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The influence of cultural identity on willingness to pay values in contingent valuation surveys

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The influence of cultural identity on willingness to pay values in contingent valuation surveys

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Abstract

Current New Zealand resource management legislation requires local government actively recognise and take into account Māori values in resource management planning. This means the decision process and participants must interact with evidence based on Māori epistemologies. The Māori world-view is holistic in nature in that it embodies historical, environmental, and spiritual values, as well as modern experiences. Concerns arise for Māori communities when planners and developers utilise economic tools such as willingness to pay surveys to determine the total value of a proposed project. Other concerns are caused by surveys that ask a participant “are you Māori” and fail to recognise the diverse realities that exist for Māori. This paper draws from a survey of 700 respondents to identify the extent to which current conventional Contingent Valuation methodologies can measure changes in the environment where the response is culturally influenced. The influence of culture on willingness to pay decisions will be investigated using a measure of Māori identity. These cultural indicators involve assessing an individual’s commitment and involvement in Māori cultural issues including: Te Reo (Māori language), whānau, other Māori, whakapapa (genealogy) and tikanga (Māori world view).

Key Words

Māori
Indigenous
Culture
Natural Resource Management
Well-being
Values
Contingent Valuation

Introduction

Indigenous nations recognise the inter-relatedness, the interdependence of all living things in the natural world. Whakapapa (genealogy) is an important concept within the Māori worldview. That is, the worldview of the indigenous people of Aotearoa/New Zealand. Whakapapa explains the relationship that Māori have with each other, natural resources, the environment, the world and the universe. Every living organism is connected through a common bond. Based on this belief a large number of responsibilities and obligations were conferred on Māori to sustain and maintain the well-being of people, communities and natural resources (Marsden, 1989; Marsden & Henare, 1992; Mead, 2003).

Negative externalities caused by unsustainable practices such as sewage outfalls adversely affect the ability of Māori to provide for their whānau (family) and manuhiri (guests), and hence lead to a loss of mana (prestige). From a Māori perspective, this loss of mana is totally unacceptable (Waitangi Tribunal, 1989; Waitangi Tribunal, 1992). Māori feel they are not able to exercise Kaitiakitanga (natural resource management) within Aotearoa.

Māori perceive their value systems have been marginalised and the role of kaitiaki (natural resource managers) has been diminished. Little weight has been given to Māori perspective and customs for conservation matters and for the management of natural resources (Awatere, Ihaka, & Harrison, 2000). There is a growing realisation by local government that understanding Māori views and beliefs is essential for resource management decisions. There is an inadequacy in the Māori values information currently used by resource management agencies in New Zealand, which has resulted in very low participation rates by iwi and hapū in local government resource management processes (Whangaparitā, Awatere, & Nikora, 2003; Blackhurst, Day, Warren, Ericksen, Crawford, Chapman, Jefferies, Laurian, Berke, & Mason, 2003).

Solutions for incorporating Māori values into iwi and local government decision-making processes are required. There are two types of approaches for assessing the impact a potential development project has on Māori values: a qualitative approach and quantitative approach. Quantitative tools such as non-market valuation are used by local government to help guide decision-making (Maddison & Mourato, 2002; Boxall, Englin, and Adamowicz, 2002; Kerr & Sharp, 2003). Basing decisions on a quantitative approach such as non-market valuation makes the decision-making task easier compared to reviewing for example the testimony of five to six iwi or hapu groups. There is a temptation for resource managers to place more emphasis on a quantitative assessment. The danger however is that Māori values are seen from within the framework of economic valuation – a western knowledge system. Incorporating Māori values into resource management should be seen as an opportunity for iwi and hapu to define the foundations of their knowledge systems. The challenge for both Māori and local government is to understand the application of these values within contemporary environmental management (Royal, 1996).

This paper investigates the relationship between ethnicity and willingness to pay for improving the environment. Establishing a relationship between these two factors would suggest that the non-market methodology has the potential to value Mātauranga Māori - Māori knowledge and beliefs. Whether the methodology is measuring economic or metaphysical concepts is not pursued in this paper. This paper provides an initial exploration of this relationship. Furthermore the link between cultural identity and willingness to pay is explored. Identifying key profiles of Māori would help to streamline resource management processes. A clear relationship for example between identity and willingness to pay would indicate that diverse profiles of Māori have varying preferences for environmental change. Policies can be developed by local government to meet these diverse needs.

This paper presents the topic of Mātauranga Māori with a brief description of indigenous knowledge followed by an introduction to some key concepts of Māori natural resource management. The paper then analyses the willingness to pay to improve the environment of Māori and non-Māori participants in a contingent valuation survey.

What is Indigenous Knowledge?

Indigenous knowledge is intertwined with people, their history, culture and ecosystems. It is a knowledge system that is diverse, dynamic and holistic in nature. While similarities in knowledge exist between different indigenous peoples through a shared relationship with the natural environment, knowledge varies on national and even local scales. Furthermore, indigenous knowledge continually grows and changes as ecological pressures influence its development (Johnson, 1992; Grenier, 1998; Battiste & Henderson, 2000; Sillitoe, 2002).

Battiste and Henderson (2000) have recognised that indigenous ways of knowing share a similar structure based on the following concepts:

(1) Knowledge of and belief in unseen powers in the ecosystem; (2) Knowledge that all things in the ecosystem are dependent on each other; (3) Knowledge that reality is structured according to most of the linguistic concepts by which Indigenous describe it; (4) Knowledge that personal relationships reinforce the bond between persons, communities, and ecosystems; (5) Knowledge that sacred traditions and persons who know these traditions are responsible for teaching 'morals' and 'ethics' to practitioners who are then given responsibility for this specialised knowledge and dissemination; (6) Knowledge that an extended kinship passes on teachings and social practices from generation to generation(2000, p.42).

Indigenous knowledge (IK) is defined by Grenier (1998) as the unique, traditional, local knowledge existing within and developed around the specific conditions of people indigenous to a particular ecosystem. The development of indigenous knowledge systems, covering all aspects of life, including management of the ecosystem, has been a matter of survival to the peoples who generated these systems. Such knowledge systems are cumulative, representing generations of experiences, careful observations, and trial and error experiments. Indigenous knowledge does not exist in a vacuum. It belongs to a community, and access to this knowledge is gained through contact with that community

(Semali & Kincheloe, 1999). No one person, authority or social group is the single repository for this knowledge or can claim to know the entire body of knowledge. It is more widely shared locally on the whole than specialised scientific knowledge (Sillitoe, 2002).

A fallacy associated with indigenous knowledge is its alleged timelessness (Battiste et al., 2000). This concept centres on the belief that any change in traditional practices is an erosion of the very fabric it comprises. Mead (2003) believes that tikanga (the act of interpreting and practising Māori knowledge) is a rich heritage that requires nurturing, awakening sometimes, and adapting to the contemporary world for the development of generations to come. Mātauranga Māori embodies the philosophy of the indigenous people of Aotearoa/New Zealand. It is a body of knowledge closely linked with the natural environment.

Mātauranga Māori

The natural environment is an important component of Māori society. For Māori, the natural world is interrelated through whakapapa (genealogy). Every living organism is connected through a common bond. Māori view themselves as an integral component of the natural world (Marsden, 1989; Harmsworth, Warmenhoven, Pohatu, & Page, 2002), and maintain a continuing relationship with the land, environment, and people and with related spiritual and cosmological entities. Land, mountains, valleys, rocks, water and seaways are viewed not only as resources, but also more importantly, as the primary sources of collective identity. They are the essential roots that entwine the component parts of what it means to be Māori. Such resources are vital taonga to be protected. The role of kaitieki reflects the individual and collective role to safeguard ngā taonga tuku iho (those treasures that have been passed down) for present and future generations (Minhinnick, 1989; Crengle, 1993; James, 1993; Tomas, 1994).

Mātauranga Māori encompasses all aspects of Māori knowledge from philosophy to cosmology. It is a dynamic and evolving knowledge system (Mead, 2003). Some key concepts of Mātauranga Māori are: mauri (life force), tikanga (customs and practices), tapu (sacred, set apart), wāhi tapu (sacred place), rahui (prohibition), noa (ordinary), ahi kaa (right of occupation and use), and kaitieki (natural resource manager). These concepts are central to understanding the natural environment from a Māori epistemology.

Ethnicity

There has been a move from a biological definition of ethnicity to one of self-identification. New Zealand censuses since 1986 have used the method of self-identification to determine ethnic identity. The New Zealand Health Service (1996) states that:

Ethnicity is not the same as nationality, race or place of birth. Ethnic groups are ... people who have culture, language, history or traditions in common. These

people have a 'sense of belonging' to the group, which may not be based on birth. It is possible to belong to more than one ethnic group. At different times of their life people may wish to identify with other groups (New Zealand Health Information Service, 1996).

Te Hoe Nuku Roa (1996) has built on the concept of Māori ethnicity with their work in developing Māori cultural identity. The central theorem of Te Hoe Nuku Roa is that cultural identity is an amalgam of not only self-identification of an ethnic group but also personal attitudes, cultural knowledge, and participation in Māori society.

Te Hoe Nuku Roa (THNR) is a longitudinal study that tracks the progress, problems, aspirations and circumstances of Māori people from a diverse range of livelihoods and over a ten-fifteen year time period. It explores the realities of Māori lives based on an integrated approach of analysing and synthesising results from social, economic and cultural indicators. The study is based on a multi-axial framework made up of four interacting dimensions – paihere tangata (human relationships), Te Ao Māori (Māori culture and identity), ngā āhuatanga noho-a-tangata (socio-economic circumstances), ngā whakanekeneketanga (change over time) (Durie, 1998).

Māori cultural identity is an important component of Te Hoe Nuku Roa's research. The THNR research team set about defining Māori cultural identity based upon seven cultural indicators:

- self-identification as Māori,
- whakapapa (ancestry),
- marae participation,
- whānau associations (extended family),
- whenua tipu (ancestral land),
- contacts with Māori people, and
- te reo Māori.

Using responses from a detailed questionnaire THNR identified four cultural identity profiles from a sample of 650 adult Māori. These profiles include:

- Compromised – Respondents fail to identify as Māori even though there is evidence to suggest that they participate in Māori society, institutions and Te Ao Māori.
- Notional – Positive self identification as Māori but little or no involvement in Māori institutions, society and Te Ao Māori.
- Positive - Positive self identification as Māori, not as much involvement in Māori institutions, society and Te Ao Māori compared to those with a secure identity.
- Secure – Positive self identification as Māori and greater access to and participation in Māori, institutions, society and Te Ao Māori.

These profiles and cultural indicators have been used in a number of studies to date (Te Hoe Nuku Roa (Ed.), 1996; Hirini & Flett, 1999; Ministry of Social Development, 2002; Stevenson, 2004). The current study is interested in investigating the potential link between cultural identity and general concern for the environment. It is hypothesised

that those respondents that have a greater access to Te Ao Māori (those with a secure cultural identity) are more likely to be environmentally concerned. Access to Te Ao Māori provides people with a knowledge and understanding of the values and principles of Māori resource management, particularly kaitiakitanga. Indeed, those with a secure identity are more likely to be part of Māori institutions and society and are therefore more likely to partake in the act of kaitiakitanga.

This type of analysis may provide insight in to the type of people that should be consulted or involved in the resource management processes. It could be pointed out that those with a secure identity are the most likely people to present the best opinion of the Māori perspective of a potential development.

There are concerns however about how a measure of Māori cultural identity is used and by whom. Of most concern is the promotion of archetypical stereotypes of Māori such as good and bad Māori along with hierarchical categories of authenticity (Robson & Reid, 2001).

Questions of who is a 'real indigenous' person, what counts as a 'real indigenous' leader, which person displays 'real cultural values' and the criteria used to assess the characteristics of authenticity are frequently the topic of conversation and political debate. These debates are designed to fragment and marginalize those who speak for, or in support of, indigenous issues. They frequently have the effect also of silencing and making invisible the presence of other groups within the indigenous society like women, the urban non-status tribal person and those whose ancestry of blood quantum is too 'white' (Smith, 1999, 72).

THNR's framework is an ideal starting point. Concrete numbers can provide decision-makers with solid evidence to make their judgement. Stevenson (2004) warns that cultural identity is much more complex than an ordinal number. He points out that a person's cultural identity is a cumulative process, and reflects a history of personal choice and social influences which will be reflected in their cultural identity but may not be explained.

The Role of Mātauranga in the Resource Management Act

The Resource Management Act 1991 (RMA) is an important piece of legislation for Aotearoa/New Zealand that aims to protect natural and physical resources and manage them sustainably (Ministry for the Environment, 1992). It is important for Māori who have a close affinity with the natural environment. On the other hand, elements of the business sector view the act as a barrier to economic development (Graham, 2004). In contrast, other commentators believe that urban development in Auckland city has been driven by a market economy and guided by a laissez-faire planning regime (Dixon, 2005). Other sectors of the community, including Māori, believe economic development is a positive step in our development, when undertaken ecologically sustainably (Fitzsimons, 2004). The recent reviews of the RMA by central government aim to promote a balance between economic development and environmental protection. The focus is on enhancing the RMA through a review of processes and procedures rather

than re-defining the principles of the Act (Office of the Associate Minister for the Environment, 2004).

The RMA includes provisions to recognise and take into account iwi environmental interests under sections 6(e), 7(a) and 8. In practice, iwi perspectives of the RMA have differed from their counterparts in local government. A bone of contention for Māori (Minhinnick, 1989; Crengle, 1993; Kawharu, 2000) is that the Act defines kaitiakitanga from an English Common law perspective. Section 7(a) of the Act defines kaitiakitanga as the act of stewardship. Stewardship is derived from the Old English word *stigward* and means one who manages another's property, finances or other affairs. Kaitiakitanga on the other hand is a concept that is inherently Māori, and derived from hundreds of years of close association with the natural environment. Kaitiaki and the exercise of kaitiakitanga as used in the RMA is taken out of context. A holistic approach needs to be taken to understand kaitiakitanga from the perspective of tangata whenua. The traditional institution of kaitiaki does not stand alone. It is part of a complex social, cultural, economic, and spiritual system that has been established through long tribal associations with the environment. Kaitiaki and kaitiakitanga cannot be understood without reference to the values inherent in the belief system (Minhinnick, 1989; Crengle, 1993; Tomas, 1994).

Methodology

Survey Design & Implementation

The “Improvements to the Road Surface and Roadside Survey” was pre-tested with a wide cross-section of the community. It was important the survey was pre-tested with a diverse range of Māori participants. As a section of the survey had been written specifically for Māori participants, feedback from these participants was essential to make the survey clear and to provide information participants want and need to make willingness to pay decisions (Mitchell & Carson, 1989). The principle of “equal explanatory power” guided the selection of the sample. Māori participants were deliberately over-sampled to produce reliable statistics of willingness to pay estimates for Māori. A random sample of the New Zealand population could approximately produce a sample distribution of 15% Māori and 85% non-Māori. As a result, the findings of the survey would predominantly reflect a New Zealand European perspective (Te Ropu Rangahau Hauora a Eru Pomare, 2002). Two thirds (2000) of the sample were randomly selected from the Tamaki Makaurau electoral roll database. Another 1000 participants were randomly selected from observations of vehicle licence plates in three locations in Auckland: Central City, Pakuranga and Manukau City. Heavy vehicles, campervans, motorcycles, buses, and company vehicles were excluded. Licence plate numbers were recorded by Dictaphone and transcribed. Contact details of participants were obtained from the Motocheck database after supplying the licence plate numbers to the Land Transport Safety Authority. The Motocheck database is a record of registered vehicles in New Zealand. A total of 700 respondents answered the mail-out survey with more than half the respondents (377) identifying themselves as Māori. The response rate for the survey was 23%.

The design of the survey followed as close as possible the guidelines set out by the NOAA panel (Portney, 1994). Two contingent valuation scenarios were included in the survey. The first scenario described how better construction techniques can produce better road surfaces. The advantages described included: increased braking capacity by 10%; decreased noise by 5 decibels; and a decrease in fuel costs of 10% (Dravitzki & Wood, 2000). The second scenario described the benefits of planting indigenous vegetation on roadsides. These benefits included: biodiversity, scenery, ecosystem support for fauna, and stabilising the roadside against erosion (Simcock & Smale, 2003). The reference levels for Scenario 1 were quite clearly defined in terms of fuel costs, braking capacity and noise levels. Scenario 2, however, explained that planting costs would be more expensive. This implied the construction of roads in general would be more expensive if native vegetation was included in the road construction regime. As a result this cost might be borne by the participant in the form of rates or fuel price increases.

The referendum model was used to frame the willingness to pay (WTP) or bid questions. Mitchell and Carson (1989) prefer the referendum model for public goods as it invokes the correct payment context and the full range of appropriate values. They also recommend the “Take-it-or-leave-it approach” as the elicitation method for mail-out surveys. The main advantages of the Take-it-or-leave-it approach is that the participant only has to make a decision based on one price, an action similar to the respondent acting in a private market and other voting referenda. Starting point bias was minimised by basing the predetermined prices on a study by Opus Consultants that looked at the willingness to pay for road surface improvements (Walton, Thomas, & Cenek, 2002). The Opus study used the open-ended format to frame the WTP questions. The range of bids for the “Improvements to the Road Surface and Roadside Survey” centred on the average WTP from the Opus study. Bids ranging from \$1.00 to \$5.50 with increments of \$0.50 were framed for the “Improvements to the Road Surface and Roadside Survey.” Each bid had a discrete sub-sample of participants who were asked if they were willing to pay for the proposed good or service.

Econometrics

A logistic regression model was applied to investigate the relationship between willingness to pay and ethnicity. The key difference between a logistic regression model and a linear regression model is that the response variable in the logistic model is binary or dichotomous, here ‘willing to pay’ or ‘not willing to pay’, and the prediction given is of the probability of an individual being willing to pay.

As with the linear regression model, the explanatory variables are combined linearly. Here the linear models are:

$$\hat{g}(x) = \beta_0 + \beta_1 \times Bid + \beta_2 \times Ethnicity + \beta_3 \times GEC + \beta_4 \times Income + \beta_5 \times Age \quad (1.1)$$

$$\hat{g}(x) = \beta_0 + \beta_1 \times Bid + \beta_2 \times MCI + \beta_3 \times GEC + \beta_4 \times Income + \beta_5 \times Age \quad (1.2)$$

Here \mathbf{x} stands for the multiple observations made on the individual. These were: *Ethnicity* - a dummy variable of 1 if the participant identified themselves as Māori, and 0 otherwise; *Bid*, the different “bid” values that respondents were asked to reply to by either yes or no; *GEC* or general environmental concern; *Income* - interval level data of personal income; *Age* - interval level data of a participant’s age and the categorical variable *MCI* (Māori Cultural Identity). *MCI* was included in to the model to investigate the relationship between cultural identity and *WTP* and consists of two categories; Positive Identity and Secure Identity. The Notional Identity category was dropped from the model due to a low sample size.

The logistic regression model (Hosmer & Lemeshow, 2000) links $g(\mathbf{x})$ to the predicted probability $\pi(\mathbf{x})$ by the logit transformation, or the log of the odds of an individual being willing to pay. Importantly $g(\mathbf{x})$ can range from $-\infty$ to $+\infty$ while $\pi(\mathbf{x})$ ranges between 0 and 1. Also although an individual’s response is measured as 0 or 1, $\pi(\mathbf{x})$ for that individual will rarely be exactly 0 or 1, so problems of $-\infty$ to $+\infty$ are avoided.

$$g(\mathbf{x}) = \ln \frac{\pi(\mathbf{x})}{1 - \pi(\mathbf{x})} \quad (1.3)$$

Transformation of the logit model results in similar properties as a linear regression model. The intercept, β_0 , is the value of the $g(\mathbf{x})$ if each $\mathbf{x} = 0$. As with the linear regression model this rarely has any interest. The other estimated coefficients can be interpreted as marginal influences of the corresponding explanatory variable on the probability of accepting offered bids, but the influence is not a simple slope. Given \mathbf{x} , the probability of paying for an environmental improvement can be estimated from the model (Hosmer et al., 2000).

Results

Demographic Profile

Participants were asked to identify the ethnic group or groups they belonged to. Multiple responses were expected for this question. The ethnicity groups used were based on those used by Statistics New Zealand for the 1996 Census (Statistics New Zealand, 1996). A direct result of the over-sampling was the majority of participants identifying as Māori (46.3%). Other significant groupings included: New Zealand European (35.9%), Chinese (3.2%), Samoan (2.4%) and Other (12.2%). It is important to note that a number of participants identified with more than one ethnic group. Independent samples t-tests were therefore essential to determine whether there were significant differences between Māori and non-Māori mean scores in key dependent variables.

Nearly half of the Māori group are located within the first three income groups used in this survey (under \$16,000; \$16-25,000; and \$26-35,000). In comparison, most of the non-Māori group falls within the first four income groups (under \$16,000; \$16-25,000; \$26-35,000; and \$36-45,000). It is significant to note that Māori make up sixty seven

percent of the fourth income group (those receiving \$36,000 - \$45,000). In contrast, non-Māori are concentrated more in the higher income groups with seventy two percent of the 10th income group (those receiving more than \$96,000). The important finding to note is that there is a gap between Māori and non-Māori income. A t-test for equality of means supported the fact that the two sample groups have significantly different incomes.

General Environmental Concern

A General Environmental Concern scale (GEC) was included with the survey. The scale consists of 31 items and is designed to measure participants' concern for the environment. This scale was a composite of five previously reported scales (Walton, Thomas, & Dravitzki, 2004). The scale of GEC was appended for the current survey with the addition of a question on cultural heritage. Participants were asked whether "Cultural and historical resources such as archaeological and pa sites should be protected from development." The majority of questions focused on participants' perceptions of pollution, property rights and environmental policies. The GEC scale from Walton et al. (2004) and the new GEC scale were collated and are presented in Table 1. The mean GEC for two sub-samples, Māori and non-Māori are compared, with the standard deviation presented in parentheses.

Table 1: General Environmental Concern

Variable	Māori	Non-Māori
GEC (Original)	91.9 (10.9)	87.4 (11.4)
GEC (New)	96.4 (11.2)	90.9 (11.8)
n	378	326

The statistics in Table 1 illustrate that the mean for Māori is higher than that for non-Māori for both *GEC* scales. On average, Māori have a greater concern for the environment. The variability of the two samples were compared using Levene's test, which showed the difference was not significant. A t test for equality of means (6.11 and 5.30 with 688 degrees of freedom) indicated there is a significant difference between the two groups for *GEC (Original)* and *GEC (New)* scales at the 0.05 level. That is, there is a significant difference between Māori and non-Māori in terms of environmental concern, although the difference is small relative to the range within the two groups. This difference may be explained by the differing worldviews, where Mātauranga Māori is an epistemology founded on a close relationship with the natural environment, but if so differences within the ethnic groups are much larger than the differences between them. These differences within the Māori sample are likely to be caused by the differing degrees of cultural identity. This issue is investigated in the following section.

Māori Cultural Identity

Six questions were included in the “Improvements to the Road Surface and Roadside Survey” that investigated the cultural identity of Māori participants. Only participants who indicated that their ethnicity included Māori in Question 50 of the survey (Which ethnic group do you belong to?) were invited to answer this last set of questions. Participants who identified with more than one ethnicity including New Zealand Māori were open to answer the *Māori Identity* section of the “Improvements to the Road Surface and Roadside Survey”.

The questions used in the *Māori Identity* section of the survey were based on the seven cultural indicators used by Te Hoe Nuku Roa (1996). These cultural indicators examined a participant’s knowledge of Te Ao Māori, Te Reo Māori and participation within Māori institutions and society. Responses from the seven sub-scales were combined to form a single measure of Māori cultural identity (MCI).

Question 51 of the survey explored whakapapa. Participants were asked: How many generations of your Māori ancestry can you name? Responses ranged from 0-5 and participants were assigned a rank based upon how much ancestry they knew. The basis of Question 51 is to extend the self-identity process to that of a collective identity. Other key markers in Māori cultural identity included in the survey focused on access to and participation in Māori institutions and society. Questions asked participants how often they visited marae (Question 52), how much interaction they had with Māori communities (Question 55), the level of interest in whenua tipu - ancestral land (Question 54), and the importance of whānau (Question 53). Te Reo Māori is an important marker within the Māori cultural identity framework. Question 56 sought to determine a participant’s level and place of usage print and broadcasting media fluency.

The idea of a secure identity is based upon self-identification as Māori along with high scoring in the cultural indicators. Those participants identifying as a positive identity have lower levels of participation in Māori society, Te Ao Māori and the Notional Identity has no access apart from self-identifying as Māori.

Table 2 presents a breakdown of the participants grouped into each identity profile for the current study and Te Hoe Nuku Roa’s (1996) study.

Table 2: Māori Cultural Identity Profiles

Study	Compromised Identity	Notional Identity	Positive identity	Secure Identity
THNR (n=134)	6.0%	6.0%	53.0%	35.0%
Awatere (n=336)		4.1%	55.5%	40.4%

The most common profile of the participants is a Positive Identity (55.5%) followed by a Secure Identity (40.4%) and a Notional Identity (4.1%). Comparable results were obtained from the Te Hoe Nuku Roa Study: Secure Identity (35%), Positive Identity (53%) and Notional Identity (6%). Note that the Te Hoe Nuku Roa Study also included a fourth grouping of Compromised Identity (6%) that consisted of participants who failed to identify as Māori even when there was evidence of participation in cultural institutions and knowledge of whakapapa and te reo Māori. The current study did not analyse the Compromised Identity because participants who self-identified as Māori through the ethnicity question were asked to answer the questions in the *Māori Identity* section of the survey. Some participants who identified as New Zealand European and answered the questions in the *Māori Identity* section were omitted from the study. It was believed that these participants had failed to read or fully comprehend the instructions on answering the questions in the *Māori Identity* section.

Māori Cultural Identity and General Environmental Concern

It is hypothesised that there is a positive relationship between Māori cultural identity (MCI) and general environmental concern (GEC). The more secure a participant's Māori cultural identity the greater their concern for the environment. This reasoning is based on the concept of kaitiakitanga – the notion of safeguarding natural resources for the benefit of future generations. It is assumed that having an understanding of kaitiakitanga is part and parcel of having a secure Māori cultural identity. Indeed, this argument is supported in part by the relatively higher GEC scores from Māori participants compared to Non-Māori. Higher average GEC scores suggest that Māori participants have an understanding of basic Māori resource management values and principles such as kaitiakitanga. To understand these values and principles requires someone who is secure in their cultural identity.

A Kruskal-Wallis one-way ANOVA test was used to test the significance of data ranked by ordinal attributes using the chi-square distribution. In this case both the GEC scores and MCI scores have been derived from scale data. The chi square statistic (3.945 with 2 degrees of freedom) was not significant at the $p < .05$ level. A Pearson correlation test was also carried out to test whether MCI can predict GEC. The test statistic was not significant at the $p < .05$ level. We accept the null hypothesis; Māori that are more secure in their cultural identity are not more concerned for the environment compared to those that are less secure in their identity.

What are the reasons for this result? One possible reason is that the MCI measure is not an accurate reflection of Māori cultural values. Potential scenarios that are highlighted next support this statement. It is possible to have Māori who are environmentally aware and have a good understanding of Te Ao Māori not rank highly in the MCI scale for diverse reasons. Some of these reasons include the lack of te reo Māori ability and the difficulty of visiting their marae especially if they are based in an urban area. Te reo Māori and association with cultural institutions are two indicators that have a high weighting and as a result these participant's identity is under-stated. Another scenario

can potentially over-state a participant's Māori cultural identity. This may occur in the case of participants that have excellent te reo Māori skills or are fluent, have greater access to Māori society and institutions but do not practice kaitiekitanga.

Statistical Analysis of Willingness to Pay

Results from the logistic regression are presented in Table 3. These indicate the type of relationship between the explanatory variables, *Bid*, *Ethnicity*, *GEC*, *Income*, *Age*, *MCI* and the response variable, likelihood of paying for road surface or roadside improvement. Four models were investigated, two for each scenario. The variable *Ethnicity* was included in a separate model to the variable *MCI* for both scenarios. The *Ethnicity* dummy variable was redundant for models with the *MCI* variable. Those participants that had a *MCI* score were the same participants who identified themselves as Māori for the ethnicity question. The working sample that could be analysed with the *MCI* variable was effectively 40% of the total sample. A reduction in the sample size helps to explain why few explanatory variables could explain the variance in Models 2 and 4. A further reduction in the working sample was caused by the inclusion of the *Income* variable. One hundred participants failed to answer the question: Please indicate your personal annual income.

Table 3: Logistic Regression Results: Dependent variable is WTP

Variable	Improvement to road surface scenario		Improvement to road-side scenario	
	Model 1	Model 2	Model 3	Model 4
Constant	1.086**	0.903	-0.588	-2.502*
Bid	-0.310**	-0.268**	-0.170**	-0.151
Ethnicity	-0.881**		0.076	
Income	0.031	0.004	0.025	-0.001
Age	0.116	0.053	0.026	-0.001
GEC	0.080**	0.040	0.158**	0.095*
MCI		-0.267		-0.163
Number of observations	585	283	590	287
-2 log likelihood	728.915	369.970	770.246	384.862

Note: ** p<.01 and * p<.05

Scenario 1: Improvement to the Road Surface

Prior expectations were realised with a negative coefficient for the variable *Bid*. The variable *Bid* is also statistically significant at the $p < .01$ level. As the bid level increases the probability that a participant is willing to pay decreases. The dummy variable *Ethnicity* also had a negative coefficient and is statistically significant at the $p < .01$ level for Model 1. This variable explains that in comparison with non-Māori, Māori are less likely to pay for improvements to the road surface. The coefficients for the variables *Age* and *Income* have a positive relationship with *WTP*. These outcomes satisfy prior

expectations that as age and income increase at the margin participants are more likely to pay for road improvement. The coefficient for *GEC* is positive and is statistically significant at the $p < .01$ level. This statistic suggests that a marginal increase in *GEC* would result in an increase in the likelihood of paying for road surface improvement.

Model 2 investigated the relationship between cultural identity and the willingness to pay for road surface improvement. The only statistically significant coefficient for Model 2 is for the *Bid* variable. Like Model 1 the coefficient for *Bid* is negative and is statistically significant at the $p < .01$ level. The dummy variable *MCI* was added to Model 2 and has two categories; Positive Identity and Secure Identity. Positive Identity was used as the reference group. Model 2 suggests that there is no statistically significant relationship between cultural identity and the willingness to pay for road surface improvement. This result is consistent with prior expectations.

Scenario 2: Improvements to the Roadside

The coefficient for the *Ethnicity* variable is positive for Model 3; in contrast to Model 1 where the coefficient was positive. It could be suggested that Māori are more likely to pay for “Roadside” improvements in the form of native vegetation, compared with non-Māori. The *Ethnicity* variable however is not statistically significant. There is significant correlation however between the variable *GEC* and the variable *Ethnicity* at the $p < .01$ level. Table 1 demonstrated that on average Māori are more concerned for the environment than non-Māori. This means that Māori are prepared to pay more for environmental improvement compared to non-Māori given that Māori tend to score higher on the *GEC* scale. This leads to the next question of: Which groups of Māori are more willing to pay more for environmental improvement?

It is hypothesised that Māori who have a higher score of *MCI* are more likely to pay for environmental improvement. The more secure a participant’s Māori cultural identity the greater their willingness to pay for environmental improvement. Table 3 shows that the coefficient for *MCI* is negative suggesting that participants with a Secure Identity are less likely to pay for environmental improvement compared to those with a Positive Identity. The coefficient however is not statistically significant. Māori are willing to pay for environmental improvement regardless of cultural identity profiles.

Conclusion

Valuing the environment in monetary terms can cause some consternation among people who have a close affinity with the natural environment. They may ask “how can you place a dollar value on something that is so intangible such as the life giving force of *mauri*?” My response would be that it is very difficult to value indigenous concepts in an economic framework. Non-market valuation captures values that are defined in the economic framework, i.e. the neoclassical approach is to “value” an environmental good or service by asking potential consumers their willingness to pay to get the good. This willingness to pay for environmental improvement by Māori consumers is believed to be derived in part from Māori cultural values and beliefs – *Mātauranga Māori*.

From a Mātauranga Māori perspective, natural resources are imbued with mauri, an intangible and intrinsic value. Tangata whenua derive satisfaction from ensuring the mauri of natural resources including waterways are maintained. A guiding principle for this, is the concept of kaitiekitanga, which is captured in the following statement:

I have always believed that tangata whenua play the most important role in ensuring that the mauri of the water is protected and looked after because we are of the whenua (land) (Awatere et al., 2000, p.19).

Colonised people live their lives within a dual perspective of the indigenous worldview and that of the coloniser. Economic decisions by indigenous people, therefore, will be based on this duality. The findings from the logistic regression reveal that within an economic valuation framework, Māori are more likely to pay for environmental improvement based on a greater concern for the environment. The GEC scale shows that on average Māori are more concerned with the environment than non-Māori. The WTP statistics show that people who are more concerned for the environment are more likely to pay for environmental improvements. Qualitative analysis also supports these findings. The Mātauranga Māori section showed that Māori have a close relationship with the natural environment through whakapapa and kaitiekitanga.

The implication for policy is: how can this WTP be “captured”? Indigenous knowledge is a shared system where no individual can obtain or store the entire knowledge system. As a result, resource management decisions are based on the collective knowledge of the community. “Capturing” WTP for environmental improvement from Māori communities may require adjusting the payment vehicle. Options for alternative payment vehicles could include labour or knowledge contributions. This issue requires further investigation.

It was also hypothesised that Māori with a more secure cultural identity are more likely to pay for environmental improvement compared to those Māori with a less secure cultural identity. The more secure a participant’s Māori cultural identity the greater their concern for the environment (GEC), and the more likely they are to pay for environmental improvement. This reasoning is based on the concept of kaitiekitanga – the notion of safeguarding natural resources for the benefit of future generations. It is assumed that having an understanding of kaitiekitanga is part and parcel of having a secure Māori cultural identity. The logistic regression results however, show that Māori are willing to pay for environmental improvement regardless of cultural identity profiles. It is suggested that the *MCI* variable does not measure Māori environmental values well (correlation tests between *MCI* and *GEC* were not statistically significant). The sample size may also have played a part in the lack of significant model coefficients.

Further work is required to develop the MCI framework to take into account Māori environmental values. It is recommended that the addition of a question pertaining to Māori environmental values is included within the MCI framework. The inclusion of such a question may enhance the MCI framework with regard to measuring a participant’s knowledge of Māori cultural values and beliefs. A change to the wording of the question concerning marae visits is also recommended. Currently the question states:

How many times have you visited your marae? This question does not take into involvement with other Māori institutions such as trusts, incorporations, training institutes, wānanga or urban marae. Broadening the scope of this question is recommended for further investigations.

Indigenous knowledge (IK) has an important role to play in resource management systems. On a local government level, IK can inform decision-making. A basic understanding of indigenous epistemologies enables policy analysts to promote resource management strategies consistent with the values of the community as a whole. Where there is ignorance on the part of an analyst about IK, the proposed resource management path will prove inefficient. In cases where indigenous perspectives are not taken into account, the result is most likely litigation. It then becomes an expensive ordeal for the parties involved and an unnecessary burden on ratepayers.

Recognition by government agencies that IK has a valid role in resource management can empower communities to become more active in local government decision-making. As a result, policies that truly reflect our diverse communities can be created.

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Glossary

Aotearoa	New Zealand
ahi kaa	right of occupation and use
hāpu	sub-tribe
iwi	tribe
kai	food
kaitieki	natural resource manager
kaitiekitanga	natural resource management
mātauranga	knowledge
mana	prestige
manuhiri	guests
mauri	life force
noa	ordinary

tangata whenua	people of the land
taonga	treasure
tapu	sacred
tikanga	custom
wāhi tapu	sacred areas
whānau	family
whakapapa	genealogy
whenua	land

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