, and participation in, work related training and development has received significant recent attention in Australia in the face of rapid technological change, an ageing labour force and a growing skill shortage. Accordingly, many organisations have put in place policies and practices that ostensibly aim to encourage and support increased employee participation in such programs. The declining participation that accompanies advancing age is well established in the literature, but given the considerable advantages of participation in terms of labour force engagement, it may be useful to further examine the barriers and stimulants to participation that apply to older workers. Drawing on an experimental choice analysis conducted in an Australian public sector organisation, this paper focuses on the participation decisions of older workers, and suggests ways to encourage participation of this group.

Key Words: Choice analysis; human capital theory; ageing workforce

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** Sue O'Keefe is a Lecturer and Lin Crase is Deputy Head of the School of Business at LaTrobe University in Albury-Wodonga. Brian Dollery is Professor of Economics and Director of the Centre for Local Government at the University of New England as well as Visiting Professor, International Graduate School of the Social Sciences, Yokohama National University.
Contact information: School of Economics, University of New England, Armidale, NSW 2351, Australia. Email: bdollery@une.edu.au

Introduction

Changing demographics characterise contemporary advanced economies and Australia is not immune to the effects of an ageing population which is the upshot of the dual impacts of rising life expectancy and declining fertility rates. Substantial government policy efforts have been directed at retaining older workers in the workforce as a buffer against skills shortages, and insurance against rising pension and health costs (Access Economics 2001, p. xi). These initiatives include changes to superannuation laws to provide a disincentive to early retirement and the abolition of compulsory retirement at a specified age in the Commonwealth Public Service.

Karmel (2004) argues that substantial government attention has also highlighted the unique potential of education and training to play a role in addressing some of the perceived problems associated with the ageing population. Concerns about skills shortages have culminated in interest in the role played by education and training in maintaining and extending the skills base of an ageing workforce (Karmel & Woods 2004). Australia's ageing workforce presents a number of challenges for the training system itself (see, for instance Department of Education Science and Training 2005) and, as highlighted by Brooke (2003), for individual organisations in their quest to maintain an appropriately skilled workforce.

However, despite recent evidence that increased levels of education and training for those older than 45 has substantial gains, both in terms of labour force attachment and productivity (Karmel 2004), older workers continue to receive a smaller quantum of the available workplace education and training (Long et al. 2000). This lack of education and training has variously been explained by the existence of economic disincentives (Becker 1964; Black & Lynch 1996; Booth & Snower 1996; Chang & Wang 1996); the impact of

older workers' attitudes (Tharenou 1997; 2001), or other 'cohort effects' (Productivity Commission 2005), and by the suggestion that it is employers' attitudes that preclude optimal participation by this group (Kroll 2003).

Given these trends, it would appear enlightening to more carefully investigate the barriers and incentives to participation by older Australian workers. Empirical work consistently shows a negative relationship between age and participation in both education and training which human capital theory (Becker 1964; Mincer 1970) conceptualises as reflecting the rising opportunity cost and reduced time for accrual of benefits (see, for instance, Cookson 1986). Most of this work employs revealed preference data to analyse participation trends.

The approach adopted in this paper is distinctive in that it utilises a stated preference method to elicit *ex-ante* information. It draws upon econometric models of worker study participation choice developed in the context of a large government organisation. Manipulation of these models affords the opportunity to estimate the magnitude of the trade-offs necessary to encourage increased participation. The paper itself comprises five sections. Part two develops the rationale and method employed in the study, prior to an explanation of the experimental method in section three. Section four presents results of the modeling process. Discussion of some of the implications of the models from an organisational and policy making perspective ensue in section five. Section six comprises some brief concluding remarks.

Rationale and Method

Experimental choice analysis[1] is one way to examine the preferences of workers for a range of study options involves conceptualising the study program itself as a 'product' that comprises of a number of salient attributes that, in combination, give the program its form and utility (Kaul & Rao 1995). Combining varying the levels of these attributes to constitute specific choice options allows distinct 'bundles' to be offered to respondents. Participant's stated preferences are ultimately revealed through their repeated choices between hypothetical study programs.

Choice modelling draws upon the *homo economicus* assumption, but simultaneously recognises the constrained nature of the individual decision process as conceptualised by Simon (1959). As such, despite its experimental nature it has been seen to more closely approximate a 'real life' choice than similar methods such as traditional or adaptive conjoint analysis. Furthermore, the iterative experimental design process that cumulatively draws on instances of qualitative data collection has expanded potential to gather information specific to the actual choice context. Notwithstanding the criticisms of stated preference techniques[2], a compelling advantage of this technique is that it affords the researcher the opportunity to gather *ex ante* data on consumer preferences, rather than

[1] This technique has been extensively been used in environmental evaluation (Morrison et al. 1996; 1998), education choices (Soutar & Turner 2002) in addition to extensive use in travel economics literature (Hensher 1994; 2004).

[2] Whilst revealed preference methods offer certainty in actual choice behaviour, this data is not always available. Moreover, revealed preference methods give no information about the choice options considered but not chosen. Crouch and Louviere (2001) contend that only very rarely are revealed preference data of much use for modelling purposes. Notwithstanding this, several areas of concern exist in the application of any stated preference technique. Firstly, all stated preference techniques can be criticised due to the poor correlation between intent and behaviour. For instance, Ajzen and Peterson (1988 p. 68) observe that '…social psychological research has revealed poor relations between attitudes and overt action'. Similarly, Diamond and Hausman (1994) found that there were large and significant differences between willingness to pay in stated preference experiments on one hand and actual payment on the other.

In addition to these concerns, a number of biases associated with all stated preference techniques have been identified (see, for instance, Morrison et al. 1996).

examining revealed preference data which does not give prior knowledge of the likely trade-offs made by consumers in framing their decisions. Choice modelling also allows the incorporation of socio-economic and demographic data in the form of interaction terms within the models, enabling an expanded understanding of the likely characteristics of consumers favouring particular combinations of attributes of the study program. In the current context, advance knowledge about the preferences of the ageing worker may facilitate the more efficient design of programs and policies to encourage participation, rather than implementing costly programs that do not take into account existing preferences.

Experimental Design

Appropriate experimental design is crucial to the success of a conjoint experiment (Hair et al. 1998, p.399). Experimental design aims to identify those variables or attributes that affect consumer preferences, to assign realistic levels to these and to establish a suitable model for consumer preferences. Choice modelling generally employs an experimental design process to first establish the choice sets to be presented to respondents. The purpose of this process is to reduce the choice task to those options likely to be considered by Simon's (1959) 'boundedly rational man'. The experimental design process is also used to reveal potential cross effects where the attributes of one alternative impinge upon the utility of another. Careful survey design which includes an iterative process can minimise the influence of cross effects and enhance the precision with which parameters are estimated (Morrison et al.1996, p.10).

The research approach generally employed here follows the iterative process used by Lockwood and Carberry (1998), involving focus sessions, interviews and survey pre-testing. Interviews and focus groups were conducted at participants' workplaces in 2004.

Each potential attribute for the choice model was analysed to determine whether its inclusion would enhance or detract from the realism and implementation of the choice experiment. In addition, data relating to the status quo were gathered to allow the specification of a realistic hypothetical situation. The attributes that resulted from this process are contained in Table 1. This process along with a review of the literature revealed other factors that may potentially impinge in the workers' decisions. This included attitudinal factors and matters of organisational policy. This process facilitated the development of a survey instrument that collected data on the individuals' demographic and socio-economic status, their attitudes to study, their perceptions of organisational policies and practices, in addition to their choices of hypothetical study programs.

Table 1: Attributes and levels

Attribute	**Levels for formal courses of study.**
Cost to individual.	Zero, $2500, $5000 and $8,000 per annum.
Leisure time forgone.	Zero, 6, 12 or 15 hours per week.
Impact on career.	Maintain current position. Advance in current industry or sector. Advance in other industries or sectors.

The attributes and levels drawn from this process facilitate the development of the choice stimuli to present to respondents. In this case an additive model form was specified. The additive or main effects model simply sums the values for each attribute (i.e. the part-worths) to get the total value for a combination of attributes. Hair et al. (1998 p.408) conclude that although some choices may be described by multiplicative effects, the additive model accounts for 80-90% of the variation in preference in most cases.

A main effects fractional factorial design was generated using SPSS Conjoint which yielded 16 choice options. A foldover design was then used to generate alternative choice options which were paired to provide the choice sets. Foldover designs generally

maximise the number of tradeoffs between options, but '…[t]he high efficiency in terms of maximising tradeoffs comes at the cost of high cognitive burdens on participants- there are no easy choices' (Lockwood & Carberry 1998, p. 14). Each survey included eight choice sets. The following is an example of a single choice set. An orthogonal design[3] was employed to ensure independence amongst the attributes. An example of a choice set appears below in Table 2.

An unlabelled choice set was deemed appropriate since the realistic choice context does not include a brand. The choice modelling literature tends to currently be predominated by the use of unlabelled experiments (Viney, Savage & Louviere 2005).The advantage of an unlabelled experiment is that it explicitly focuses the respondents' attention on the attributes of the product at hand (Blamey et al. 1997). Blamey et al. (1997 p.2) also observe that such an approach may lead to a more discerning and discriminating response. In an unlabelled design, orthogonality within alternatives is the central concern, as it matters not whether orthogonality is maintained across the experiment as a whole (see, for instance Hensher et al. 2005 p. 150-151). Moreover, the use of an unlabelled design necessitates the estimation of generic parameters regardless of the number of choice alternatives (Hensher et al. 2005 p. 151)[4].

[3] Whilst orthogonal designs such as these currently predominate the literature, there appears to be a fundamental shift away from this approach, towards the employment of more efficient designs. This reflects the fact that whilst orthogonal designs represent a statistical and theoretical ideal, ensuring orthogonality over an entire data set is problematic, since a design can only be considered orthogonal if the entire fractional or full factorial is used (Hensher et al. 2005 p. 126). In this context, Hensher et al. (2005, p.126) provide some insight into the extent of the problem: 'One wonders how many carefully crafted orthogonal designs have in reality maintained their statistical properties after data are collected and used in model estimation'.

[4] Hensher et al. 2005 provide a comprehensive discussion of the theoretical and practical implications of the choice to employ an unlabelled or a labelled choice set.

Table 2: Example of a choice set for Study

Would you choose A, B or C?

	Cost to you (pa)	Leisure hours lost per week	Career impact
Option A	0	0	Maintain current position
Option B	8000	6	Advance in other industry or sector
Option C	No study		

In addition to the demographic variables and the attributes themselves, the survey instrument gathered data on the respondents' psychographics in an attempt to capture preference heterogeneity as described by Boxall and Adamowicz (2002). This approach is not novel and has previously been employed by Ashok, Dillon and Yuan (2002), Ben-Akiva, McFadden, Garling and Gopinath (1999) and Morikawa, Ben-Akiva and McFadden (2002).

Principal component analysis was employed to facilitate the effective inclusion of other data through interactions. Specific psychographic items for inclusion in the survey were developed from interrogation of data gathered from semi-structured interviews, focus groups and a comprehensive review of the psychological literature. Following Hayes and Darkenwald (1990), respondents were asked to rate the strength of their agreement on a five point Likert Scale with a value of 1 representing strongly disagree, and a value of 5 depicting strong agreement.

Exploratory principal component analysis (using SPSS version 11) was undertaken to statistically determine the subscale structure of attitudes to Study. Notwithstanding the statistical concern for ensuring orthogonality in econometric models such as these, the principal component analysis of the attitude items employed a non-orthogonal approach (oblique rotation) as relationships between factors were assumed (Tabachnick & Fidell

1996). This method is commonly used in studies that utilise similar psychological variables (see, for instance, Hart et al. 1993; Maybery, Crase & Gullifer 2005). To ensure more stable principal component structures a criterion of five subjects per item is optimal (Hart et al. 1993) – a ratio of 6.45:1 easily met this criteria. Three 'rules of thumb' criteria were used to derive factors, eigenvalues of one (Rummell 1970; Stevens 1986), scree tests and '...smaller factors are retained only if they have sufficient substantive meaning to be interpretable' (Rummel 1970, p.362). A number of items were subsequently discarded from the analysis in an attempt to include only those factors with greatest explanatory power. The factor structure for Study is included below in Table 3. This table includes the items from the survey and their factor loadings.

This factor structure for Study explained 58.68% of the total variance. Chronbach's alphas for ENJOYMENT and ORGANISATIONAL VALUES were 0.70 and 0.54 respectively. Some cross-loading of factors was evident for particular items, but this subsequently proved to be of little relevance since the modelling process found only two of these variables had a significant bearing on the individual's choices to Study. Table 3 presents the results of the principal component analysis for the Training product.

Table 3: Principal component analysis for Study product

ITEM	Enjoyment	PBC	OV/SSN	Importance
The expense of a formal course of study is a waste of employers' money	0.04	0.10	0.07	**0.74**
Successful people do not need formal courses of study	0.27	0.00	0.24	**0.68**
Formal courses of study are mainly for people with little else to do	**0.50**	0.24	0.12	**0.58**
Formal courses of study can be a waste of time	0.28	0.07	-0.09	**0.62**
I dislike participating in education and training	**0.81**	0.14	0.12	0.27
I enjoy formal courses of study that allow me to work with others	**0.73**	0.12	0.12	0.09
I'm fed up with teachers and classes	**0.77**	0.12	0.18	0.32
This organisation values formal courses of study highly	0.03	0.15	**0.81**	0.02
Workplace policies encourage employees to participate in formal courses of study	0.07	0.06	**0.79**	0.00
My supervisor really has little influence over whether I undertake further formal courses of study	0.21	**0.57**	0.38	0.35
It is up to me whether I undertake formal courses of study	0.01	**0.85**	0.07	0.01
It is really not up to me whether I undertake formal courses of study	0.16	**0.69**	0.03	0.22
Amount of variance explained	22.75%	**15.30%**	10.54%	10.09%

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalisation.

Prior to the development of the choice sets themselves, attributes and levels were coded for estimation as presented in Table 4.

Table 4: Definitions and coding of variables

Variable/constant	Definition	Coding
PRICE	Cost per annum to the individual ($)	0, 2500, 5000,8000
TIME	Number of leisure hours lost per week	0,6,12,15
ADVANCE	The study or training program leads to career advancement.	Dummy variable with career > 1 taking the value of 1.
C1	Alternate specific constant	Constrained to be equal across V1 and V2
AGE	Respondents age at time of survey	Numeric value
MANAGE	Workers who were at level four or above in the organisation	Dummy variable with level >3 taking a value of 1.
ENJOYMENT	Respondents additive score (1-5) on items designed to measure enjoyment of study.	Dummy variable, with scores > 3 taking the value of 1.
OV	Respondents additive score (1-5) on their perception of the degree to which organisational values support participation in study.	Dummy variable, with scores > 3 taking the value of 1.

For clarity, Table 4 includes only those variables that subsequently proved significant in model estimation. The coding process involved a number of matters that require explanation. Firstly, the underlying intent of the coding of variables differs from that of the development of the choice sets. The wording employed in the choice sets must be such that it is meaningful to respondents, and the iterative design process facilitates this through the process of interviews and focus sessions. However, the coding must enable models to be estimated. This necessitates taking into consideration the nature of the variable, and more specifically whether the levels of a variable have linear or non-linear effects.

In this case, the career attribute presented to participants exhibits non-linear effects[5]. It is an ordinal variable, where the progression from level 1 to level 2 cannot reasonably be assumed to be equal to the progression from level 2 to level 3. That is, the numerals are indicators rather than depicting a statistical relationship. In cases such as these, Hensher et al. (2005, p. 119) suggest the use of dummy or effects coding. Accordingly, the CAREER attribute is simply divided into two categories: ADVANCE and NO ADVANCE. In accordance with Human Capital Theory, the essential characteristic of this attribute from both a theoretical and a practical perspective was the extent to which the Study program was seen by employees as transferable (or more general in nature) vis-à-vis the extent to which it was conceptualised as non-transferable. Hence, the dummy coding allows estimation of this more complex relationship, whilst simultaneously capturing the essence of the attribute.

Similar reasoning applies, in this context, to the psychographic variables, and the MANAGE variable. The psychographic variables developed from the principal component analysis represented points on a five point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The numbers 1 to 5 therefore represent merely an indicator of the intensity of feelings of agreement or otherwise, and in a similar fashion to that of the CAREER attribute, required dummy coding. The level variable thereby is renamed MANAGE and divides respondents into two categories: managers and others as per the table above.

Table 3 introduces the PRICE attribute. Although the iterative process revealed that respondents considered the cost of a Study program to the individual to be a central attribute of the 'product', this nomenclature has been altered to avoid confusion.

[5] The author is indebted to the comments of an anonymous reviewer from the *Australian Journal of Labour Economics* for clarifying this point.

Accordingly, from this point onwards, the attribute has been named PRICE for modelling purposes.

Findings

In the first instance, basic multinomial logit models were computed using Equation 1.0. A specialised computer program, LIMDEP, designed to analyse models employing limited dependent variables, was used to conduct the analysis. The indirect utility functions specified for the basic models were as follows:

$$V_1 = C_1 + \beta_1 \text{ Price} + \beta_2 \text{ Time} + \beta_3 \text{ Career}$$

$$V_2 = C_1 + \beta_1 \text{ Price} + \beta_2 \text{ Time} + \beta_3 \text{ Career}$$

$$V_3 = 0 \qquad [1.0]$$

Table 5: Study Models

	Study Model
C1	0.10332 (.310)
PRICE	-0.0002923*** -(15.681)
TIME	-.0.07509*** -(8.708)
ADVANCE	1.1215*** (9.969)
AGE*C1	-0.01882** (-2.374)
MANAGE* C1	0.35625** (2.154)
ENJ* C1	1.24994*** (7.458)
OV* C1	0.45039** (1.972)
Rho 2 (ρ^2))	0.22779
Adjusted Rho 2 (ρ^2 *adj)*	0.22510
Observations	1152
Chi-Square	2254.2514

t- ratios in parentheses
***Significant at the 1% level
**Significant at the 5% level
*Significant at the 10% level

The Study Model was developed using the basic linear equation, but ultimately with the inclusion of AGE, MANAGE, ENJOYMENT and ORGANISATIONAL VALUES variables through interactions with the constant. The overall model proved to be significant and explained more than 20% of the variation in the data, without violating the IIA assumption. This feat is quite unusual in the literature (Foster & Mourato 2000), and is an indication that the model estimation has captured in large part, the richness of the data within the utility function (Hensher et al. 2005 p.481). The chi-square test was generally supportive that the model was statistically significant. More particularly, the AGE* C1 variable was negative and significant at the 5% level with older employees less likely to choose any of the Study options, *ceteris paribus*. This reinforces the constraining influence of advancing age on decisions to participate in study programs. Respondents who were managers were more inclined to choose a Study option (significant at the 1% level), as were those who enjoyed study (ENJOYMENT) being significant at the 5% level. Those who believed that the organisational values support their participation in Study programs were, *ceteris paribus*, more prepared to undertake such a program.

Willingness to pay estimates and manipulation of attribute levels

Inspection of the Study Model suggests that manipulation of product attributes might potentially offset the reduced interest in study that accompanies advancing age. Understanding the trade-offs between the positive influence of particular attribute levels and the negative influence of age can provide insights into the likely success of these alternative approaches to induce greater participation by an ageing workforce.

The attribute interactions show that older workers are both more price sensitive and more protective of their leisure time from the impost of Study. Policy attention might therefore productively focus on variations in these two attributes in an attempt to further encourage older workers to participate.

By way of illustration, manipulation of the market share equation [2.0] was undertaken to determine the relative impact of age on the choice to Study against an alternative product scenario. Blamey et al. (1999, p. 342) offer the following method of calculating market share:

$$\text{Market Share} = \Sigma P_{ih} / \Sigma [\Sigma P_{ij}] * 100 \qquad [2.0]$$
$$I=1,N \; j \varepsilon C \; i=1,N$$

where there are N respondents and the ith respondent faces j alternatives, including the hth option. The socio-economic data pertaining to the 'average respondent' is often substituted into the utility function to provide an estimate of market share from the choice data.

Market share calculations in the current context can be employed to provide an estimate of the number of participants who would choose a Study program comprising a specified combination of attributes. Thus, this estimation involved selecting a particular product scenario (i.e. with the attributes of PRICE, TIME and ADVANCE held constant at $5000, 6 hours and 1 respectively) and substituting mean values for the other significant socio-economic variables whilst simultaneously varying age from (in this case) 25 to 50 years. The result revealed a 34.7% reduction in the numbers within this sample who would choose the Study product if the age of respondents was doubled from 25 to 50.

By considering the same utility function, but setting age at 50, it is possible to consider how manipulating one of the product attributes might achieve the same market share as that which would attend a workforce aged 25 years. More specifically, in this case

reducing the TIME attribute from 6 hours of leisure per week to 1.46 hours yielded an equivalent off-set for the impact of age. It is clear that the information contained in the models allows for the enumeration of incentives to target ageing workers. Alternatively, varying the PRICE attribute could also achieve substantial improvement in the number of employees choosing a Study option. Calculations showed that a reduction of PRICE from $5000 to $2982.88 yielded a participation rate equivalent to that previously ascribed to 25 year olds. Accordingly, it appears feasible from the point of view of the organisation to gain increased levels of participation in study for older workers by reducing the impost on them in terms of financial burden and forfeited leisure time.

Discussion

The existence of the negative relationship between age and participation decisions is borne out in the Study Model developed here. However, it is also feasible that it may not be age *per se* that renders employees less willing to undertake education, but rather some combination of individual attitudes and values that are inadvertently statistically confounded with age. Alternatively, there may be other unobserved cohort effects in operation that further complicate the situation of older workers.

Moreover, whilst the negative relationship between age and participation in education and is strong, it may not be as problematic as it first appears. It is feasible that an increase in average 'work-life span' will alter the assumptions upon which an individual calculates the opportunity cost of participation, effectively increasing the amount of time over which benefits may be realised. Recent work by Karmel and Woods (2004, p.12) shows that there are substantial advantages for older people's investment in education, particularly in terms of improved engagement with the labour force. Moreover, higher level qualifications were found to be more positively associated with higher employment levels

than were lower level qualifications (p.33). Despite their suggestion that training provides a type of 'insurance' against unemployment, they also argue that it is also possible that employers provide more training precisely because '…the employer expects to keep [the worker]' (Karmel & Woods 2004, p.33).

Concluding Remarks

In short, continual up-dating of the skills set of older workers is essential in an ageing and increasingly complex society. It is likely that there are workplace and government policies that may encourage the uptake of education for these cohorts of the population. If we accept the imperative for increased investment in the skills and competencies of an ageing workforce, it is likely that significant organisational attention might productively focus on encouraging participation of this group. The models developed here assist in this regard, since they point to other salient factors that affect workers' decisions and might thereby militate against the negative influence of age. In other words, an increase in age need not be accompanied by reduced participation if appropriate countervailing influence is applied through manipulations of the 'product' attributes. This paper has taken a novel approach to investigating the nexus between age and worker's willingness to participate in study programs. A stated preference technique was employed to unravel the trade-offs that workers make in deciding to study.

Whilst this paper goes some way to understanding the decision drivers of workers, other useful avenues of enquiry might involve examining the impact of specific human resource management policies and practices on the participation of older workers. Possible areas to consider may feasibly involve examining issues surrounding the establishment of an explicit internal labour market and work and life balance, the extent to which training and development policies are explicitly tied to measures of performance

and reward, and the fit between policy and practice.

References

Access Economics (2001). *Population, Ageing and the Economy*. Canberra, Commonwealth of Australia.

Ajzen, I. & Peterson, G. (1988). Contingent value measurement: The price of everything and the value of nothing? in Peterson, G., Driver, R. & Gregory, R. (eds) *Amenity Resource Valuation: Integrating Economics with other disciplines*. Venture Publishers, PA, pp. 65-76.

Ashok, K., Dillon, W. & Yuan, S. (2002). Extending discrete choice models to incorporate attitudinal and other latent variables. *Journal of Marketing Research* XXXIX(Feb): 31-46.

Becker, G. (1964). *Human Capital: A Theoretical Analysis with Special Reference to Education*. New York, Columbia University Press.

Ben-Akiva, M., McFadden, D., Garling, T. & Gopinath, D. (1999). Extended framework for modelling choice behaviour. *Marketing Letters* 10: 187-203.

Blamey, R., Bennett, J. & Morrison, M. (1997). *Dissonance Minimisation in Contingent Valuation Surveys*. Paper presented at the 41st Annual Conference of the Australian Agricultural and Resource Economics Society. Gold Coast, January 21-24.

Blamey, R., Gordon, J. & Chapman, R. (1999). Choice modelling: Assessing the environmental values of water supply options. *Agricultural and Resource Economics* 43: 337-358.

Black, S. & Lynch, L. (1996). Human capital investments and productivity. *American Economic Review* 86(2): 263-267.

Booth, A. & Snower, D. (1996). *Acquiring Skills*, Cambridge University Press.

Boxall, P. & Adamowicz, W. (2002). Understanding heterogeneous preferences in random utility models: A latent class approach. *Environmental and Resource Economics* 23(4): 421-446.

Brooke, L. (2003). Human resource costs and benefits of maintaining a mature-age workforce. *International Journal of Manpower* 24(3): 260-283.

Chang, C. & Wang, Y. (1996). Human captial investment under asymetric information: The Pigovian conjecture revisited. *Journal of Labor Economics* 14(3): 505-519.

Cookson, P. (1986). A framework for theory and research on adult education. *Adult Education Quarterly* 36(3): 130-141.

Crouch, G. & Louviere, J. (2001). A review of choice modelling research in tourism, hospitality and leisure, in Mazanec, J., Crouch, G., Ritchie, R. & Woodside, A. (eds) *Consumer Psychology of Tourism, Hospitality and Leisure*. CABI Publishing, Wallingford.

Department of Education Science and Training (2005). *Skilling Australia- New Directions for Vocational Education and Training*. Canberra, AGPS.

Diamond, R. & Hausman, J. (1994). Contingent valuation: Is some number better than no number. *Journal of Economic Perspectives* 8(4): 45-64.

Foster, V. & Mourato, S. (2000). Valuing the multiple impacts of pesticides use in the UK: A contingent ranking approach. *American Journal of Agricultural Economics* 8(4): 45-64.

Hair, J., Anderson, R., Tatham, R. & Black, W. (1998). *Multivariate Analysis*. Prentice-Hall International, New Jersey.

Hart, P. M., Wearing, A. J. & Headley, B. (1993). Assessing police work experiences: Development of the police daily hassles and uplifts scales. *Journal of Criminal Justice* 21: 553-572.

Hayes, E. & Darkenwald, G. (1990). Attitudes towards adult education: An empirically based conceptualisation. *Adult Education Quarterly* 40(3): 158-168.

Hensher, D. (2004). Accounting for stated choice design dimensionality in willingness to pay for travel time savings. *Journal of Transport Economics and Policy* 38(2): 425-446.

Hensher, D. A. (1994). Stated Preference Analysis of Travel Choices: The State of Practice. *Transport economics: Selected readings. 1997*: 81.

Hensher, D. A, Rose, J. & Greene, W. (2005). *Applied Choice Analysis: A Primer*. Cambridge University Press, Cambridge.

Karmel, T. (2004). *Australia's approach to lifelong learning*, UNESCO International Expert meeting on TVET, NCVER, Bonn.

Karmel, T. & Woods, D. (2004). *Lifelong Learning and Older Workers*. Adelaide, NCVER.

Kaul, A. & Rao, V. (1995). Research for product positioning and design decisions: An integrative view. *International Journal of Research in Marketing* 12(4): 149-159.

Kroll, M. (2003). The challenge of the age and competency structure in industry for innovations and human resource policy. *Journal of European*

Industrial Training 27(6/7): 355-371.

Lockwood, M. & Carberry, D. (1998). *Stated preference surveys of remnant native vegetation conservation*. Economics of Remnant Native Vegetation Conservation on Private Property. Johnstone Centre, Albury.

Long, M., Ryan, R., Burke, G. & Hopkins, S. (2000). *Enterprise-Based Education and Training: A Literature Review*. Melbourne, Report To The New Zealand Ministry Of Education.

Maybery, D., Crase, L. & Gullifer, C. (2005). Categorising farming values as economic, conservation and lifestyle. *Journal of Economic Psychology* 26: 59-72.

Mincer, J. (1970). On-the-job training: Costs, Returns and Some Implications. *Journal of Political Economy* 70(5): S50-S79.

Morikawa, T., Ben-Akiva, M. & McFadden, D. (2002). *Discrete choice models incorporating revealed preferences and psychometric data*.

Morrison, M., Blamey, R., Bennett, J. & Louviere, J. (1996). *A comparison of stated preference techniques for estimating environmental values Research report*. Sydney, UNSW.

Morrison, M., Bennett, J. & Blamey, R. (1998). Valuing improved wetland quality using choice modelling. *Choice Modelling Research Report No. 6.* University of New South Wales, Sydney.

Productivity Commission (2005). *Economic Implications of an Ageing Australia*. Research Report, 24 March 2005, Commonwealth of Australia, Canberra.

Rummell, R. J. (1970). *Applied Factor Analysis*. Evanstown, IL, Northwestern University Press.

Simon, H. (1959). Theories of decision-making in economics and behavioural science. *Micro-economics- Selected Readings*. E. Mansfield. New York, W W Norton & Company Inc.

Soutar, G. & Turner, J. (2002). Students' preferences for university: A conjoint analysis. *The International Journal of Educational Management* 16(1): 40-45.

Stevens, J. (1986). *Applied Multivariate Statitistics for the Social Sciences*. New Jersey, Lawrence Erlbaum Associates.

Tabachnick, B. & Fidell, L. (1996). *Using Multivariate Statistics*. HarperCollins College Publishers, New York.

Tharenou, P. (1997). Determinants of participation in training and development. *Journal of Organisational Behaviour*: 15-27.

Tharenou, P. (2001). The Relationship of training motivation to participation in training and development. *Journal of Occupational and Organisational Psychology* 74: 599-621.

Viney, R., Savage, E. & Louviere, J. (2005). Empirical investigation of experimental design properties of discrete choice experiments in health care. *Health Economics* 14: 349-362.