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Influence of varying intensities of natural area on-site interpretation on attitudes and knowledge

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5 Penguin Island Survey Results

Penguin Island represents a natural area site with a higher intensity of on-site interpretation when compared with the TTW site. To investigate the influence of this on attitudes and knowledge, surveys were carried out during February, April, November and December 2001. 157 visitors, using the ferry as access, completed paired surveys before and after their visit to the island. This represented a 35% refusal rate based on the number of visitors approached. To test for reactivity bias a result of the paired survey design, 50 visitors completed surveys after visitation only, representing a 21% refusal rate, as part of a post-visit only group. As with the TTW surveys, the lower refusal rate for the post-visit only data probably related to the lesser commitment required by the visitor.

5.1 Reactivity bias

As was discussed in the TTW survey results chapter, the paired survey design may have skewed data collected after the site experience owing to the influence of completing a survey before experiencing the site. Comparative analysis of the post-visit only group and the paired survey completed after the experience at Penguin Island was undertaken to ascertain whether reactivity bias was evident for the knowledge, environmental attitude and attitude to site experience components of the survey. The results are described in turn.

Knowledge

Figure 5.1 illustrates the mean knowledge scores of the post-visit only group and paired survey completed after the experience of Penguin Island. The error bars represent the standard error of the mean. The graph suggests that the groups had similar scores for the “correct”, “incorrect” and “don’t know” responses.

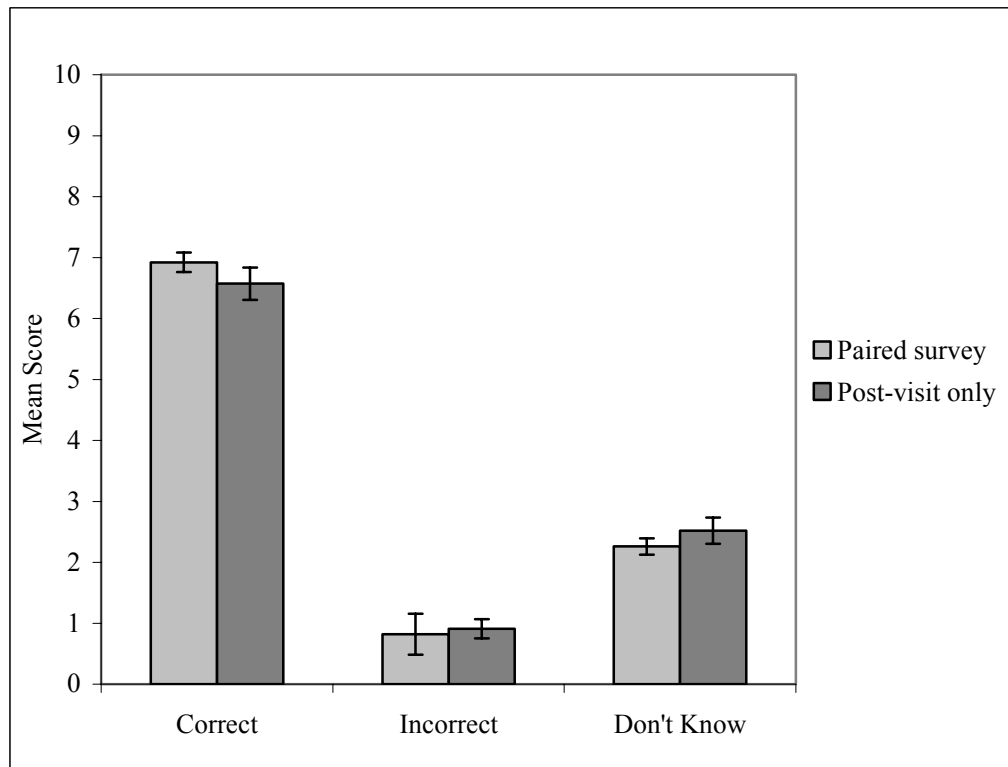


Figure 5.1: Mean knowledge scores as compared between the post-visit only and paired survey groups after experiencing Penguin Island.

The lack of a statistically significant difference between the paired survey and post-visit only groups was confirmed using the Mann-Whitney U test. Table 5.1 sets out the Mann-Whitney test statistics and p values resulting from the comparison of the “correct”, “incorrect” and “don’t know” scores between the post-visit only group and paired surveys completed after the site experience.

Table 5.1: Test statistics resulting from comparison of knowledge scores of the paired survey and post-visit only groups at Penguin Island.

Quiz Responses	Mann-Whitney Tests	
	$\alpha = 0.05$	
	z score	P value
Correct	-0.84	0.39
Incorrect	-0.01	0.99
Don't Know	-0.94	0.34

Environmental Attitude

As with the knowledge scores, environmental attitude scores were compared between the post-visit only group and paired survey group response data collected after the site experience. Figure 5.2 illustrates the mean scores for the “Human use”, “Intrinsic ecological value” and “Total” attitude for both the post-visit only and paired survey groups. The error bars represent the standard error of the mean. The graph suggests that there was little difference in response between the two groups.

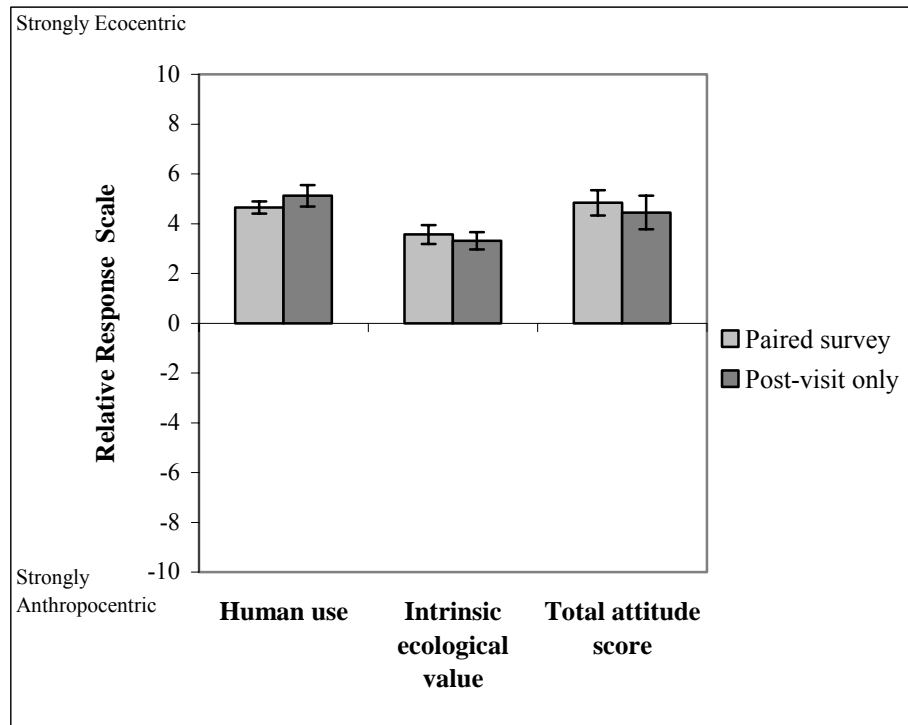


Figure 5.2: Mean environmental attitude responses of post-visit only and paired survey groups after experiencing Penguin Island.

Statistical comparison of environmental attitude response between the post-visit only group and the paired survey completed after the experience of Penguin Island revealed no significant difference as demonstrated in Table 5.2.

Table 5.2: Test statistics and p values for comparison of environmental attitude responses between post-visit only and paired survey groups at Penguin Island.

Environmental Attitude Scores	Mann-Whitney Tests	
	$\alpha = 0.05$	
	z score	P value
Human use	-0.31	0.76
Intrinsic eco value	-0.16	0.85
Total score	-0.25	0.78

Attitude to Penguin Island site

Finally, attitude responses of the post-visit only and paired survey groups to Penguin Island site were compared to ascertain the presence of reactivity bias in the paired data. Figure 5.3 illustrates the similarities in response between the two groups after experiencing Penguin Island. The error bars represent the standard error of the mean.

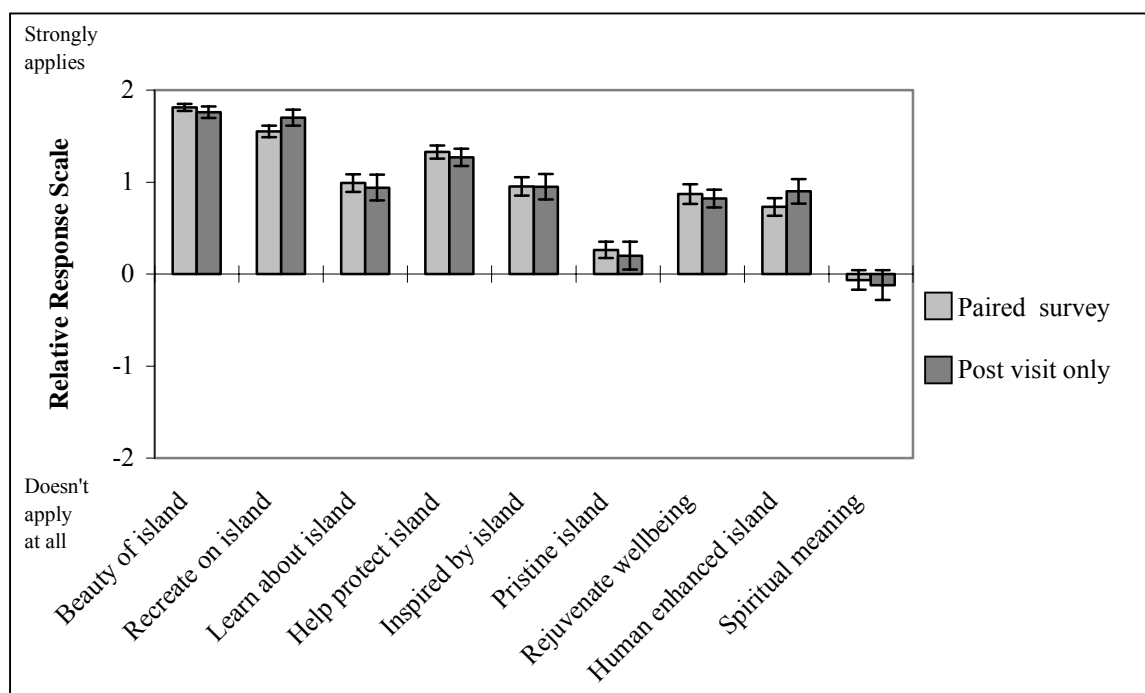


Figure 5.3: Mean attitude responses to Penguin Island experience as compared between post-visit only and paired survey groups after experiencing the site.

The lack of significant difference between the post-visit only and paired survey groups was confirmed using Mann-Whitney U tests for each of the rated aspects. Table 5.3 details the test statistics and p values for each aspect. As none of the p values were less

than the 0.05 significance level, no significant difference was evident between the paired and post-visit only survey groups for any of the attitudinal aspects.

Table 5.3: Mann-Whitney test statistics from comparative analysis of post-visit only and paired survey group responses to attitudes to Penguin Island

Site Attitude Statements	Mann-Whitney Tests	
	$\alpha = 0.05$	
	z score	P value
Beauty of Island	-0.72	0.74
Recreate on Island	-0.46	0.65
Learn about Island	-0.30	0.76
Help protect Island	-0.16	0.87
Inspired by island	-0.10	0.92
Pristine Island	-0.68	0.50
Rejuvenate well-being	-0.28	0.78
Human Enhanced Island	-0.32	0.79
Spiritual meaning	-0.39	0.70

The lack of significant difference between the post-visit only and paired survey data collected after the site experience suggests an absence of reactivity bias resulting from the paired design.

5.2 Descriptive Statistics

The independent variables brought to the site by respondents may act significantly in terms of how the experience influenced their attitudes and knowledge. Relationships between the independent variables may also create another layer of influence. If influences on attitudes and knowledge after the experience vary between groupings of visitors, this is suggestive of the on-site experience being associated with that influence. For example, if data indicates that respondents undertaking the same experience but with differing levels of annual natural area visitation are influenced in a significantly different manner, this points to factors on-site being related to the differing influences.

Demographic variables

Table 5.4 summarises the demographic variables of the paired survey group surveyed at Penguin Island. Some significant relationships were found between visitor variables that in turn may have influenced responses to the attitude and knowledge components of the survey.

Table 5.4: Summary of demographic variables of the Penguin Island paired survey group.

Variable	No.	%	Variable	No.	%
Gender			Place of residence		
female	47	43.9%	WA	81	75.7%
male	60	56.1%	Interstate	0	0
<i>Not stated</i>	-	-	International	26	24.3%
			<i>Not stated</i>	-	-
Total	107	100%	Total	107	100%
Penguin Island repeat visitation			Penguin Visitor Centre repeat visitation		
First time visit	56	52.3%	First time visit	21	19.6%
Repeat visit	51	47.7%	Repeat visit	30	28.0%
<i>Not stated</i>	-	-	Didn't visit	56	52.3%
			<i>Not stated</i>	-	-
Total	107	100%	Total	107	100%
Age group (yrs)			Annual natural area visitation rate		
<15	0	0	none	0	0
15-24	15	14.0%	1-2	34	31.8%
25-39	58	54.2%	3-6	37	34.6%
40-59	23	21.5%	6-12	24	22.5%
60+	11	10.3%	>12	12	11.2%
<i>Not stated</i>	-	-	<i>Not stated</i>	-	-
Total	107	100%	Total	107	100%
Visiting with					
Friends	11	10.3%			
Family	68	63.5%			
Partner	28	26.2%			
Spouse	-	-			
Tour group	-	-			
Alone	-	-			
<i>Not stated</i>	-	-			
Total	107	100%			

Males outnumbered females while the 25-39 year old age group comprised the majority of respondents surveyed on the ferry. The proportional age group data collected at

Penguin Island approximates data relating to the most recently available national park visitation and age group proportions collected by the Australian Bureau of Statistics in 1996-97 (ABS, 2002) and past Penguin Island surveys (unpublished).

Most respondents were residents of Western Australia while the remaining proportion were international visitors. Of demographic interest was the absence of interstate residents in the ferry survey data. Examination of the Visitor Comment Book on Penguin Island revealed the vast majority of Island visitors were Western Australian residents or international visitors with no interstate visitors obviously apparent. While the lack of interstate visitors to Penguin Island presents an interesting phenomenon, investigation of the reasons behind this are beyond the scope of this thesis.

The majority of respondents were accompanied by family members as indicated by the “visit with” data. This may be related to the recreational focus of the Penguin Island site in combination with its close proximity to urbanised areas. Penguin Island has traditionally been viewed as a family oriented natural area venue (Dans, 1997). Alternatively, this result may indicate that families are more likely to use the ferry rather than other means of access to the island. Management actively discourages of the sand bar as an alternative mode of access through highlighting the dangers of the crossing and promoting the ferry as a safe means of transport to the island. This safety message may appeal to families with children or elderly members. The only other alternative access to the island is by private boat. While the researcher observed a number of visitors using this means, not all families would have such facilities at their disposal.

Significant relationships were found between social context of visitation (“Visit with” responses) and the gender and place of residence of respondents. Respondents visiting with family tended to be female ($\chi^2 = 43.1$, $df = 2$, $p < 0.01$) and reside within WA ($\chi^2 = 21.2$, $df = 2$, $p < 0.001$). The same relational analysis revealed that those respondents visiting with friends were more likely to be male, international visitors. Analysis of strength of association between gender and social context indicates this to be a strong relationship (Cramer’s $V = 0.634$, $p < 0.001$) while the relationship between place of residence and social context of visitation was moderate (Cramer’s $V = 0.445$, $p < 0.01$).

All of the repeat visitors to Penguin Island were WA residents. The dominance of local resident visitors reflects the status of the island as a major local recreational venue as mentioned in section 3.2. While the proportion of repeat visitors surveyed was significantly high, conversations with on-site staff and managers suggested this group was under represented by the survey results (Goodlich, 2000). Fraser Island represents a similar environment to Penguin Island in that it offers a range of activities from recreational pursuits to exploration and learning activities in a coastal island environment. Here, Ballantyne et al (1998) found that approximately 66% of visitors surveyed were repeat visitors seeking recreational experiences. The apparent under representation of repeat visitors in this survey may be a function of the mode of access used. Regular visitors familiar with the site may be more likely to access the island via the sand bar or private craft rather than pay for a ferry ticket. Thus, conducting surveys on the ferry probably favours first time visitors.

5.2.1 Reason for visitation

This was a multiple choice question with an “other” option to allow for responses not included in the options provided. The “Penguin Experience” visitor centre was the most frequent reason given for visitation to the island (47% of responses). Recreational activities including swimming and a general need for relaxation comprised the majority of the remaining proportion of reasons given (Table 5.5). Respondents may provide more than one reason meaning the number and percentages add up to more than 100%.

Table 5.5: Reasons indicated for visiting Penguin Island

Reason Given for visitation	No.	%
To see penguins	47	43.9%
Swimming	32	29.9%
General relaxation	27	25.2%
To show the island to guests	13	12.1%
It is a tourist attraction	9	8.4%
fishing	5	4.7%
<i>Not stated</i>	-	-
Total	133	125%

All of the respondents who indicated the islands status as a “tourist attraction” also had indicated they wanted “to see penguins” as a main reason for visitation suggesting that these two responses are related (that is, a tourism oriented visit). The “fishing” response group appeared to be a small sub group of the general fishing population visiting the island who chose to access the island by ferry rather than using private boats or the sand bar. Observations of visitors on the island suggested a much larger portion of the visitor population partakes in fishing than is indicated in this survey. Generally, visitors intent on fishing tend to be locals and appear to access the island by other means, primarily the sand bar.

The main reason for visitation was significantly related to repeat visitation ($\chi^2 = 24.02$, $df = 5$, $p < 0.01$). Comparison of repeat and first time visitor survey respondents indicated that repeat visitors were more likely than first time visitors to indicate general relaxation as a reason for visiting the island. First time visitor respondents were more likely to indicate viewing the penguins as their main reason for visitation. Cramer’s strength of association statistic indicates this to be a moderate relationship (Cramer’s $V = 0.476$).

Field & Wagar (1973) and Ballantyne et al (1998) commented that the frequency of visitation to a site influences the activities undertaken during the visit whereby repeat visitors are more inclined toward social and general relaxation activities. While first time visitors were more receptive to communication and interpretive activities, repeat visitors sought other recreational pursuits such as relaxation and fishing. This suggests that an accumulated number of previous visits to Penguin Island may reduce the likelihood of visiting the Penguin Experience visitor centre as its familiarity reduces respondent interest. However, having stated this, repeat visitors using the ferry may still choose to visit the Penguin Experience due to the entry fee being included in the cost of the ferry ticket.

5.2.2 Interpretive media used by Penguin Island respondents

A multiple choice question was used to determine what interpretive media respondents used while on Penguin Island. Respondents were able to select more than one option. Of the interpretive media available (detail in section 3.1.2) the touch table was the most commonly used while the information centre staff and rangers were the second most commonly used by respondents (Table 5.6).

Table 5.6: Frequency of interpretation sources used by respondents on Penguin Island.

Medium	Frequency	Percent
Touch table	63	58.9%
Info desk staff	46	43.0%
Ranger	42	39.2%
Pamphlets	32	29.9%
Signs	31	29.0%
None	10	9.3%
<i>Not Stated</i>	-	-
<i>Total</i>	<i>224</i>	<i>209%</i>

Of the various interpretive media available, 33% of respondents used 2 sources while 29% used 3 sources. This was primarily the touch table in combination with one or two other sources. Categorising media source use by media type demonstrated approximately a quarter of respondents used a combination of all three media types: interpersonal, text based and interactive (Table 5.7).

Table 5.7: Combinations of media types used by survey respondents at Penguin Island.

Media Combination Used	No.	%
All three	27	25.2%
Interpersonal only	23	21.5%
Interpersonal & interactive	23	21.5%
Text based & interactive	13	12.1%
None	10	9.3%
Text based & interpersonal	7	6.5%
Text based only	4	3.7%
Interactive only	-	-
<i>Not stated</i>	-	-
<i>Total</i>	<i>107</i>	<i>100%</i>

Interpersonal communication alone and used together with interactive media were the second most common combination of sources (21.5% respectively). Use of the combination of text based media and interactive made up 12% of the responses. Interestingly, none of the respondents indicated the use of the interactive medium alone.

This was always used in combination with other media types whereas text based media was used in isolation to a small extent and the interpersonal medium was used solely on a more frequent basis.

When comparative analysis of media use was conducted based on independent variables, frequency of natural area visitation was significantly related to interpretive media type use ($\chi^2 = 62.41$, $df = 15$, $p < 0.01$). More frequent natural area visitor respondents tended to favour the interpersonal medium while respondents who visited natural areas less frequently tended to use text based interpretive media. For example, of those indicating rangers as a source accessed while at Penguin Island, 86% visited natural areas six or more times per year. Of those indicating the signs as an interpretive medium used at the site, approximately 80% visit natural areas less than six times per year. Strength of association analysis indicated this to be a moderately strong relationship (Cramer's $V = 0.523$).

The situation in which respondents who are more frequent visitors to natural areas were more likely than less frequent visitors to approach rangers as an interpersonal source of interpretation suggests a greater willingness to communicate with park rangers. Such respondents may have had past positive experiences talking to park rangers and are thus more willing to repeat such interactions to seek out personalised or more detailed interpretation about aspects of the site. This may in turn link back to the positive relationship between accumulation of experiences in natural areas and development of attitudes toward that environment in general (Hammit, 1981; Fakeye & Crompton, 1991; McKercher, 1996). That is, those with a greater accumulation of experience are likely to have developed a more personalised attitude toward the natural environment and therefore are more likely to require more personalised information to add meaning to those attitudes and knowledge. Interpersonal methods of communication are more likely to be able to fulfil this need than text based communication media (Lipman & Hodgson, 1978). Thus availability of interpersonal interpretation may cater to more frequent natural area visitors as they are able to perhaps obtain personalised information and details not provided by signs and other media sources.

A significant relationship was also found between interpretive medium use and repeat visitation. Of those indicating use of interpretive media sources, repeat visitors were less likely to use a single type of communication medium than first time visitors ($\chi^2 = 28.34$, $df = 4$, $p < 0.01$; Cramer's $V = 0.515$). For example, of the respondents who

indicated use of a single source of interpretation, 95% were first time visitors. Related to this finding, combinations of media type used were also significantly related to repeat visitation ($\chi^2 = 31.27$, $df = 6$, $p < 0.01$). Respondents who were repeat visitors to Penguin Island were more likely than first time visitors to use interactive media in combination with interpersonal or text based interpretive media. The greater use of multiple media types and sources suggested a greater motivation to seek out information. Tilden (1957) commented that motivation to seek out information is an important indicator of an individual who has been provoked to develop understanding and awareness of the surrounding environment. This phenomenon may be a function of repeated visitation in natural areas providing a motivation to build on knowledge and perceptions gained through accumulated experience (Field & Wagar, 1973). Thus, using a greater variety of information sources represents a motivation to seek information that may add to the knowledge previously gained at the site. In terms of provision of a higher intensity of interpretation, a variety of on-site media would seem to cater to the preferences of repeat visitors, an important component of site visitor populations.

5.2.3 Activity participation

A multiple choice question was used to ascertain what activities respondents took part in while on Penguin Island. The three main activities undertaken as indicated by respondents were: the Penguin Experience, the walk trails and swimming (Table 5.8).

Table 5.8: Activities undertaken while on Penguin Island as indicated by respondents.

Activity Undertaken	Frequency	Percent
Penguin Experience	93	86.9%
Island walks	76	71.0%
Swimming	36	33.6%
Other	7	6.5%
<i>Not stated</i>	-	-
Total	212	198%

A small minority of “other” responses included “fishing”, “nothing” and “relaxation”. More than 85% of the respondents indicated that they had visited the Penguin

Experience during their stay on the island, mainly a function of the entry fee being intrinsic with the ferry ticket cost. This contrasts with the less than 50% who indicated that viewing the penguins was a main reason for visiting the island as presented in Table 5.5.

5.3 Influence of Higher Intensity Interpretation on Attitudes and Knowledge

Environmental attitude responses significantly changed between the paired surveys completed before and after the experience of Penguin Island. Gender and frequency of natural area visitation were found to be of statistical significance in relation to environmental attitude changes. Knowledge was positively affected after the site visit with reason for visitation significantly related to this change. Attitudes toward Penguin Island as a natural area destination were also significantly influenced by the visit. Frequency of natural area visitation was significantly related to the impact of the site experience on visitor attitudes toward the site. These findings are discussed in turn.

5.3.1 Environmental attitude

The mean responses before experiencing Penguin Island indicated surveyed visitors were generally ecocentric in their attitude toward the environment (Figure 5.4).

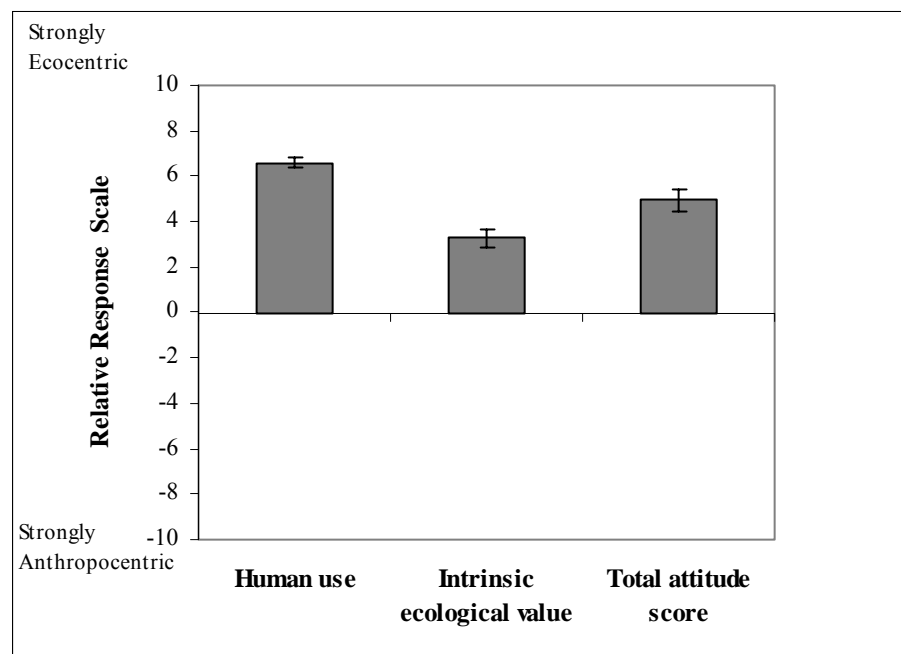


Figure 5.4: Mean paired survey response to environmental attitude statements before experiencing Penguin Island.

Paired analysis revealed that respondents were significantly more ecocentric in response to the “Human use” statements than those referring to the “Intrinsic ecological value” of the island ($z = -6.80, p < 0.01$). This suggested respondents had positive attitudes toward the need for responsible use of the environment but a less positive response to the concept of nature as having value beyond that measured by usefulness to humans. In other words, it may appear that while respondents are empathetic toward the need for nature conservation, they are still likely to value the area in terms of its benefit to humans rather than for any altruistic reasons.

The mean paired survey responses completed after experiencing Penguin Island indicated no significant difference between attitudes toward the intrinsic value of nature and the human use statements (Figure 5.5). This suggested that these aspects were held in equal regard in terms of concerns for conservation of the island.

Responses to the human use and ecological value statements appeared moderate with a conservation focus. The anthropocentric shift in response to the human use of nature statements may be a function of the island offering recreational activities such as picnicking, swimming and fishing. The conservation focus may then take on a background aspect of the island experience despite the design of the facilities being based on a management objective of minimal ecological disturbance (Dans, 1997)

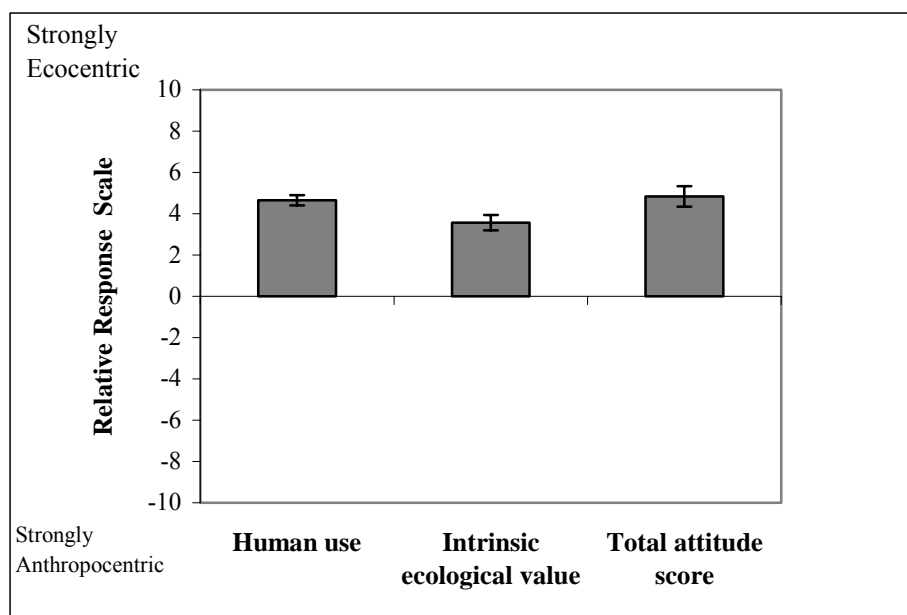


Figure 5.5: Mean paired survey environmental attitude response after experiencing Penguin Island.

Comparison of mean paired responses to the human use statements before and after experiencing Penguin Island indicated a significant shift toward the anthropocentric end of the scale ($z = -8.39, p < 0.01$). That is, respondents appeared less opposed to the concept of the environment valued as a resource for human use after their experience of the island. There was no significant change in response to the intrinsic ecological value statements or the overall total environmental attitude after the experience of the island.

Analysis of the change between the before and after responses of individually paired surveys reinforces the above finding. Figure 5.6 illustrates the mean change of individually paired environmental attitude responses after experiencing Penguin Island.

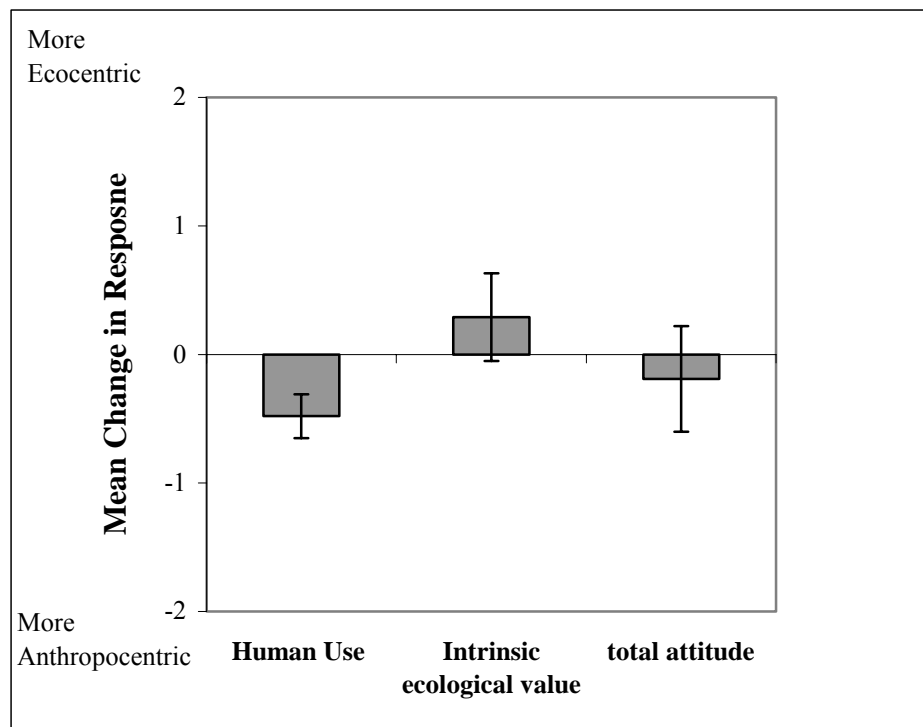


Figure 5.6: Mean paired change in response to environmental attitude statements after experiencing Penguin Island.

A one sample Kolmogorov-Smirnov test indicated the data to be normally distributed, thus one sample T-tests were used to determine whether the magnitude of change was significantly greater than zero. Table 5.9 details the test statistics and p values for each of these tests.

Table 5.9: Results of K-S test for normal distribution and a 1 sample T-test of change in environmental attitude response after experiencing Penguin Island.

Attitude Statement	1 sample K-S		1 sample T-test (test value = 0)	
	K-S z value	p value	t value	p value
Human use	1.07	0.16	-2.87	0.005
Intrinsic ecological value	1.24	0.11	-0.85	0.39
Total attitude score	1.17	0.13	0.46	0.65

The p-values indicate that the apparent change in the “Intrinsic ecological value” score and the “Total“ environmental attitude score were not significantly greater than zero while the change in response to the “Human use” statements was significantly greater than zero. This suggests that while the change in response to the “Intrinsic ecological value and “Total” attitude scores were not significant, the change in response to the “Human use” statements was.

Using the natural environment as a resource for human benefit is often associated with ecological degradation (Dunlap & Liere, 1978; Satterfield & Gregory, 1998). The anthropocentric shift in attitudes towards human use of the natural environment in the context of Penguin Island may be a function of the combination of the being site designed for minimal ecological impact in combination with the active recreational focus of the island. That is, respondents perceive that active recreational use of a natural area such as Penguin Island is possible without causing severe ecological disturbance. Thus, respondents to statements referring to natural areas being resources for human benefit may be somewhat dissociated from ecological destruction as their experience of Penguin Island demonstrated the two concepts are compatible. The influence on respondents, as a result of experiencing Penguin Island, appears to manifest as a responsible use conservation ethic.

The following sections examine the significant relationship between gender and frequency of natural area visitation and the response to the environmental attitude statements. While gender differences in mean environmental attitude were apparent, there was no significant difference between males and females in terms of the magnitude of change in response after experiencing the site. In contrast, frequency of natural area visitation significantly influenced both the mean environmental attitude and

the extent to which the Penguin Island visitor centre impacted on the environmental attitude response. There appeared to be no significant relationship between environmental attitude and the remaining respondent variables measured.

Gender and Environmental Attitude

There was no significant difference, in response to the environmental attitude statements, between male and female respondents before experiencing Penguin Island as was found in the TTW paired survey data in section 4.3.1. Figure 5.7 illustrates that there appeared to be greater ecocentric response to the “Human use” statements, as compared with the “Intrinsic ecological value” statements, by both genders immediately before experiencing Penguin Island. This was confirmed through paired statistical analysis of the mean scores for each of the statement groupings by males and females respectively ($z = -3.23, p < 0.02$).

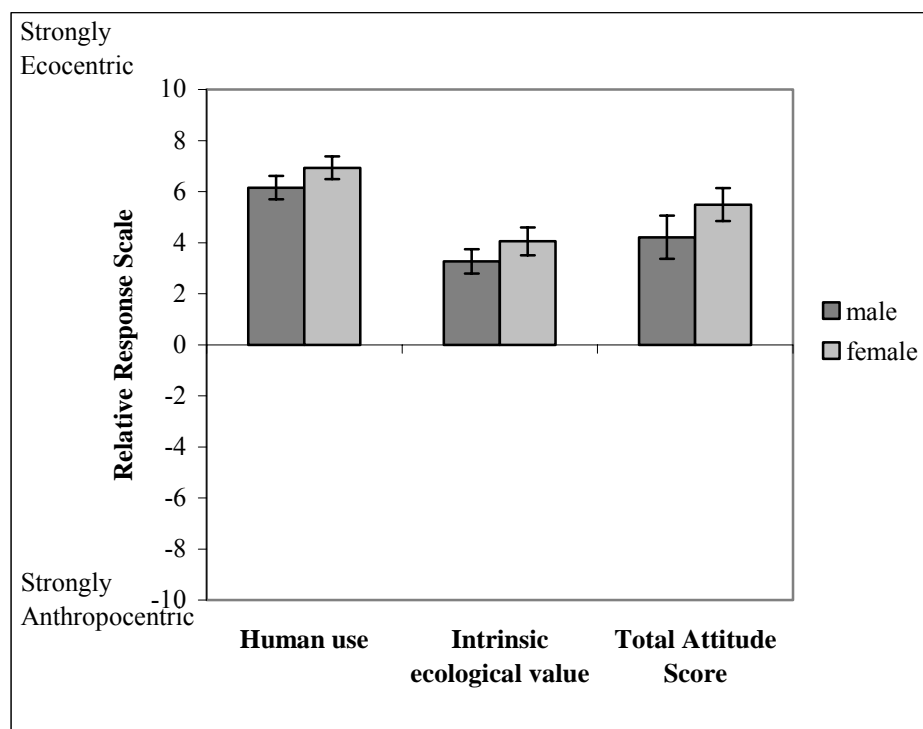


Figure 5.7: Mean environmental attitude response immediately after experiencing Penguin Island according to gender.

Figure 5.8 illustrates the significant difference in gender response to the environmental attitude statements immediately after experiencing Penguin Island. Females were significantly more ecocentric than males in response to the “Intrinsic ecological value” statements after the experience ($z = -4.32, p < 0.01$) as was found in the TTW gender response data. There was no significant difference in rating, by males and females, of

the “Human use” statements or the “Total” environmental attitude score. Both genders also demonstrated no post-visit significant difference in respective rating of the intrinsic ecological value and human use statements.

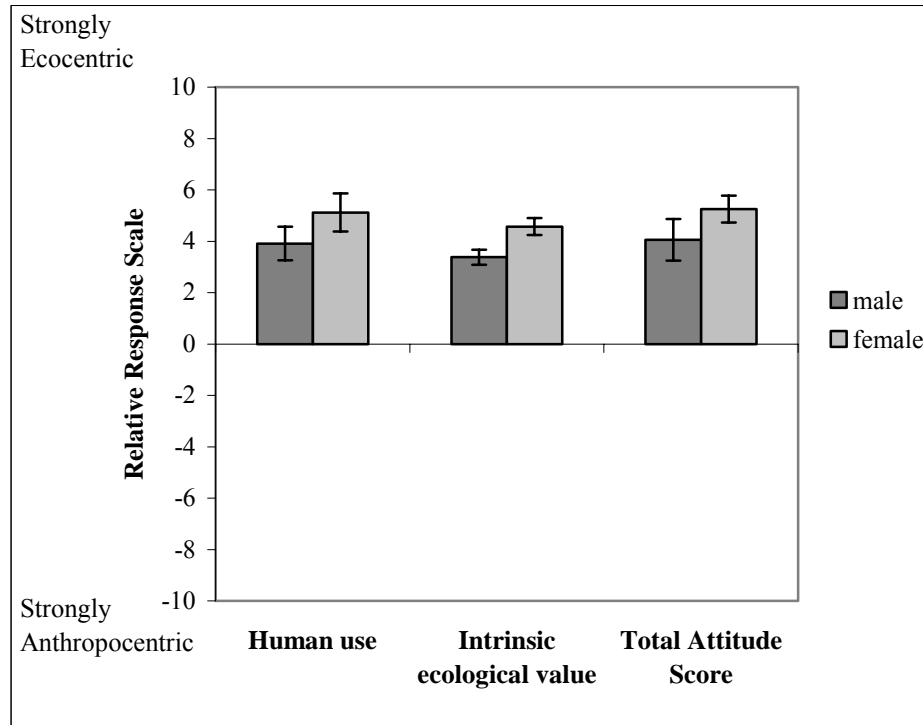


Figure 5.8: Mean environmental attitude response immediately after experiencing Penguin Island according to gender.

Figure 5.9 illustrates the mean change in individually paired environmental attitude responses. Using the K-S test for normal distribution and one sample T-tests as performed previously, results indicated that the change in response to the “Human use” statements was significantly greater than zero (male $t = -4.64$, female $t = -5.28$, $p < 0.001$). The change in response to the “Intrinsic ecological value” an “Total” environmental attitude statements was not significantly greater than zero. This suggests that both males and females demonstrated a significant anthropocentric shift in response to the “Human use” statements immediately after experiencing Penguin Island. There was no significant difference in the magnitude of change between males and females.

The response to environmental attitude results according to gender, obtained from Penguin Island, indicated the differences between gender were not related to the context of the natural environment in which attitude were measured. Males demonstrated no significant alterations in response to the statements of intrinsic ecological value or the total environmental attitude score. However, females had a slight ecocentric change

with respect to the intrinsic ecological value statements ($z = -2.01, p < 0.05$). While the shift in female response was significantly greater than zero within that gender grouping, there was no statistical difference in magnitude of change between genders owing to the variation in response of individuals within each group.

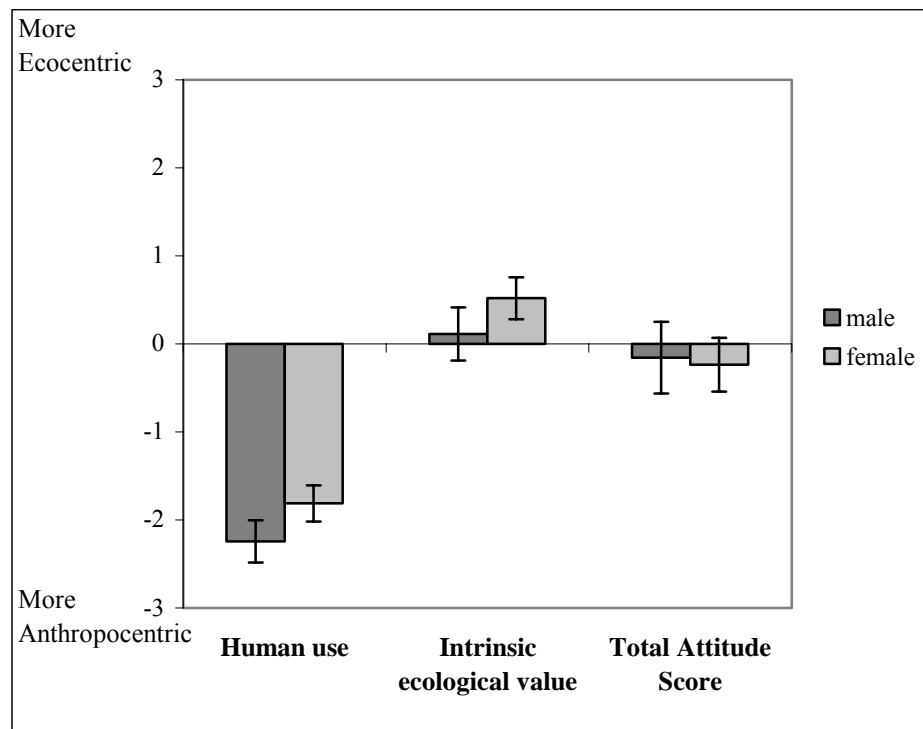


Figure 5.9: Mean change in response to environmental attitude statements at Penguin Island according to gender.

Despite the moderation of negative responses to human use of the island, females appeared to also be receptive to the ecological value of the island to a greater extent than males. Influencing environmental attitudes seems to have favoured females, as they appeared more willing than males to express ecologically sensitive views after their experience.

Frequency of Natural Area Visitation and Environmental Attitude

All of the natural area visitation groups demonstrated a generally ecocentric environmental attitude before experiencing Penguin Island (Figure 5.10). All groups also responded with a greater ecocentric attitude towards the human use statements as compared with the responses to the intrinsic ecological value statements. However, a significant difference in response to the “Human use” statements was evident before experiencing the site, where the most frequent visitation group demonstrated a

significantly more ecocentric response than the less frequent visitation groups ($\chi^2 = 22.78$, $df = 3$, $p < 0.01$). That is, the less frequent natural area visitation groups empathised more than the most frequent group with the concept of the environment being valued in terms of a resource for human use. The consequence of this is a significant difference in total environmental attitude between the two extreme categories of natural area visitation with the most frequent (>12) group being significantly more ecocentric than the least frequent (1-2) group ($\chi^2 = 17.28$, $df = 3$, $p < 0.01$). There was no significant difference between grouped responses to the intrinsic ecological value statements.

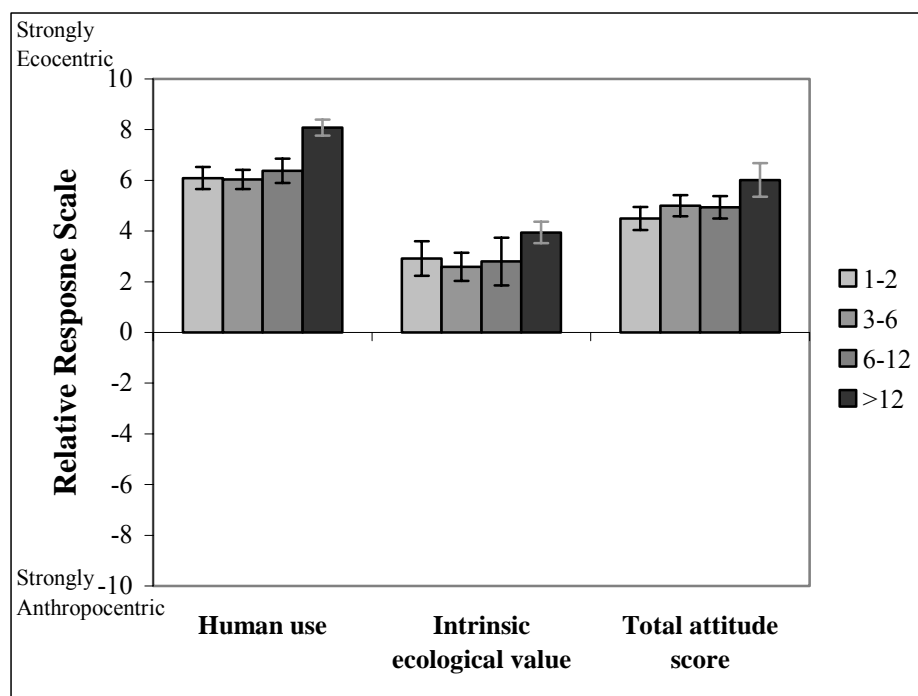


Figure 5.10: Mean environmental attitude score before experiencing Penguin Island according to frequency of natural area visitation.

The differences in environmental attitude response evident between the various levels of natural area visitation may be attributed to the influence of accumulated past experience and its influence on perceptions of the environment as discussed previously.

The environmental attitude response after experiencing Penguin Island indicated that the difference in response to the “Human use” statements became more accentuated between the “>12” group and the remaining natural area visitation groups (Figure 5.11). As with the paired survey completed before the experience, there was a significant difference between the “>12” natural area visitation group and the remaining groups (χ^2

= 19.28, $df = 3$, $p < 0.01$) while there was no significant difference between the visitation groups ranging from “none” to “6-12”.

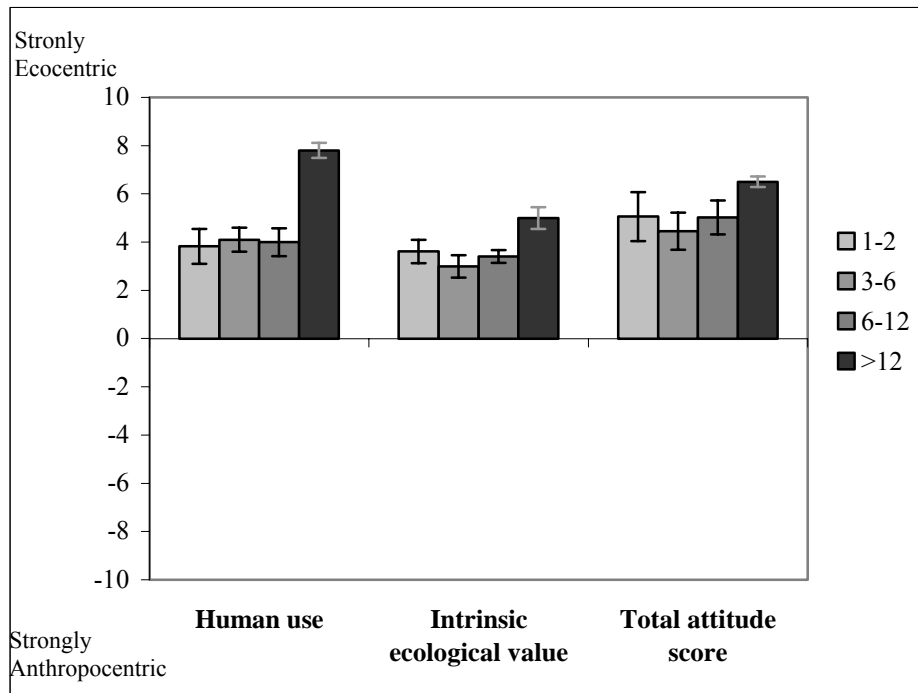


Figure 5.11: Mean environmental attitude response after experiencing Penguin Island according to frequency of natural area visitation.

The greater difference in response to the “Human use” statements between the “>12” visitation group and the remaining groups was the result of a significant anthropocentric shift in response in all but the most frequent (>12) natural area visitation group ($z = -8.39$, $p < 0.01$). There was no significant shift in response to the ecocentric statements or in the total attitude scores of any of the groups as explained previously (Figure 5.12).

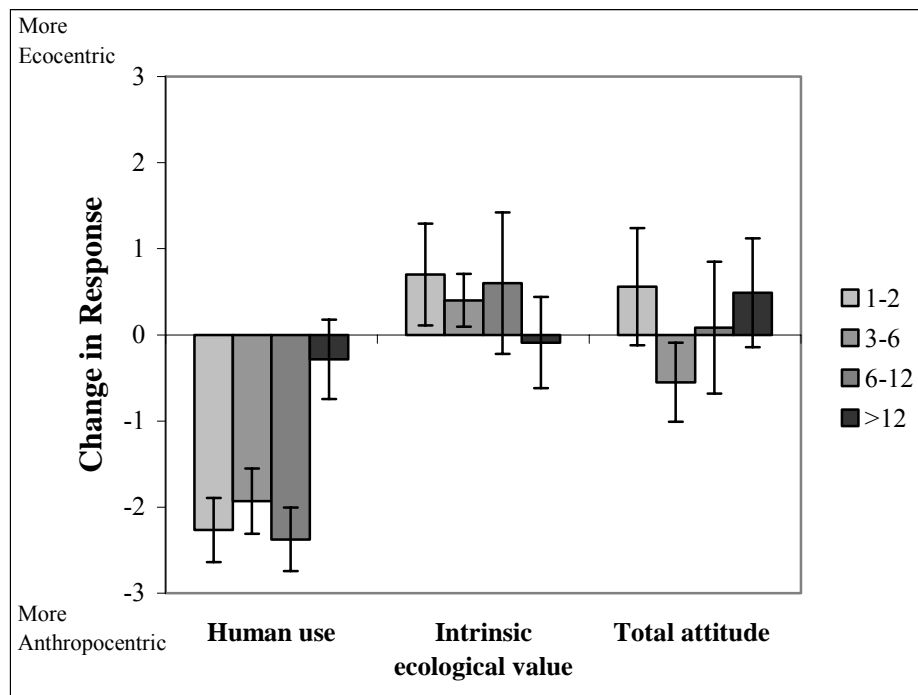


Figure 5.12: Mean change in response to environmental attitude statements at Penguin Island according to frequency of natural area visitation.

The lack of a significant change in attitude response by the “>12” group was suggestive of a threshold of accumulated past experience at which environmental attitudes become increasingly stable and less likely to be influenced by a single current experience. This is demonstrated by the anthropocentric significant shift in response to the concept of the environment valued in terms of its usefulness to humans by the three less frequent groups while the “>12” group had no change in response.

Environmental attitudes are heavily influenced by accumulated past experience in natural areas as already discussed in Chapter 2. As individuals acquire more information in regard to natural areas, the associated attitudes are based on a greater wealth of experience effectively resulting in attitudes becoming strongly held and not easily altered by a one-off experience (McGuire, 1985; Ajzen, 1992). Subsequently, the environmental attitude relationship between the groups, after experiencing Penguin Island, remained essentially the same as the responses before experiencing the site. It would appear that respondents less experienced in natural areas are more prone to attitude change in the short term as a result of a one-off experience.

5.3.2 Knowledge

Figure 5.13 illustrates the mean knowledge scores of paired survey respondents before experiencing Penguin Island. While respondents had a mean correct score of more than 50%, the remaining difference was a result of a large proportion of “don’t know” responses as opposed to “incorrect” responses. Thus, respondents were largely aware of their lack of knowledge as indicated by selecting “don’t know” rather than choosing incorrect responses.

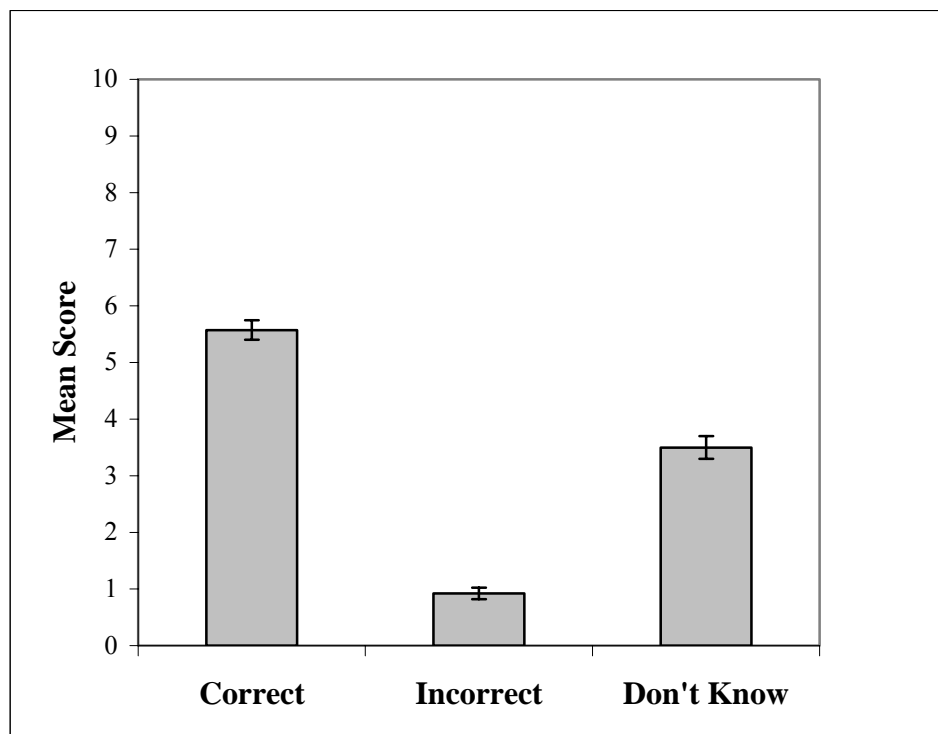


Figure 5.13: Mean knowledge score of paired survey respondents before experiencing Penguin Island.

The relationship between the “correct”, “incorrect” and “don’t know” scores was the same after experiencing the site, except the mean “correct” score was higher while the remaining knowledge scores were slightly lower (Figure 5.14).

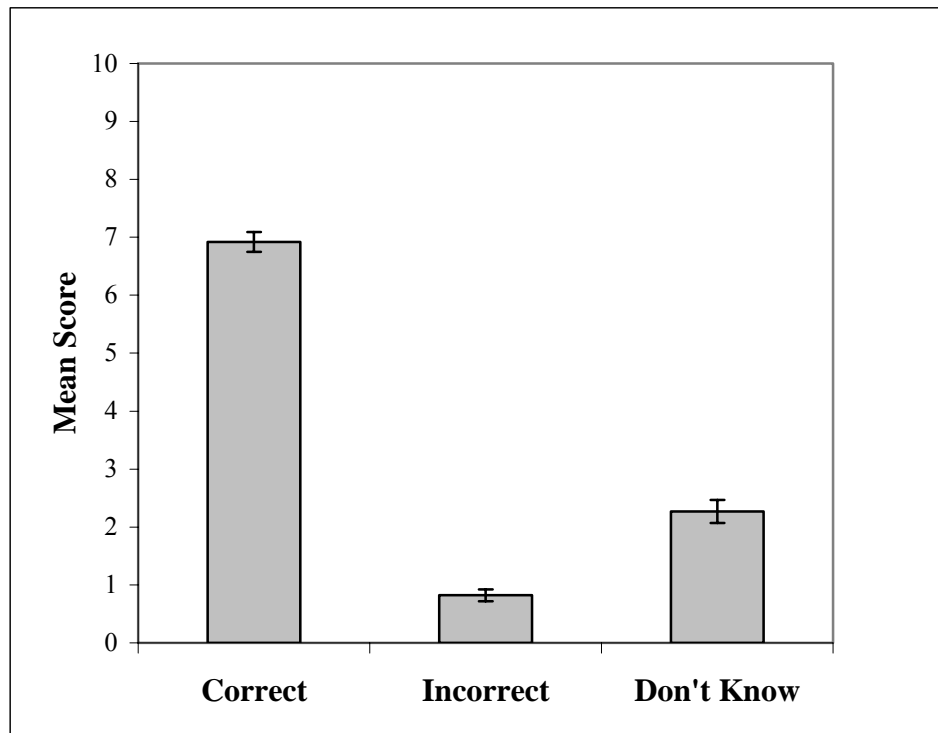


Figure 5.14: Mean knowledge scores of survey respondents after experiencing Penguin Island

Analysis of the mean change in individually paired knowledge scores indicated a significant increase in the number of correct responses ($t = -3.45, p < 0.02$) and a significant decrease in the number of “don’t know” responses ($t = -2.75, p < 0.02$). There was no significant change in the number of incorrect responses. Thus the improvement of correct responses, as measured by the quiz, was a result of a significant reduction in the number of “don’t know” responses rather than incorrect responses (Figure 5.15).

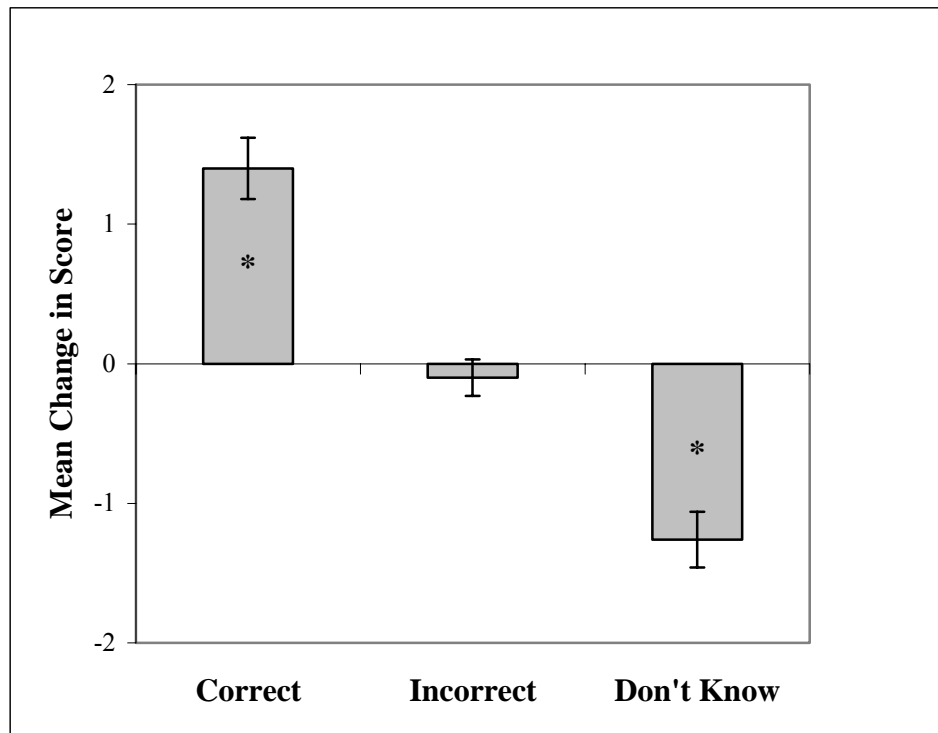


Figure 5.15: Mean change in knowledge scores after experiencing Penguin Island.

The significant increase in mean knowledge of respondents after experiencing Penguin Island suggested they were able to access and recall information included in the content of on-site interpretive media. The only respondent variable that appeared to be significantly related to knowledge gain was the main reason for visiting the island. There were no other significant relationships evident between the remaining respondent variables and knowledge.

Reason for Visitation and Knowledge

Motive for visitation may be divided into those that are seeking to explore and learn through visiting the “Penguin Experience” visitor centre (PEVC) along with partaking in the island walks and those that are seeking to experience recreational activities such as swimming or relaxation. While less than half stated the PEVC as the main reason for visitation, the vast majority of respondents surveyed (87%) indicated they attended the PEVC while on the island. Thus, while the former group was interested in exploration and gaining knowledge, the recreation group was not, but needless, both groups experienced an activity intended to educate respondents.

Those indicating the PEVC as a main reason for visitation demonstrated a significantly greater increase in correct responses to the knowledge quiz after visitation than those

indicating other reasons despite both groups taking part in the experience while on the island, as illustrated in Figure 5.16 ($z = -3.88, p < 0.01$).

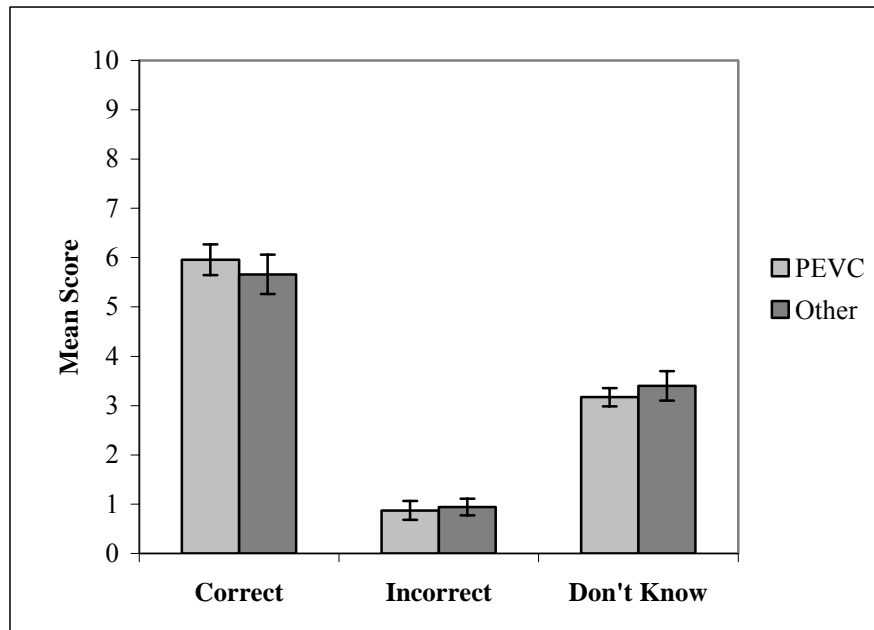


Figure 5.16: Mean knowledge scores before experiencing Penguin Island according to main reason for visitation

Comparison of knowledge scores between the group indicating the PEVC as the main reason for visitation and the “other” reasons group indicated significant differences in the number of correct and incorrect responses (Figure 5.17).

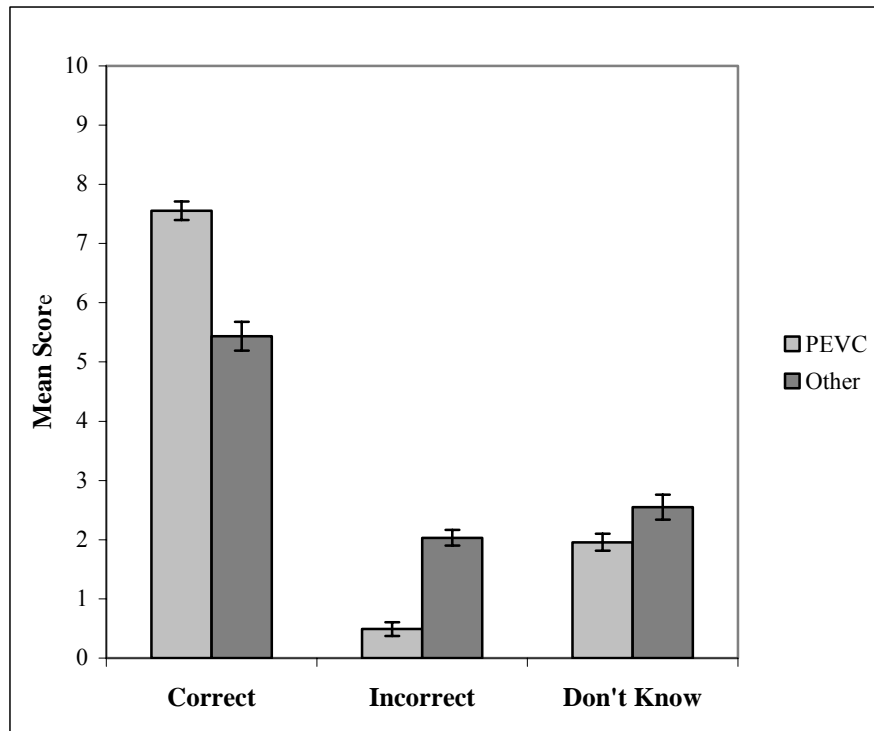


Figure 5.17: Mean knowledge scores after experiencing Penguin Island according to main reason for visitation

It was found that the group indicating the PEVC as the main reason for visitation to Penguin Island had a significantly higher “correct” score than the “other” reasons group ($z = -6.49, p < 0.001$). The number of incorrect responses by the “PEVC” reason group was significantly lower than that of the “other” reasons group ($z = -6.88, p < 0.001$). The interest in this finding lies in the circumstance where members of each group visited the PEVC while on the island but those who stated this facility as their main reason for visitation appeared to have a greater gain in knowledge.

Examination of the change in knowledge scores of the “PEVC” and “other” reasons groups indicated both groups significantly decreased the number of “don’t know” responses after the experience with (Figure 5.18).

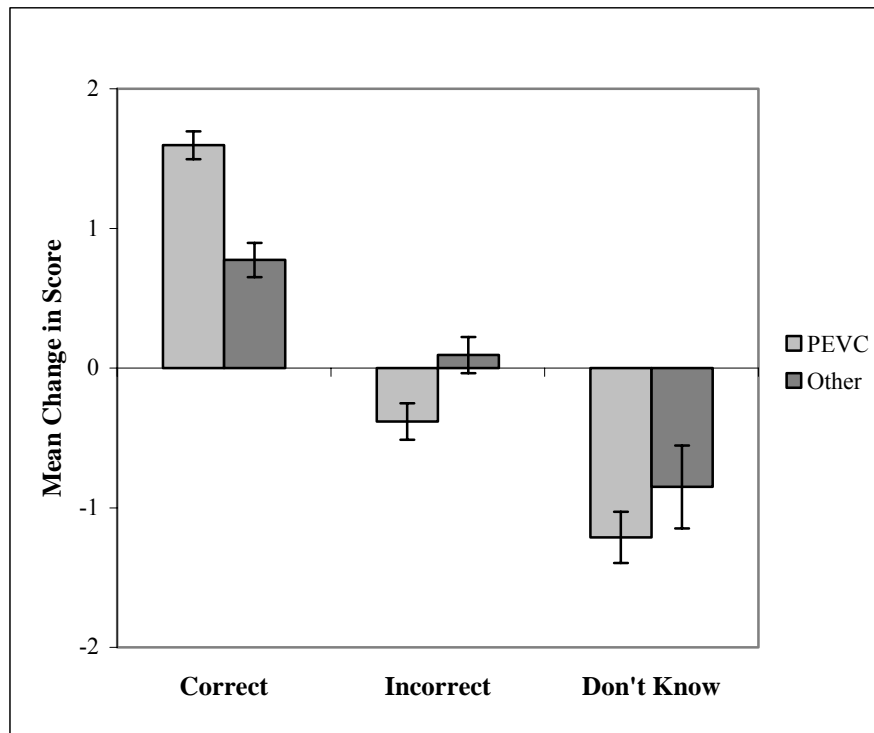


Figure 5.18: Mean change in knowledge scores after experiencing Penguin Island according to main reason for visitation

There was no significant difference in the magnitude of this change between the groups. However, the PEVC group significantly decreased the number of incorrect responses ($t = -3.87, p < 0.02$) while the “other” group showed no significant change. This indicated that both groups appeared more confident of the ‘correct’ responses to the knowledge quiz after the experience (indicated by using significantly less “don’t know” responses). This supports the notion that information transferral is reliant on the respondents’ motivation to learn. That is, the PEVC appeared to benefit those who were motivated by its presence to a greater extent than those who made an opportunistic visit while on the island.

Ballantyne et al (1998) noted that visitors to Fraser Island who were not motivated by exploration and learning were considerably less receptive to acquisition of knowledge than their counterparts. In addition, earlier work by authors such as Shafer (1969) and Hendee et al (1971) suggested that visitors to natural areas function within a fairly specific sphere of awareness. That is, visitors may view a natural area as a place for social interaction or a place for meditative contemplation or a place for exploration and learning. While a visitor may fall into more than one of the categories identified by these authors, the type of interaction with the natural area is strongly influenced by how

the visitor perceives the natural area as an experience (awareness and appreciation). This in turn may exclude the visitor from viewing their experience in a different context, such as social recreation seekers not responding to the concept of natural areas as a learning experience. Thus, the survey respondents who were motivated by activities not directly related to knowledge acquisition, but who opportunistically visited the penguin visitor centre, were less likely to improve their knowledge than those respondents directly motivated to learn about the penguins. This suggests that a high intensity of interpretation will not influence visitors who are unwilling to learn or engage with the communicated messages.

5.3.3 Attitude toward Penguin Island as a natural area experience

Respondents rated most of the experiential aspects of the site positively before their experience of Penguin Island. Aspects such as beauty, recreation and learning were rated as most applicable prior to visitation while responses to human enhancements, well-being and spirituality were less positive. Other aspects including “Experience pristine island”, “Inspired by island” and “Help protect island” were rated moderately positively. Respondents’ attitude toward the island as a natural area, before their experience, was thus primarily in the context of a place of natural beauty in which to recreate and, to a lesser extent, learn within a conservation frame of reference.

Rating of the experiential aspects of the island after the experience indicated that beauty and recreational interactions rated highest while “Help protect island”, reflecting a conservation ethic, was rated third. Other aspects rated after the site experience such as: “Learn about island”, “Inspired by island”, “Human enhanced island” aspect and “Rejuvenate well-being” were rated moderately while “Spiritual meaning” and “Pristine island” concepts were rated near neutral after the experience of Penguin Island.

Examination of the change in paired responses to attitude toward the site immediately after the experience revealed that respondents significantly altered the rating of several aspects of the site experience. “Learn about island” was significantly reduced in rating after visitation ($z = -4.93, p < 0.01$) while “Human enhanced island” was significantly increased in rating ($z = -4.44, p < 0.01$).

The high rating of “Learn about island” before the experience points to an expectation of exposure to interpretive media for educational purposes. However, it appears that the

island experience did not tend to foster this educational aspect. This may relate to the island being perceived as primarily a recreational destination. That is, respondents actively pursue recreational activities such as walking and swimming and so are less likely to absorb educational messages as previously referred to in the study of Fraser Island visitors by Ballantyne et al (1998).

In this vein, it was interesting to note that while the learning aspect was decreased in mean rating, the mean knowledge score of visitors increased. This may point to a discrepancy between the attitude respondents had toward the island as a learning experience and the knowledge absorbed by respondents while on the island. Another explanation may relate to respondents sharing information during completion of the paired survey after the experience. In this way, survey participants may indicate the correct response without having actually learned it while on the island. This scenario has some credibility as survey participants completed the form while seated on the ferry where the space available and seating arrangement required that passengers sat within close proximity of each other. This may have facilitated or encouraged sharing of information during completion of the survey as discussed in the limitations section 3.7.2.

Attitudes toward the experience of Penguin Island as a “Pristine island” and gaining “Spiritual meaning” from the experience were significantly reduced in rating after the site experience ($z = -3.50$ & -2.70 respectively, $p < 0.01$). The “Pristine island” aspect was reduced from a moderately positive rating to a near neutral rating after the experience. This may possibly be a function of crowding and human development on the island and the near vicinity of the mainland urban areas. The reduction in rating of “Spiritual meaning” may not hold the same importance as the pristine island change as spirituality was initially rated near neutral before visitation as well as after visitation.

The key changes in terms of respondents’ attitudes toward the experience appeared to be an increased rating of “Rejuvenate well-being”, “Help protect island” and the “Human enhanced island” aspects of the experience. As the management of the island promotes conservation in a recreational context, it would appear that respondents are more conscious of this function of the island after their experience. It seems likely that this has occurred through the high intensity use of on-site interpretation along the theme

of conservation and repetition of messages by various sources. For example, the ferry operator’s speech while travelling to the island includes comments regarding appropriate behaviour and the delicate nature of the island and prominent signs indicating the island is a conservation reserve (with symbolic indication of inappropriate behaviour) reinforced this message on arrival while signs located on the exterior of the PEVC devote considerable space to the delicate nature of the island and the importance of conservation. These messages are again repeated during the penguin feeding and ranger presentation at the PEVC. It seems the intensity of this message may have influenced respondent attitudes.

Frequency of natural area visitation and attitude toward Penguin Island experience

Significant differences between natural area visitation groups were evident in the attitude response before experiencing the site (Figure 5.19). In all cases, the “6-12” and “>12” groups rated these aspects significantly greater than the “1-2” and “3-6” groups. There were no significant differences between these group pairs. Consequently, the “1-2” and “3-6” pair of visitation groups will be referred to as the <6 groups while the “6-12” and “>12” pair will be referred to as the >6 groups.

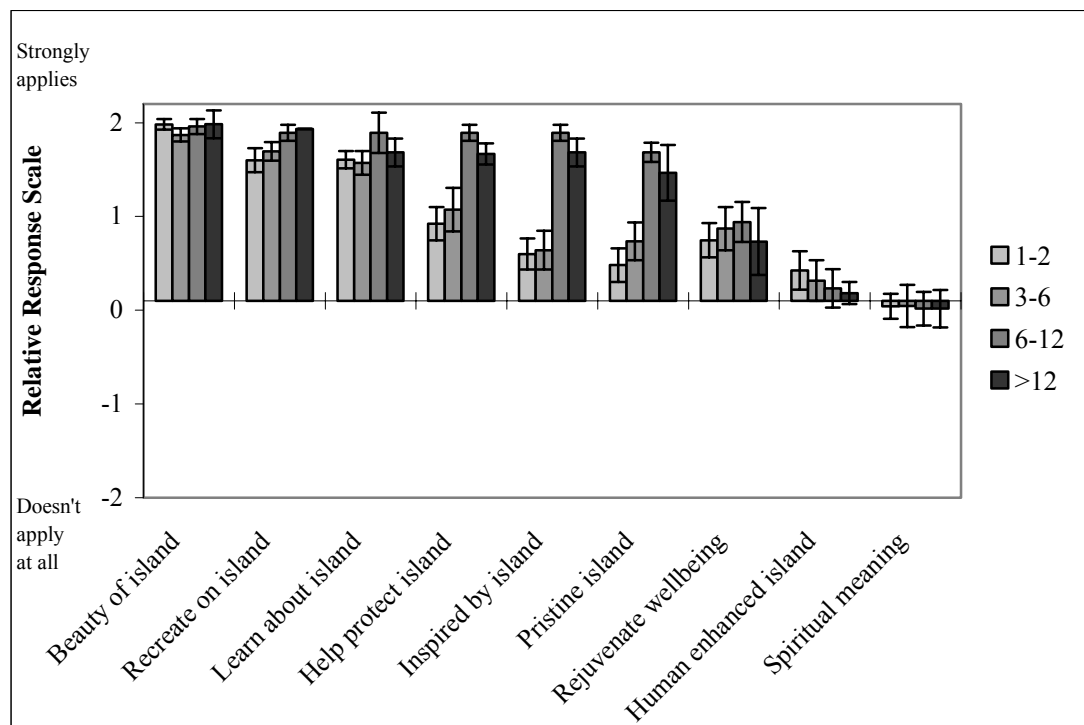


Figure 5.19: Mean attitude response to Penguin Island before experiencing the site according to natural area visitation.

A significant difference was apparent in the response to the “Pristine island” aspect before experiencing the site. The >6 visitation groups rated this aspect as significantly more applicable than the <6 visitation groups ($\chi^2 = 28.04$, $df = 3$, $p < 0.01$). Similarly, the >6 groups rated the “Help protect island” aspect as significantly more applicable than did the <6 groups ($\chi^2 = 26.78$, $df = 3$, $p < 0.02$) with an essentially identical result in response to the “Inspired by island” statement ($\chi^2 = 36.93$, $df = 3$, $p < 0.01$).

The significant differences in rating of the aspects of the site before the experience suggested a relationship between past experience in natural areas and attitudes toward Penguin Island as a natural area experience. The ratings of “Help protect island” before the experience suggested the more frequent natural area respondents surveyed held stronger positive attitudes toward this as an aspect of their experience. Similarly, the “Inspired by island” and “Pristine island” aspects suggested that the more frequent visitation groups had a stronger positive attitude toward Penguin Island in the context of these aspects relative to the less frequent natural area visitors.

The pattern of differences between the visitation groups, after experiencing the island, in response to the “Help protect island”; “Inspired by island” and “Pristine island” remained the same (Figure 5.20). This pointed to accumulated experience in natural areas having an influence on attitudes toward these aspects to a greater extent than the site experience itself.

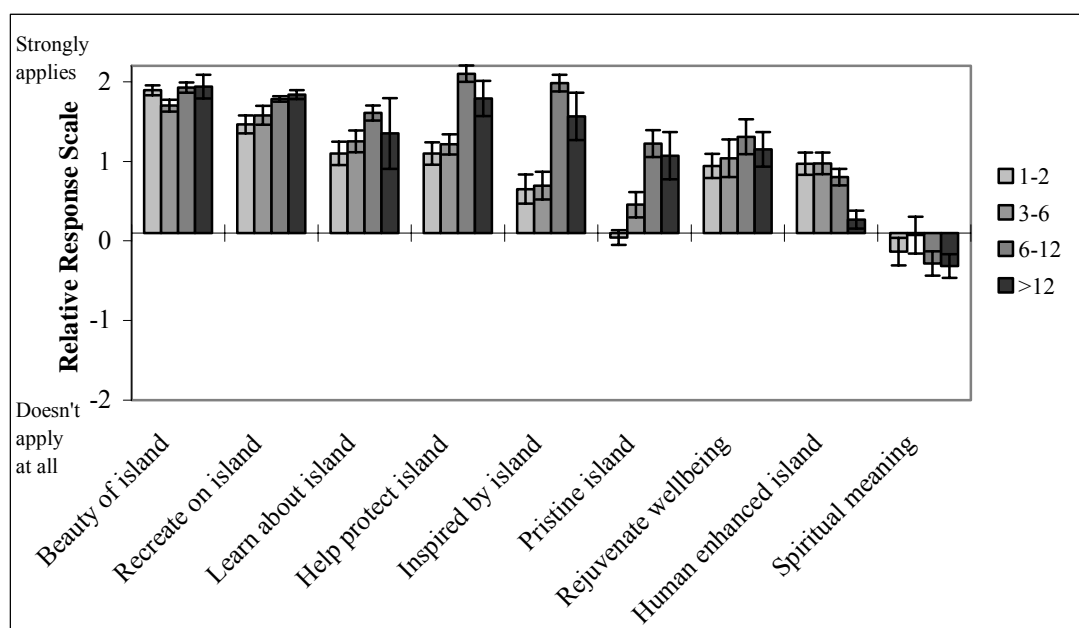


Figure 5.20: Mean attitude response to Penguin Island experience after experiencing the site according to frequency of natural area visitation

Examination of the magnitudes of change in rating of the various site experience aspects revealed a significant difference in response to the “Human enhanced island” statement ($\chi^2 = 24.76$, $df = 3$, $p < 0.01$). All but the “>12” visitation group demonstrated a significant increase in the rating of this component in the post visit survey data. This indicated the less frequent visitor groups responded positively to the built aspects of the site experience while the “>12” group did not alter their attitude (Figure 5.21).

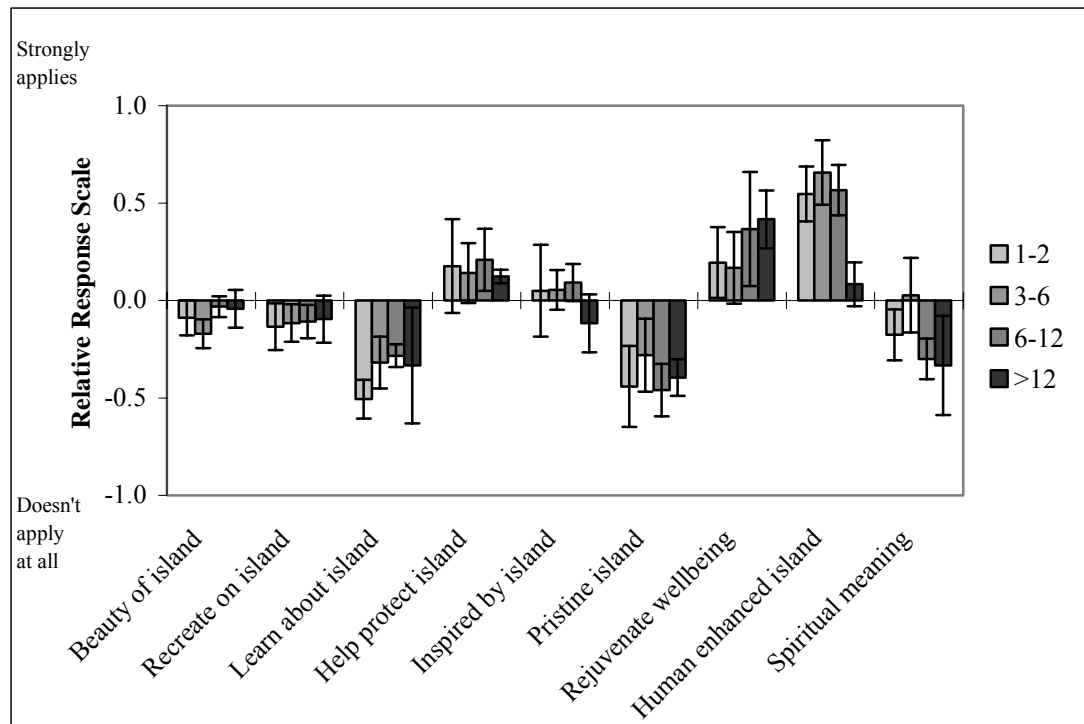


Figure 5.21: Change in attitude toward Penguin Island experience according to frequency of natural area visitation.

While the “>12” group demonstrated no significant alteration in rating of the “Human enhanced island” statement, the remaining less frequent visitation groups demonstrated a significant increase in rating. That is, the “>12” group remained neutral towards this aspect after their experience while the remaining groups altered their response from near neutral to moderately positive. This suggested that the group of respondents with the highest level of accumulated experience in natural areas did not place a high priority on the built aspects while the less frequent natural area visitors appeared to be positively influenced in terms of attitude toward the built aspects of the site. This result complemented the findings of Bixler and Floyd (1997) who commented that those with a lesser positive appreciation for natural areas are more likely to prefer human modified environments.

5.4 Influence of Activities Undertaken at Penguin Island

On-site communication with respondents may take place through the activities available and the interpretation media presented such as signs and displays (Evison, 1981). Activity participation on Penguin Island was significantly related to environmental attitude and awareness and appreciation of the site. Information media used was significantly related to knowledge acquisition but not attitudes or awareness. The findings are discussed in turn.

Penguin Island offers a range of activities including active recreational pursuits, observational and exploration activities and educational experiences. The three most common activities indicated in the visitor survey data were the PEVC, the island walk trail and swimming (which also included snorkelling). As the vast majority of respondents indicated they visited the PEVC, this acted as a constant across all data groupings. The main variation in the activities undertaken by respondents surveyed was between the island walk trails (observation and exploration) and swimming (active recreational). Responses were therefore analysed accordingly. Three groups were identified as defined in Table 5.10.

Table 5.10: Categorisation of activity participation at Penguin Island

Activity Grouping	Description	No. (% of sample)
Swim	respondents who indicated swimming but not walking	n = 31 (29%)
Swim & walk	respondents who indicated participation in both activities	n = 20 (19%)
Walk	respondents who indicated walking but not swimming	n = 55 (52%)

Significant differences between the activity groups were found in response to the environmental attitude statements and the attitude toward the experience of Penguin Island statements. There were no significant differences in response to the knowledge aspects of the survey data between the groups. Activity participation was significantly related to frequency of natural area visitation but no other respondent variables. It was

surmised that the relationship between activities and environmental attitude was a function of natural area visitation frequency.

5.4.1 Activities and environmental attitude

Analysis of environmental attitude before experiencing the Penguin Island indicated a significant difference between the “Walk” group and the two swimming groups. There was no significant difference between the “Swim” and “Swim & walk” group (Figure 5.22). While all groups demonstrated apparently ecocentric attitude responses, respondents who indicated involvement in swimming seemed to be more ecocentric in their attitude before experiencing the site than those who did not swim ($\chi^2 = 10.79$, $df = 2$, $p < 0.01$).

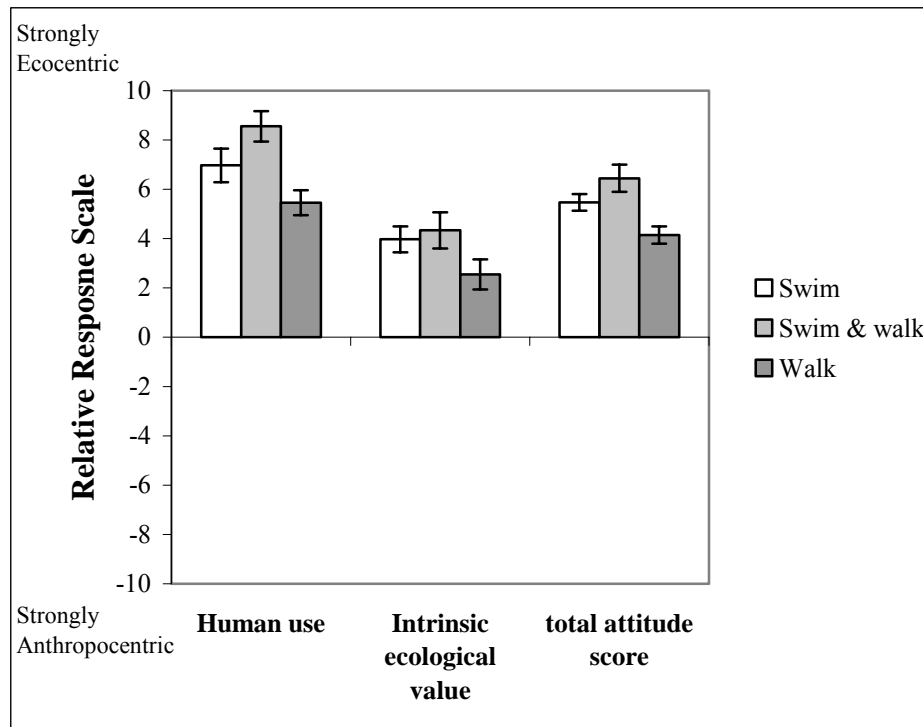


Figure 5.22: Mean environmental attitude response according to activity participation before experiencing Penguin Island.

The difference between the “walk” group and the two other groups that involved swimming was apparently due to a significant difference in response to the statements referring to aspects of human use of the environment where those who swam were significantly more ecocentric in response than those who did not ($\chi^2 = 18.89$, $df = 2$, $p < 0.01$). The difference in response to the “Human use” statements suggested that

respondents who were more strongly ecocentric in terms of the view of the environment as a resource for human exploitation tended to choose swimming as an activity while on the island whereas less ecocentric individuals were more likely to choose the walk trails alone as an activity. There was no significant difference in response, between the swimming and non-swimming groups, to the statements of “Intrinsic ecological value”

Studies such as that of Theodori et al (1998) and Nord et al (1998) reiterate earlier work from the 1970’s stating a significant relationship between environmental attitude and choice of natural area activities. These studies found that ecocentric attitudes were more associated with what were referred to as non-consumptive activities such as hiking, wildlife watching and skiing while those with little or no ecocentric leanings tended towards consumptive activities such as hunting and fishing. Further to this, a study examining environmental attitudes and recreational preferences in the U.S. found a significant relationship between varying degrees of ecocentric attitude and respective recreational preferences. Cordell et al (2002) found that people who were more ecocentric toward concepts of human interaction with the natural environment were likely to prefer swimming (among other activities) as a recreational pastime while people who were less ecocentric mainly preferred hiking (or walking). Both groups were found to value nature for its intrinsic worth equally. Cordell et al (2002) did not discuss the possible reasons for this relationship as the study was primarily concerned with demographic categorisation. An earlier study by Hendee et al (1971) had proposed a number of categorised groups of recreational activities and their significance in terms of interaction with the environment. Among the five categories suggested, swimming was placed under the heading of “active-expressive” recreation. This appears to relate to a greater willingness to interact with the natural environment (Hendee et al, 1971, p31). On the other hand, walking was placed in the “appreciative – symbolic” category that has a focus on viewing scenery and wildlife in a passive manner (Hendee et al, 1971, p29).

This finding was reflected in the Penguin Island attitudinal results where the “Walk” group was seemingly less ecocentric than the “Swim” and “Swim & walk” groups. It thus appears that individuals with relatively strong ecocentric tendencies were more likely to engage in active interaction with the natural environment, such as swimming, while those less inclined toward the ecocentric paradigm apparently engaged in more passive recreational activities, such as walk trails.

The relationship evident between a greater likelihood of interactive recreation and the ecocentric paradigm may be a function of accumulated experience in natural environments affording a greater motivation for interactive recreational pursuits. Accumulated experiences in natural settings are understood to positively enhance ecocentric attitudes through development of a personal connection with natural environments, which also build on familiarity and comfort in natural surroundings (Fakeye & Crompton, 1991; McKercher, 1996). Logical extrapolation of this argument suggests that the stronger ecocentric attitudes of the swimming groups (“Swim”, “Swim & walk”) before experiencing the island suggested a more positive attitude toward the Penguin Island environment, associated with a general familiarity and comfort in being in a natural setting, than the “Walk” group.

This was supported in the Penguin Island survey data by the significantly strong relationship found between frequency of natural area visitation and involvement in the activity of swimming while on the island ($\chi^2 = 37.77$, $df = 6$, $p < 0.01$). More frequent natural area visitors appeared more likely to partake in swimming than the less frequent visitation groups. For example while 68% of respondents in the >6 natural area visitor groups took part in swimming activities, only 37% of the < 6 groups did the same while on Penguin Island. Cramer’s strength of association statistic shows this to be a moderately strong relationship (Cramer’s $V = 0.420$).

The greater willingness to swim may metaphorically represent the urge to immerse oneself in the natural environment, and interact at a more intimate level. This could be seen as an expression of the stronger ecocentric attitude of swimmers relative to non-swimmers, who might prefer a distant (more passive) mode of recreation. This supports the notion of a greater accumulation of experience in natural areas equating with greater ecocentric tendencies in environmental attitude that appeared to be subsequently expressed as a willingness for more interactive behaviour. It follows that, at a site offering a variety of activities, the choice of activities undertaken may be influenced by the visitor rather than the variety of activities influencing the visitor.

The post visit response reiterated that the relationship of environmental attitudes between the respective groups remain essentially the same as the pre-visit responses (Figure 5.23).

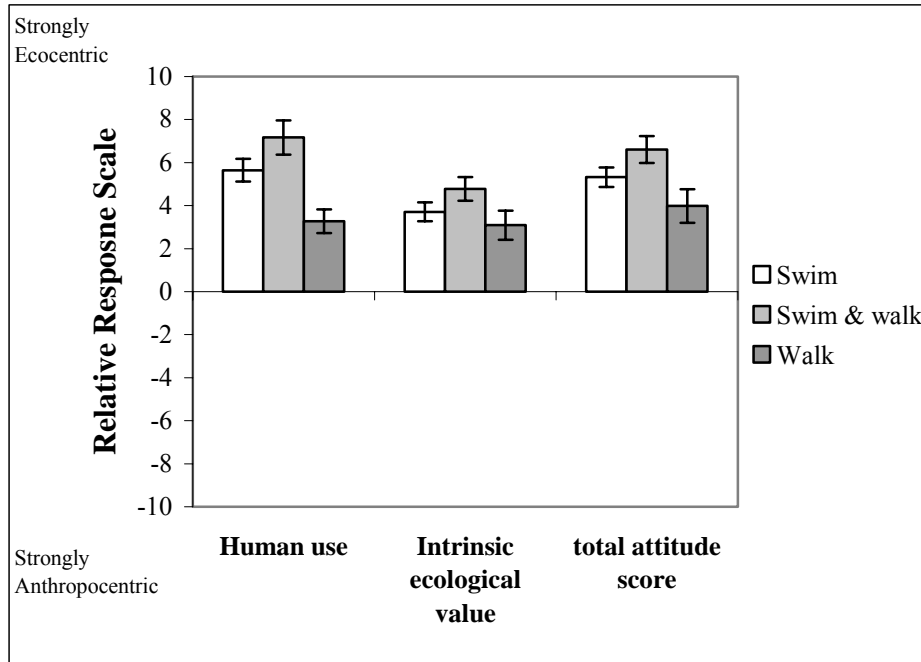


Figure 5.23: Mean environmental attitude response after experiencing Penguin Island according to activity participation on Penguin Island

All groups demonstrated a significant anthropocentric alteration in attitude to the human use of the natural environment (swim $z = -4.52$; swim/walk $z = -3.87$; walk $z = -6.04$, $p < 0.01$). However, the walk only group demonstrated a significantly greater anthropocentric shift than the groups who swam ($\chi^2 = 10.11$, $df = 2$, $p < 0.01$). There was no significant change in rating of the intrinsic ecological value of nature attitude statements or in the total attitude score (Figure 5.27).

The significantly greater anthropocentric shift in attitude toward “Human use” of the environment by the “Walk” group may be an indication that the attitudes respondents bring with them determine the activities they choose which in turn reinforce their perceptions of the natural environment. In other words, the activities did not influence respondent attitudes so much as the attitudes respondents brought influenced activity choice.

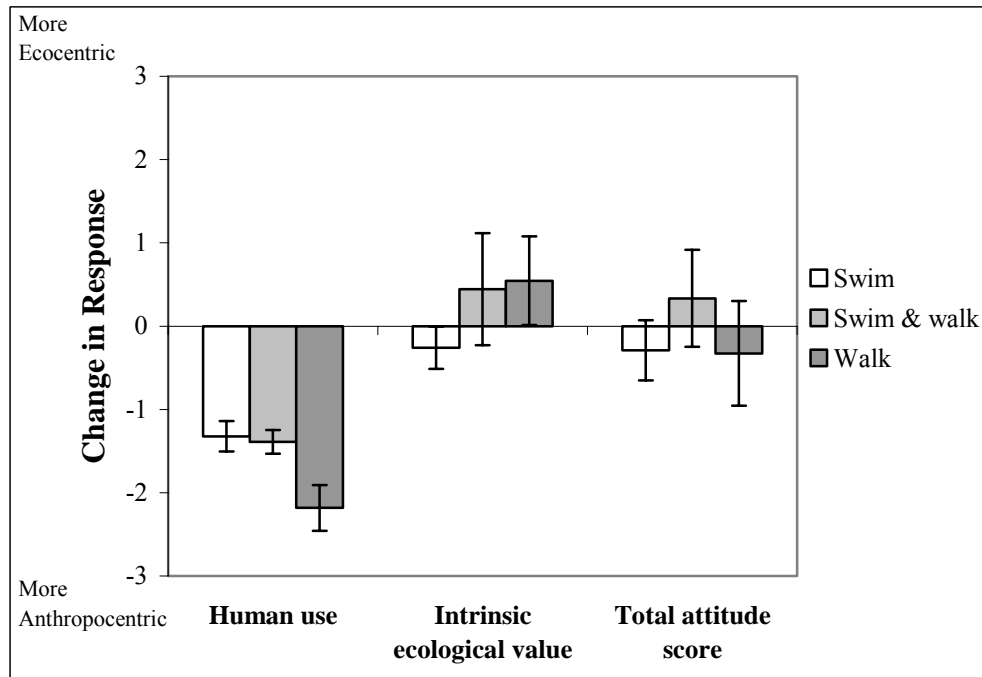


Figure 5.24: Mean environmental attitude response of Penguin Island respondents according to activity participation

The link between environmental attitude and recreational choice has been discussed in Chapter 2. Further to this, Hammit (1981) pointed out the central importance of cognitive map theory in term of attitudes toward the natural environment. Essentially, individuals absorb information by simplifying it and fitting it into the existing perceptions of the environment held by that individual (Hammit, 1981; Ajzen, 1992). The link between environmental attitude, recreational activity and the preference for reinforcement of existing attitudes and perceptions was reflected in the greater anthropocentric shift toward human use of the environment by the initially more anthropocentric Walk group.

Thus it may be hypothesised that a site offering a variety of activities as part of a policy of high intensity on-site interpretation simply allows the visitor to select those activities best suited to their attitudes rather than significantly influencing attitudes of the visitor. However, while the survey data suggested this scenario, providing a variety of activities may also encourage visitors who are willing to try ‘something new’ to step outside their comfort zone, perhaps influencing the attitudes they have toward the site by experiencing it in a new way. Choice of activity at Penguin Island is left entirely to the discretion of the visitor, perhaps rendering the above conjecture less likely than at a site actively encouraging involvement in new experiences.

5.4.2 Activities and attitude toward Penguin Island experience

A significant relationship was evident between the attitudes toward Penguin Island before experiencing it and the activities subsequently undertaken while on the island (Figure 5.28). Significant differences occurred in the rating of “Recreate on island” ($\chi^2 = 9.47$, $df = 2$, $p < 0.01$); “Learn about island” ($\chi^2 = 12.57$, $df = 2$, $p < 0.01$) and “Human enhanced island” ($\chi^2 = 8.96$, $df = 2$, $p < 0.05$). The differences were between those either choosing to swim or those choosing to walk. Significant differences also occurred in the rating of: “Inspired by island” ($\chi^2 = 16.98$, $df = 2$, $p < 0.01$); and “Pristine island” ($\chi^2 = 11.14$, $df = 2$, $p < 0.02$). Differences in rating of these aspects occurred between respondents undertaking a single main activity and those involved in multiple activities.

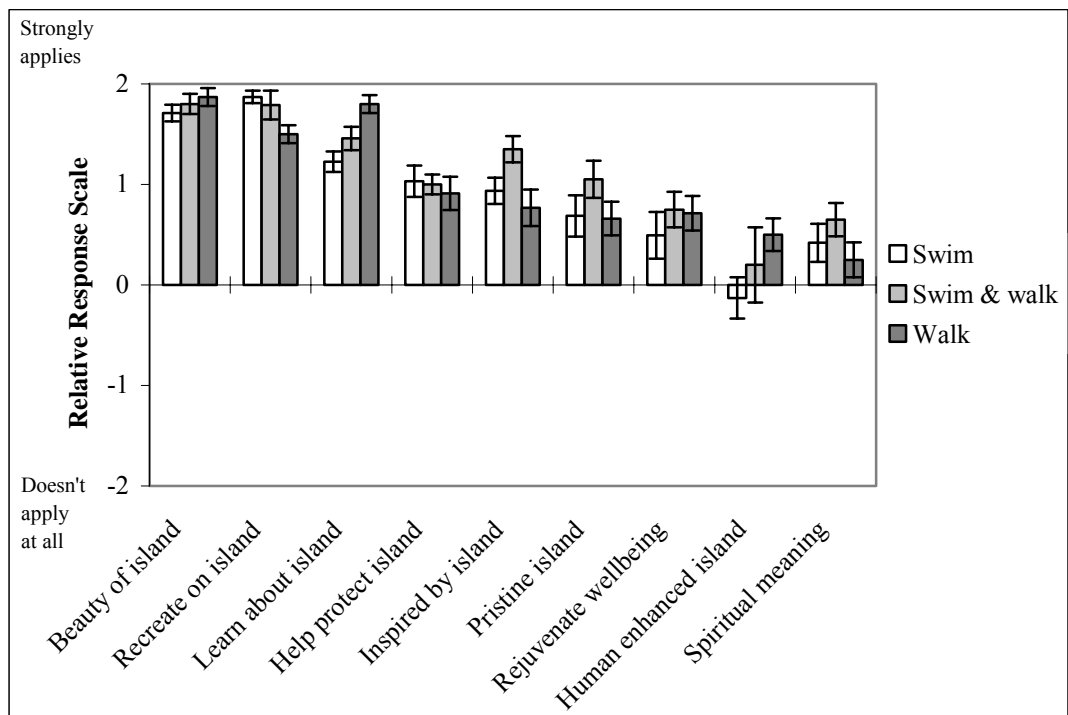


Figure 5.25: Mean attitude response to Penguin Island before the experience according to activity participation.

The relationship between recreational pursuits and mode of interaction with the environment as described by Hendee et al (1971) may explain the relationship between prior attitudes toward the experience of Penguin Island and the subsequent activities chosen by respondents. As discussed in relation to general environmental attitudes, the activity of walking relates to aesthetic-appreciative interactions with the natural

environment while swimming correlates with active-expressive interactions (Hendee et al, 1971). Therefore, respondents who expressed an attitude toward Penguin Island as a place to learn about nature and appreciate the built facilities would tend to be individuals who prefer walk trails to swimming. Respondents who emphasised recreation to a greater extent would be more likely to take part in swimming activities than those with a lesser emphasis.

The relationship between activity participation and prior attitudes regarding “Pristine island” and “Inspired by island” appeared to relate to the diversity of activities rather than the choice of activities undertaken. That is, while there was no significant difference between the “Walk” group and the “Swim” group responses, both of these respective groups were significantly different to the “Swim & walk” group response (swim $z = -2.027$, $p < 0.05$; walk $z = -2.13$, $p < 0.05$). This difference may relate to the link between natural area activity preferences and environmental attitude. Hendee et al (1971) had previously associated recreational activities with the type of interaction that occurs between the individual and natural settings. The way in which people interact with a natural setting is significantly influenced by their past experience in such settings where more experience is associated with ecocentric attitudes and behaviour (Hammit, 1981; Fakeye & Crompton, 1991; McKercher, 1996). In addition, Cordell et al (2002) described a link between attitude to the environment and recreation choice whereby ecocentric individuals are more likely to prefer a wider variety of activities than those who have anthropocentric tendencies.

While the direct correlation between rating of the “Pristine island” and “Inspired by island” statements was not significant, this may be a function of the limits of the five point rating system. Other variables within the data set point to a link between activity choice, the rating of these statements and environmental attitude. The environmental attitude results show that the “Swim & walk” group was slightly more ecocentric than the remaining groups although the difference as compared with the “Swim” group was not statistically significant. In addition, the more frequent natural area visitation groups (also associated with a more ecocentric attitude) rated the “Pristine island” and “Inspired by island” aspects significantly higher than the less frequent groups.

There was also a significant relationship between frequency of natural area visitation and activity participation ($\chi^2 = 37.77$, $df = 6$, $p < 0.01$). Of those who participated in

both swimming and walking (“swim & walk”), the majority (60%) visited natural area >6 times per annum. This may explain the link between the activities undertaken and rating of the ‘pristine’ and ‘inspired’ statements according to environmental attitude. That is, respondents with a greater accumulation of past experience on natural areas were more likely to participate in a wider range of activities offered by the site.

This is supported by the ratings of attitude toward Penguin Island after experiencing the site retaining the same statistical relationships between the activity groups as in the survey completed before experiencing the island (Figure 5.29).

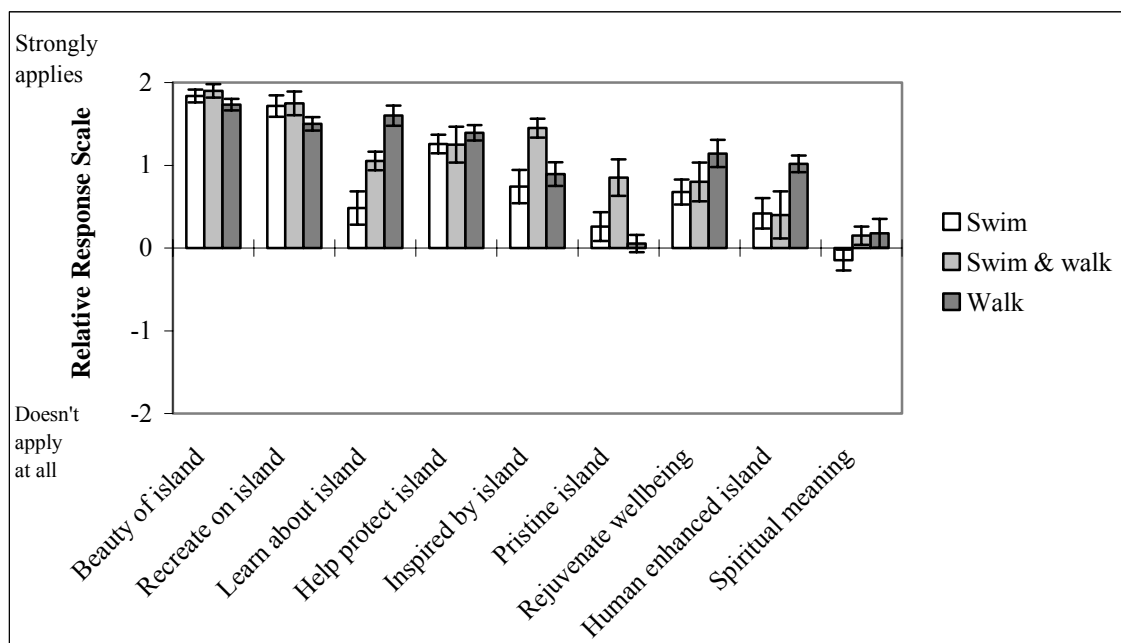


Figure 5.26: Mean attitude response to Penguin Island after experiencing the site according to activity participation.

Examination of the change in ratings revealed significant differences between the activity groups with regard to the “Learn about island” and “Human enhanced island” aspects of the experience were evident in the data collected after the experience (Figure 5.30). While all groups significantly reduced their rating of the “Learn about island” aspect of the experience, the “Swim” group had a significantly greater reduction than the “Walk” group. The “Swim” group and “Walk” group increased their rating of the “Human enhanced” aspect of the experience to a greater extent than the “Swim & walk” group.

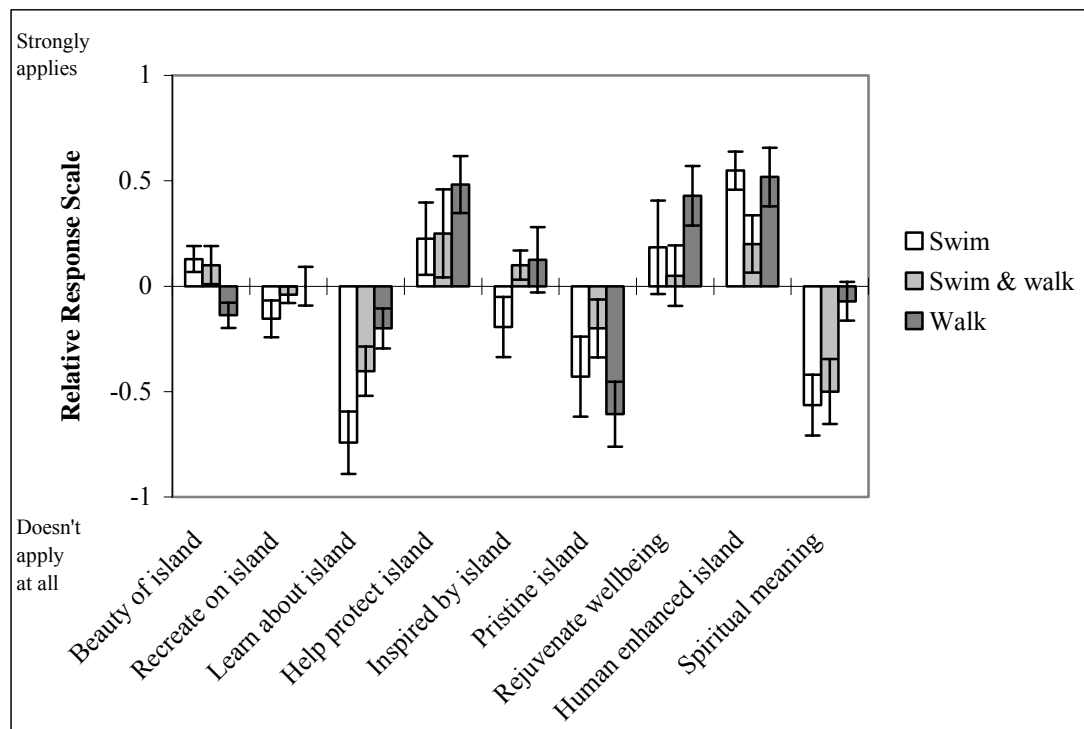


Figure 5.27: Mean change in attitude response to Penguin Island experience according to activity participation

The significant difference in alteration of rating of the “Learn about island” may be a function of the relationship between respondent attitudes and their chosen activities. According to Hendee et al (1971), activities in natural areas may be grouped into categories representing the mode of interaction between the individual and the environment. Swimming was categorised into the active-expressive category while walking was categorised as appreciative-symbolic. Ballantyne et al (1998) discussed the link between the main activities carried out by respondents and their willingness to learn about the natural environment. Those involved in more active recreational activities were, by default, less inclined to learn new information than those involved in exploratory (observational) activities. These findings link back to Hendee et al (1971) and may explain the significantly greater decline in rating of the “learn about island” statement by the swimming group when compared with the walking group. The “Appreciative-symbolic” category involved “...appreciation of features of the natural environment...” (Hendee et al, 1971, p29) while the “active expressive” category focused more on active participation rather than appreciation. If these categories are linked to the findings of Ballantyne et al (1998), it may be concluded that individuals involved in the active pastime of swimming are less likely to place importance on learning than those involved in the more exploratory activity of walking. This is suggested by swimmers who significantly reduced the rating of their perception of the

island as a learning experience to a greater extent than the walkers. Thus the range and manner of activities provided by the site influenced visitor attitudes toward learning. Learning in this sense was probably perceived in terms of structured provision of interpretation (signs, talks) and was considered less important by those involved in active recreational pursuits.

5.5 Conclusion

As a natural area site offering a range of on-site interpretation in the form of experiences and media, Penguin Island appears to have significantly influenced respondents in conjunction with certain visitor variables. Significant positive changes were measured in environmental attitude, knowledge and attitude toward the site experience. The primary variables related to influences on attitudes and knowledge were gender; frequency of natural area visitation and activity participation. Gender and past experience in natural areas affected environmental attitudes and attitudes to the site experience while activity participation was related more to the knowledge acquisition and attitudes to the site experience components. The independent variables affecting the site influence on Penguin Island respondents were similar to those of the TTW.

The interpersonal and interactive media at Penguin Island were the most popular as indicated by the higher frequency of use by respondents. This finding reflects Falk and Dierkings' (1992) comment that visitors tend to spend most of their time looking, smelling, touching and listening, not reading. The availability of a wide range of interpretive media appeared to result in respondents selecting their preferred media type rather than encouraging a more diverse selection of interpretive media experiences. Availability of active recreational type activities at the site, such as swimming, seemed to result in respondents who participated in these activities being less receptive to the learning aspect of their experience. This seemed to be the case even though respondents who visited the island to swim also visited the "Penguin Experience" visitor centre with its intensive use of interpersonal, interactive and text based interpretation.

This means that for effective interpretation to reach all visitors to Penguin Island, messages need to be specifically targeted at individuals and groups involved in active recreational activities on site and who are not likely to be readily receptive to interpretation as mentioned by Ballantyne et al (1998). Alternatively, site design could be manipulated to encourage a 'learning environment' through restriction or control of

the range of recreational activities available to create a focus on on-site interpretation. Such an approach may be possible on a small site such as Penguin Island and desirable owing to its delicate ecology and high conservation value. However, imposing such a prescriptive management approach contrary to the long social history of the site, as a natural area used for active recreational pursuits, may prove difficult given the likelihood of visitor resistance to the change.