A Mindfulness/Mindlessness Model of the Museum Visitor Experience

Thesis submitted by
Gianna MOSCARDO BA(Hons) (JCUNQ)
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Psychology and Sociology at James Cook University of North Queensland

DECLARATION

I declare that this these is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

G M Moscardo

16 February 1992

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ABSTRACT

In the 1920s a Professor of Psychology at Yale University, Edward Robinson, and several of his graduate students conducted a major research programme in several museums investigating various aspects of visitor behaviour. These psychologists were concerned with both studying human attention and memory and with expanding the role of psychology in the improvement of public life. This programme ended in the 1930s and this applied area was not considered again until the 1970s when several psychologists, as well as researchers from the disciplines of education and museum management, began to publish studies of visitor behaviour. This more recent research focussed specifically on the design of exhibits and paid little attention to the development of psychological theory. The present thesis reports on a series of studies conducted in the earlier tradition of both extending psychological theory and providing knowledge for the better design of museum settings.

The thesis is based upon the concepts of mindfulness and mindlessness as used by Ellen Langer in explaining cognition in social situations. Mindfulness refers to the processing of information available in a setting and the use of this information in the creation of new schema and new routines of behaviour. The opposing cognitive state of mindlessness refers to the use of existing routines of behaviour to guide behaviour in settings and involves minimal processing of the information in the setting. Langer argues that much behaviour is enacted mindlessly. Further mindfulness is likely to occur in novel or unfamiliar situations, when a routine is disrupted by something unexpected, or when the situation is of importance to the individual. A model

to describe the behaviour and cognition of museum visitors based on mindfulness/mindlessness was set out and a series of predictions with regard to visitor behaviour and cognition were described. These predictions were then used to guide a review of the existing visitor research. The results reported in this research were shown to be consistent with the Mindfulness Model.

A study was conducted with a sample of 348 individuals examining the emic descriptions of museum visits in an attempt to understand the scripts that museum visitors hold. This study examined frequency distributions and used crosstabulation analyses and mean difference tests to reveal that few visitors included in their descriptions any discussion of thinking, learning or processing information from exhibits. It was concluded that it was likely that many visitors quickly became mindless in museums and followed a simple routine of briefly glancing at exhibits as they moved through a museum. It was noted that this was consistent with observations of visitors in various museum settings.

The predictions of the Mindfulness Model were then tested in two Australian museums using both observation and survey techniques. The two settings were a display of communications technology, the Semaphore to Satellite exhibition at the Museum of Victoria, and the Gallipoli and Sinai and Palestine galleries of the Australian War Memorial. These settings provided a range of exhibits for study. A total of 730 visitors were observed and 275 surveyed in the Semaphore to Satellite exhibition and 1460 visitors were observed and 360 surveyed in the Gallipoli and Sinai and Palestine galleries of the Australian War Memorial. The data was analysed using crosstabulation analyses, mean difference tests and discriminant analysis. In both cases the

results supported the predictions derived from the Mindfulness Model. The studies conducted at the Australian War Memorial also found that exhibits which invoke an affective response from visitors were more likely than other exhibits to induce mindfulness. The results of both studies indicated that motivation was an important variable for mindfulness.

It was concluded that the Mindfulness/Mindlessness Model of Museum Visitor Behaviour and Cognition was supported by evidence collected in several settings. Potential applications of the model both within museums and in other settings were outlined.

The study reported in Chapter Three has been published in the *Australian Psychologist* (Moscardo, 1991a).

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CHAPTER 1

Psychologists in Museums: Developing an Understanding of Visitor Behaviour and Cognition

> *If you are willing to accept psychological research as a part of the normal, forward-working features of the museum business, you must at the same time fortify yourselves with patience. On the other hand, it is also my conviction that sound solution of problems of installation, labelling, guidance, and educational work can be attained only through psychological investigation, arduous and tortuous as the prospect may seem.*
>
> (Robinson, 1930, p. 9.)

1.0 Early Psychological Research in Museums: 1880 - 1940

There is a long history of psychological research in museums and exhibitions. Sir Francis Galton is supposed to have followed visitors through the "dusty and dimly lit corridors of the Victorian museums of his day" (Alt & Shaw, 1984, p. 25). While there is no mention of this in various biographies of Galton, including his autobiography, he did conduct an extensive research programme in museums through his anthropometric laboratories (Forrest, 1974). The first of these was established at the 1884 International Health Exhibition held in South Kensington. Nearly 10,000 visitors passed through the Laboratory and participated in a series of tests which measured

> *Keenness of Sight and of Hearing; Colour Sense; Judgement of Eye; Breathing Power; Reaction Time; Strength of Pull and of*

Squeeze; Force of Blow; Span of Arms; Height; both standing and sitting; and Weight. (Galton, 1908, p. 245.)

Participants paid a threepenny fee for admission and were given a duplicate card of their results to take away with them. The project was such a popular success it was moved to the South Kensington Museum in 1885 where it continued to attract visitors for a further eight years (Forrest, 1974; Galton, 1908). In addition to being the first published instance of psychological research conducted in a museum, Galton's Anthropometric Laboratory was probably the first participatory exhibit used in a museum. Galton's research thus had two outcomes; it provided information for Galton's own research questions, and it directly influenced the experience of many museum visitors.

The relationship between psychology and public exhibitions was further developed in the United States in 1893 when Joseph Jastrow, who received the world's first Ph.D. in psychology (Roback, 1952), followed Galton's lead and set up a psychological laboratory at Chicago's World Fair. The Jastrow laboratory gathered data on mental capacity and physical anthropometry, as well as displaying the apparatus used in psychological research (Perloff & Perloff, 1977). The success of the Jastrow laboratory lead to a further display of psychology at the St. Louis World Fair in 1904. Again an anthropometric laboratory was used to collect data and to present psychology to the public (Davis, 1904; Perloff & Perloff, 1977). As with Galton's exhibits the World Fair Laboratories are reported to have been successful both in attracting visitors and collecting data (Perloff & Perloff, 1977).

The world fairs provided not only an opportunity for psychologists to promote their discipline, they were also the cause of a change in the attitudes of museum curators towards their visitors (Hudson, 1975, 1987). Hudson, in his social history of museums (1975), states that these international exhibitions were so successful that "they compelled both governments and the leaders of fashion and taste to recognise that the sciences and the useful arts were the proper concern of the community as a whole" (p. 41.). This resulted in museums becoming more accessible to the public and thus opened the way for attention to, and criticism of, the ways in which museums displayed their collections for their visitors (Hudson, 1975).

This new focus on museums resulted in a new area of research, that of understanding the interaction between visitors and exhibits. The first systematic attempt to evaluate this area was published by a curator, Benjamin Gilman, in The Scientific Monthly in 1916. In this article, entitled "Museum Fatigue", Gilman reports on a study conducted at the Boston Museum of Fine Arts. Gilman devised a set of questions related to the objects on display and then photographed a visitor as he attempted to answer the questions. The photographs were then used to point out the physical obstacles that the display cases presented for visitors. His discussion, while entirely concerned with the physical dimensions of exhibits, was the first to suggest that exhibit design needed to consider visitors as well as the objects to be displayed.

This concern with museum visitors and *museum fatigue* was pursued in more detailed psychological research by Edward Robinson, a Professor of Psychology at Yale University. Robinson conducted a series of studies in the 1920s focussing on visitor attention to objects in museums. The results of these studies were reported in a monograph published in 1928 (cited in

Bitgood, 1988a). In his first study Robinson observed visitor behaviour in four art museums ranging in size from 40 rooms displaying 1000 paintings to 6 rooms displaying 140 paintings. Additionally, a group of students were observed seated in a laboratory while they were shown 100 paintings. This laboratory condition was an attempt to remove physical fatigue from the experience of viewing art. As the numbers of paintings viewed by the subjects varied considerably both between and within the five settings, Robinson divided the total number of paintings observed by each subject into tenths. This allowed him to compare patterns of attention for all subjects. Figure 1.1 demonstrates the pattern of attention which was found for all five settings. (This pattern of attention was also reported by O'Harré (1974) from observations of visitors in the Museum of Fine Arts in Boston.)

After an initial period of high levels of attention, peaking at the third and fourth tenths, visitor attention to paintings dropped rapidly with lowest levels of attention paid to the final paintings viewed. For visitors in the museums the highest levels of attention ranged from 9 to 18 seconds and attention then declined to 7 to 11 seconds. The students seated in the laboratory had the highest levels of attention, with an average of 28 seconds for the third tenth declining to 19 seconds by the last tenth. But the pattern of attention was the same as for the museum visitors. Robinson also found that the rate of decline of attention was the same regardless of the total number of paintings viewed. He concluded that the fall in attention was not due to physical fatigue (Bitgood, 1988a).

In his second study, Robinson examined the influence of density of paintings on *museum fatigue* . Bitgood (1988a) reports that " in a laboratory setting Robinson presented either a single picture, two at a time, or ten at a

time, to subjects seated at a table." (p. 4.). Robinson found that more attention was paid to paintings when only one painting was presented, but regardless of the number of paintings shown, the pattern of attention given in Figure 1.1 best described the behaviour of the subjects (Bitgood, 1988a).

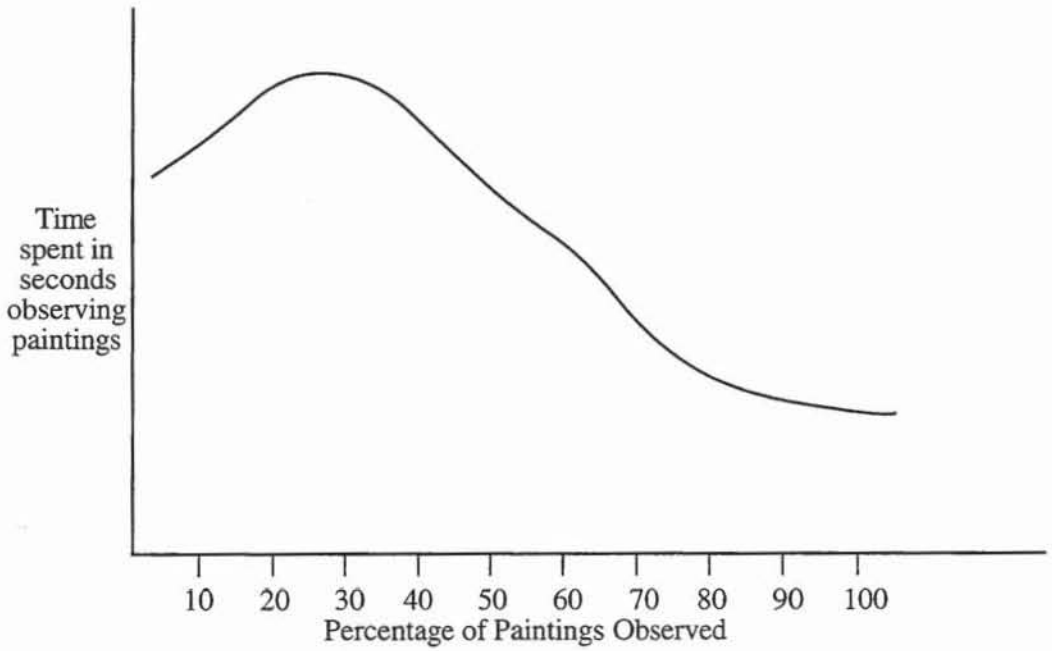

Figure 1.1: Pattern of Attention for Visitors Viewing Paintings in Art Museums and the Laboratory.

Robinson's next study looked at the variety of the content of the paintings and viewing time. In this study subjects looked at five cards of five paintings taken from the categories, landscapes, portraits, Madonnas, animals and seascapes. Five conditions were organised as follows:-

1. The first card had five paintings from the first category, the second card had five paintings from the second category, and so on until all 25 painting shad been viewed.

2. Each card had paintings from two categories.

3. Each card had paintings from three categories.

4. Each card had paintings from four categories.

5. Each card had a painting from each category.

Robinson found an increase in average viewing time per painting from condition 1 (15 seconds) to condition 4 (20 seconds) with a drop to 15 seconds for condition 5 (Bitgood, 1988a). Unfortunately no results were reported by Bitgood for viewing times in condition 1 for the five different types of painting.

In the final study reported by Bitgood (1988a) Robinson returned to a museum. In this study Robinson gave 86 visitors a pamphlet which contained some brief information about 20 of the paintings on display. Fifty-five visitors used the pamphlets and these visitors spent longer in the museum (an average of 28 minutes compared to 17 minutes for those who did not use the pamphlet) and viewed more paintings (an average of 46 paintings versus 30) (Bitgood, 1988a). Melton (1972) noted that the rate of decline of attention slowed in one museum and suggested that this particular setting was characterized by a variation in the paintings displayed in different galleries.

He proposed that attention was related to the homogeneity or heterogeneity of displays.

Bitgood (1988a) also reports that Robinson identified several factors in his museum studies which influenced visitor attention. In terms of ability to enhance visitor attention these factors were placed in the following order:-

"1. *Combination of large size and a central position on the wall.*

2. *Large size alone or the end position on the wall alone.*

3. *Combination of large size and end position on the wall.*

4. *Combination of large size and low density.*

5. *Low density by itself.*

6. *Central position on the wall alone."* (Bitgood, 1988a, p. 5.)

During the next decade Robinson conducted or supervised many psychological studies of museum visitors. He constantly argued that psychology had an important role to play in enhancing the experiences museums offered to their visitors (Robinson 1930, 1931a, 1931b, 1933). In 1930 he reported on two studies conducted at the Buffalo Museum of Science with a student of his called C.W. Mason. The first of these studies compared the educational effectiveness of guided tours with a card game, for groups of school children. Analysis of data collected from 10 000 children indicated that the guided tour was the more effective educational tool overall and was especially more effective than the card game for younger children. This result supported the findings of a study conducted by another of Robinson's students, Marguerite Bloomberg at the Cleveland Museum of Art (cited in Goldberg, 1933).

The second study reported by Robinson in 1930 was of adult museum visitors and their reading of the labels provided in museums. Robinson

claimed that his observations indicated that roughly one in ten visitors read any given label and that, on average, this visitor would read only one-tenth of a label. By systematically varying labels it was found that labels were more effective if they had larger type, used paragraphs and had simple contents.

In 1933 Robinson reviewed research he had conducted into the effectiveness of museum advertising and he made several recommendations on the design of newspaper articles and the timing of radio advertisements. In this paper Robinson also briefly refers to research conducted by another student Arthur Melton, and hints at the potential of this work to provide the basis of "a science of experimental architecture." (p. 6.). Robinson's prediction was to come true with his and Melton's work cited as the first examples of environmental psychology in action (Bell, Fisher & Loomis, 1978), and Melton's studies republished in Human Factors in 1972 under the title "Visitor behavior in museums: Some early research in environmental design."

Melton published the results of three major research programmes in 1933, 1935 and 1936. The first article (1933a) reported on two field experiments at the Pennsylvania Museum of Art, examining the time spent by visitors examining paintings and objects in a gallery which was changed in several ways. In the first experiment Melton compared visitor behaviour in a gallery containing 21 paintings only to visitor behaviour in the same gallery with 21 paintings and 9 pieces of furniture. The results favoured the first condition with visitors spending more time in the gallery (72.1 seconds on average compared to 70.8 seconds) and looking at more paintings (4.61 on average as compared to 3.28). The second experiment compared four

conditions within a gallery with antique period architecture. The four conditions were:-

1. A composite of furniture and seven paintings.
2. Furniture only.
3. Seven paintings only.
4. Eleven paintings only.

The results of this experiment are given in Table 1.1.

Melton concluded that these results indicated that paintings alone were more interesting than furniture alone (1933a). He did not comment on the actual average times spent in front of the objects which ranged from 7.08 seconds to 7.97 seconds. Several museum professionals have expressed concern over the brevity of these times (Bitgood, 1988b; Zyskowski, 1983). The other major finding reported by Melton in 1933(a) was from the first experiment and was concerned with data collected in this experiment on the paths that the visitors took as they moved through the gallery. There was a clear preference for a right turn after entry with 75 to 83 percent of visitors turning right across the several days of observations. Melton further examined visitor paths in a series of five studies conducted in different museums and published his results as a monograph in 1935 (cited in Bitgood, 1988c) On the basis of these studies examining circulation of visitors in different galleries Melton came to two major conclusions:

1. *Visitors have a strong tendency to turn right when entering a gallery.*

2. *Visitors are strongly attracted by exits.*

(Bitgood, 1988c, p. 6.)

Table 1.1

Summary of Results of Melton's 1933 Study of Attention in a Gallery with Antique Period Architecture

Condition	n	Time in gallery	No. objects examined	Time spent examining objects
Composite	328	73.3 sec	3.71	30.8 sec
Furniture	174	52.1 sec	2.02	15.9 sec
7 paintings	180	55.3 sec	2.61	22.0 sec
11 paintings	255	68.0 sec	3.90	28.5 sec

Condition	Time spent per painting	Time spent per furniture
Composite	7.19 sec	7.97 sec
Furniture		7.46 sec
7 paintings	7.08 sec	
11 paintings	7.55 sec	

Note : Figures refer to averages.

Figure 1.2 is an example of Melton's results which demonstrates both of these principles. In this figure 82.1 percent of visitors turned right when they entered the gallery and 62.6 percent exited at the first opportunity having passed only a small section of the gallery.

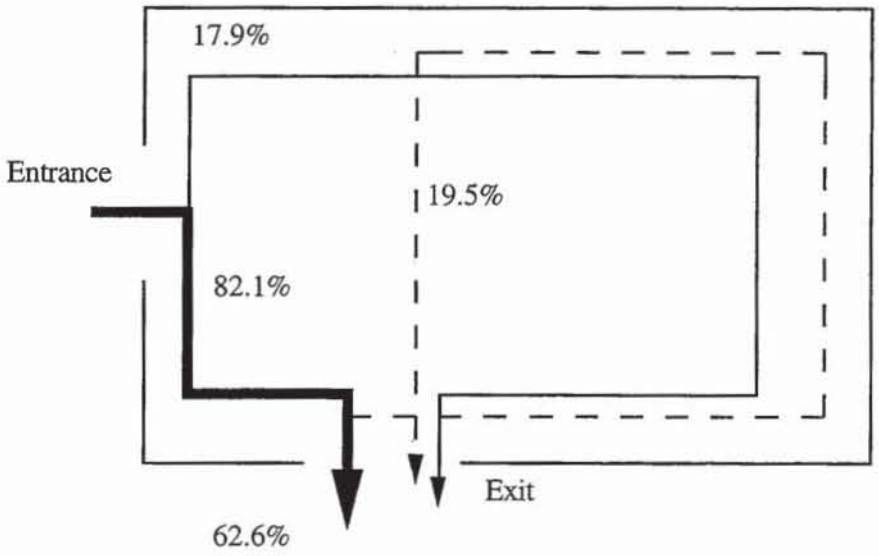

Figure 1.2: Example of Visitor Paths in a Museum Gallery (Taken from Bitgood, 1988c, p. 6).

Finally Melton studied the impact of movement on visitor attention at the New York Museum of Science and Industry (1936). In this museum Melton observed visitor attention to exhibits in a gallery of machinery with either an inactive or active machine referred to as a Gear-Shaper. He found that movement increased the attention paid by visitors to the Gear-Shaper in two ways. Firstly, more visitors stopped at the Gear-Shaper when it was active, with the results indicating an increase from 1.5 percent of visitors to 38.6 percent, and secondly, these visitors spent more time looking at the

Gear-Shaper, with an increase from 22.6 seconds to 74.8 seconds on average. Further, the movement of the Gear-Shaper increased the overall time spent by visitors in the whole gallery and increased the time spent at adjacent objects.

In a further experiment automatic operation of a small machine versus manual operation of the machine by visitors were compared. Melton concluded the "manual operation was far superior to ... automatic operation" (1936, p. 7), with an increase of attention paid to the machine of 10 seconds on average from 13.8 to 23.8 seconds and an increase in the reading of the label with the machine by visitors.

In summary, the results from these two decades of psychological research suggest the following conclusions with respect to museum visitor behaviour:-

1. Visitors, on average, spend very little time looking at exhibits in museums.

2. There is a consistent pattern to the attention paid to exhibits as visitors move through a museum, with high levels of attention at the beginning of a visit which peak at about a third of the way through the visit and then decline sharply for the rest of the museum.

3. Visitors prefer to turn right upon entry to a gallery.

4. Visitors are strongly attracted by exits.

5. Visitor attention to exhibits is enhanced by large size, the use of information pamphlets about the exhibits, and movement of exhibits, especially if controlled by the visitor.

The end of the 1930s marked the end of this period of psychological activity in museums. Apart from some isolated instances psychologists did

not return to museums until the 1970s. While this partly reflects a decline in the resources available to museums during the years of the Second World War, it is due in a large part to the rise of Behaviorism as a dominant force in psychology. This new theoretical drive in psychology was opposed to non-laboratory research. Behaviorism also very much restricted theoretical development in psychology and many areas of human activity were deemed not amenable to study. Behaviorist stimulus-response theories could not, and indeed were not interested in, explaining results such as those summarised above (Valentine, 1982). Behaviourists argued that if psychology was to be accepted as a natural science it should only study what could be objectively observed, that is behaviour. Anything connected with the mind was deemed not amenable to such study and thus not to be included within psychological research. A move back to laboratories to maximise experimental control accompanied this concern with objectivity (Gardner, 1987). Museums were thus no longer an appropriate area for psychological research which left Robinson and Melton's task incomplete. They had provided a considerable body of data and proposed several principles of visitor behaviour but they had offered no explanation of their results. Melton (1933b) alluded to this in a summary of his work saying that "the uniformity of the observed behavior patterns is significant for museum education and for an objective social psychology" (p. 721). Here Melton means significant in the sense of requiring an explanation. What sort of explanation is necessary? Tolman provides an answer to this question when he says that "behavior as behavior, that is as molar, is purposive and is cognitive" (Tolman, 1932, cited in Valentine, 1982, p. 149.). That is, what is needed is an explanation that is

concerned with molar units of analysis and that is cognitive and concerned with attention and learning in its educational sense of knowledge acquisition.

1.1 The Return of Information Processing and Schema to Psychology

The Hixon Symposium held at the California Institute of Technology in 1948 is described by Gardner in his history of Cognitive Science (1987) as "a critical juncture of scientific history" (p. 14.). The symposium was concerned with the relationship between the nervous system and behaviour and was attended by mathematicians, neurophysiologists and psychologists. These speakers introduced several new perspectives on the study of the nervous system including the notion of parallels between electronic computer processing and the functioning of the human nervous system. The participants, including Lashley who gave his paper on "The problem of serial order in behavior", also directly challenged the value of Behaviorism for explaining much of human activity. The developments in computing reported at the symposium and Lashley's critique set not only the foundations for the development of cognitive science but also cleared the way for psychologists to return to research concerned with cognition (Gardner, 1987; Sanford, 1985; Valentine, 1982).

Gardner (1987) goes on to describe three critical lines of research emerging during the 1950s as a result of the Hixon Symposium. These lines of research were lead by Miller, Cherry and Broadbent, and Bruner. The importance of Miller, Cherry and Broadbent's research is also noted by Sanford (1985) and Valentine (1982). Miller in his 1956 essay on "The magical number seven, plus or minus two" argued that there is a limit to the

capacity of the human nervous system to deal with the information that surrounds it, but that these limits can be dealt with by grouping together information elements into larger single units. Cherry (1953) and Broadbent (1954) also provided evidence for limited information processing capacity and extended this work by demonstrating the phenomenon of selective attention. Broadbent in 1958 produced a flow chart to represent human information processing, the first flow chart used by a psychologist (Gardner, 1987). In this model information comes through the senses and is kept in a short-term store momentarily. A filter mechanism then choses some of this information to be passed on into the system for further analysis and storage in long-term memory. Later Broadbent modified the strong uni-dimensional nature of this model allowing knowledge already in the long-term memory to influence the selection and analysis of new information (Gardner, 1987). Finally Gardner discusses the work of Bruner and his colleagues on categorisation and concept formation. In this work Bruner, Goodnow and Austin (1956) talked about sequences used by subjects in these processes called *strategies.*

Why were these lines of research critical? Gardner (1987) argues that these three research programmes produced three important ideas to psychology; that there are limits to information processing capacity, that there are several steps involved in information processing, and that information processing can be described using representational systems. These three ideas were to be important underlying assumptions for much of the cognitive research that was to follow. Palermo (1971) goes so far as to suggest that this period of research represents a scientific revolution with a shift in paradigm. According to Gardner (1987) these research programmes

supported a move in psychology back to *molar* and *top-down* approaches to research and theory. In this argument Gardner (1987) proposes that *molar* approaches to psychology start with large scale sections of common human activity as their units of analysis and attempt explanations of these, as opposed to *molecular* approaches which attempt to break down human activities in their components and use these small portions of activity as the units for analysis. Abelson and Black (1986) describe *top-down* approaches to understanding cognition and behaviour as those which assume the existence of knowledge structures which influence the processing of new information and which can guide behaviour. Both approaches overlap and rely upon the use of the concept of *schema.*

The concept of *schema* has its origins in the work of Bartlett and Piaget in the 1920s and 1930s (Abelson & Black, 1986; Gardner, 1987) and made a major comeback to psychology as many researchers attempted to move away from the sophisticated, but ecologically invalid methodologies employed in the research into the serial order of information processing (Gardner, 1987). Before reviewing the development and use of *schema* in psychology in more detail, it is appropriate to provide a definition of the term, as few discussions provide a detailed description of the concept. Gardner's (1987) definition is a typical example of the definitions provided. Gardner (1987) defines *schema* as abstract cognitive structures which are used to organise knowledge. Neisser, however, provides a more useful and detailed definition in his 1976 book. Here he defines a *schema* as "a central cognitive structure" (p. 54) and goes on to elaborate this by saying that

> *a schema is that portion of the entire perceptual cycle which is internal to the perceivers, modifiable by experience, and*

> *somehow specific to what is being perceived. The schema accepts information as it becomes available at sensory surfaces and is changed by that information; it directs movements and exploratory activities that make more information available, by which it is further modified* (p. 54).

Neisser (1976) points out several areas of theory and research which have the concept *schema* at their core. In particular he refers to *frames* used by both Minsky (1977, 1980) in artificial intelligence, and Goffman (1974) in sociology. Both Minsky and Goffman argue that context and meaning are critical elements in understanding cognition and behaviour and both use a schema-like concept, *frames*, which direct and organise information processing. These *frames* anticipate or provide expectations for new settings or social situations (Minsky, 1980). Neisser also sees an analogous concept for *schema* in Miller, Galanter and Pribram's (1960) concept *plans*. In Neisser's definition *schema* have the capacity to direct perception and action as do *plans*. Abelson and Black (1986) provide a more extensive but less detailed review of what they refer to as *schema theories* pointing to the use of the concept in memory representation and organisation, text understanding, categorisation and social cognition. They also review work done at Yale under Abelson on *scripts* which are defined as "the mental representations of the causally connected actions, props and participants that are involved in common activities" (p. 19.).

The *scripts* concept has been taken up by several social psychologists. Forgas, for example, in his 1982 discussion of *episode cognition* directly compares *social episodes* to *scripts* and reviews an extensive programme of research into *social episodes*. Argyle, Furnham and Graham (1981) also

discuss *scripts* in the *concepts and cognitive structures* component of Social Situations Analysis. Forgas (1982) identifies an increasing concern in social psychology with the use of cognitive concepts to understand social behaviour. In a similar vein, Graumann and Somer (1984) review the history of the use of *schema* in social psychology. Again the concepts of *scripts* and *frames* are described as having a central role in understanding social activity.

Eiser (1986) also discusses the importance of cognition in social psychology, but emphasises in his discussion the work of Kahneman and Tversky (1982, and Tversky & Kahneman, 1983) on decision making. In this work the term *heuristic* is introduced to refer to the informal strategies that people use to simplify decision making. This reflects Taylor's (1984) assertion that in cognitive social psychology there has been a move away from models of humans as *information processors* to humans as *cognitive misers*, using a number of techniques to reduce their information processing.

This focus on the ways in which people can reduce their cognitive workload had been introduced earlier by Craik and Lockhart (1972) when they discussed and researched the idea of levels of processing. In their work they describe people as being able to choose to pay attention to different aspects of the information available to them in a setting. For instance, people can focus attention on the form of a phrase or on its meaning. Focussing on the form is called *shallow processing*, and focussing on the meaning is called *deep processing*. Craik and Lockhart argue that while in most instances *deep processing* is preferable, the choice of processing level is determined by the type of task to be done, the circumstances of the performance and the motivation and knowledge of the individual. Schneider and Shiffrin (1977;

Shiffrin & Schneider, 1977) also point to ways to reduce cognitive load in their work on *automatic processing*. Here it is proposed that some activities or processes can become automatic through repetition and require little information processing capacity. These theorists are challenging the assumption that all information is processed in some fashion and proposing instead that it may be possible for much human activity to be conducted in a routine fashion with minimal information processing. It is exactly this proposition that is central in Ellen Langer's work on Mindfulness and Mindlessness.

1.2 Langer's Mindfulness/Mindlessness Concept: Challenging and Extending Information Processing Theories

In 1972, Langer and Abelson published the results of two field experiments which examined the effect of the structure and content of a request on helping behaviour. In the first experiment at a shopping centre a white female confederate feigned a knee injury and requested help from companionless female passersby using one of the following four statements:-

1. My knee is killing me, I think I sprained it. Would you do something for me? Please do me a favour and call my husband and ask him to pick me up. (Victim oriented and legitimate).

2. Would you do something for me? Please do me a favour and call my husband and ask him to pick me up. My knee is killing me, I think I sprained it. (Target oriented and legitimate).

3. My knee is killing me, I think I sprained it. Would you do something for me? Please do me a favour and call my employer and tell him I'll be late. (Victim oriented and illegitimate).

4. Would you do something for me? Please do me a favour and call my employer and tell him I'll be late. My knee is killing me, I think I sprained it. (Target oriented and illegitimate).

Langer and Abelson believed that the beginning phrase of a request acts as a cue for one of two styles of helping. One style was referred to as *victim oriented* where help is the result of sympathy for the victim, while the other is referred to as *target oriented* which emphasises the duty of the target helper. In addition Langer and Abelson believed that helping behaviour would be influenced by the legitimacy of the request, or the social acceptability of the reason given. The authors believed that calling a spouse for help was more socially acceptable than being late for work. By combining these two variables in the structure of the request two hypotheses were put forward. Firstly, that when the help requested is legitimate helping behaviour will be more likely if the request is victim oriented, and secondly, that if the request is illegitimate a target oriented request will be more successful. The results supported these predictions. In a second similar field experiment, a confederate asked companionless female passersby to post a letter either because the confederate had to catch a train (legitimate) or go shopping (illegitimate). In this instance the first hypothesis was supported but the second was not. It appeared that the legitimacy of the request was not important for target oriented requests. Langer and Abelson concluded that victim oriented appeals focus the target helper's attention on the legitimacy of the request, whereas target oriented requests force the target helper to make an immediate decision. Once the decision to help is made the target does not process any further information such as the legitimacy of the request. A

replication of this study in Scotland found higher levels of helping in all conditions but the same pattern of results (Innes, 1974).

In 1978 Langer, Blank and Chanowitz extended this research in three further field experiments. It was in this article that the concepts of *mindfulness* and *mindlessness* were first described. The article began with the proposition "that complex social behavior that appears to be enacted mindfully instead may be performed without conscious attention to relevant semantics" (p. 635.). In discussions of this idea the authors argue that mindless behavior, defined as "mindless in the sense that attention is not paid precisely to those substantive elements that are relevant for the successful resolution of the situation" (p. 636), depends upon the use of *scripts*. The notion of a script is used to explain the 1972 study results where the opening phrase of the helping request determined the script that was followed by the target helper. Schank and Abelson's (1977) *scripts* are seen as similar to Goffman's *frames*, Harré and Secord's *episodes* and Miller, Galanter and Pribram's *plans*. Mindfulness is the opposing cognitive state to mindlessness and is characterised by active mental processing, the creation of new categories and the changing of existing cognitive structures.

The 1978 article reports on three field experiments each using the compliance paradigm used in the 1972 experiments. The results did support the hypothesis that the structure of the request can act as a cue for a script for helping behaviour and that once the script is activated the helper does not process further information in the request. Specifically, when adults using a photocopying machine at the Graduate Center of the City University of New York were asked to let a confederate move ahead of them, the subjects were more likely to comply with the request if a reason was given than if no reason

was given. There was, however, no difference in compliance for adequate (I'm in a rush) than inadequate (I have to make copies) reasons. In the second experiment Manhattan residents were sent a questionnaire with varying instructions. It was found that when the request was in a form familiar to the residents they were more likely to comply. In the third experiment memos were sent to 40 secretaries at the City University of New York Graduate Center with either a request (I would appreciate it if you would return this paper immediately to Room 238 through interoffice mail), or a demand (This paper is to be returned immediately to Room 238 through interoffice mail). In each case half of these memos were signed and half were unsigned. Langer, Blank and Chanowitz had previously determined that the most common form of memo in the Graduate Center was an impersonal request and they predicted maximum compliance for this condition. The results supported this prediction with 90 percent compliance in this condition. Levels of compliance for the other three conditions were 50 percent (impersonal demand), 60 percent (personal demand) and 70 percent (personal request). Thus in all four conditions there was strong evidence of mindless behaviour.

In 1978 Langer also published her first detailed theoretical discussion of mindfulness and mindlessness. In this discussion she provides the historical background to her work which emphasises the role of limited information processing capacity and discusses in detail Abelson's scripts as mechanisms for reducing cognitive load. Langer (1978) further suggests that in much of our everyday functioning we use scripts to guide our behaviour and we are thus often mindless which is contrary to the assumptions of many theories in social and cognitive psychology. According to Langer, not only

are many social psychologists mistaken in assuming active mental processing for much social behaviour, but that research conducted in laboratories is not representative of everyday social behaviour because the novelty of the laboratory setting will make subjects mindful when normally they would be mindless. In this article Langer makes reference to the work of Berlyne to support her proposal that novelty is likely to induce mindfulness.

Berlyne (1960, 1966, 1967) believed that arousal could be seen as a replacement for the concept of drive used in earlier theories of human motivation. Arousal energizes and activates the nervous system and results in heightened attention to the environment and curiosity and exploratory behaviour. According to Berlyne there are three groups of stimulus properties that can result in arousal and curiosity. The first he called psychophysical variables and he proposed that extremes in either the quantity or quality of the physical properties of a stimulus can result in arousal. Thus loud noises, bright lights, and intense smells should attract our attention. The second group of variables was labelled ecological and referred to those properties of stimuli that are related to survival. Thus direct threats to our survival attract our attention. Berlyne called the third groups collative variables and said that these were properties related to the information available in the environment. In this case, novelty, surprisingness, complexity and ambiguity are all features which create conflict and result in curiosity. Berlyne particularly focussed on these collative properties in his discussions of curiosity and learning. Berlyne contrasted *perceptual curiosity* which can be seen as a reflex reaction to the properties of the environment outlined above, with *epistemic curiosity,* which derives within the individual and refers to the way individuals gain knowledge. This epistemic curiosity

causes the individual to search for information through observation, consultation, which includes asking questions and reading, and directed thinking which involves changing schema. (Berlyne, 1960, 1966, 1967). The distinction between these two types of curiosity can be likened to the difference between a state and a trait. Perceptual curiosity is state-like and is a response to settings, while epistemic curiosity is trait-like and arises from within individuals.

In this theory curiosity seems very like mindfulness. It can be argued that we will be mindful in settings which are characterised by novelty, surprisingness, complexity and ambiguity, where we encounter extremes in the physical properties in the setting, or where there are threats to our survival. In this case mindfulness is like perceptual curiosity. Langer also predicts that mindfulness will be induced when scripts are interrupted or when considerable effort or cost is required by the individual. This seems very similar to Berlyne's epistemic curiosity.

As well as this theoretical discussion of mindfulness/mindlessness Langer (1978) reviewed several studies which she believed provided support for her arguments. In addition to the field experiments previously discussed (Langer & Abelson, 1972; Langer, Blank & Chanowitz, 1978), several experiments concerned with the *Illusion of Control* were reviewed (Langer, 1975; Langer & Roth, 1975). In these studies participants played games of chance, but in some conditions various features of the situation were manipulated so as to lead the participants to believe that the outcome of the game depended on skill rather than chance. The manipulations cued a skill script which then guided subsequent behaviour. A study of burglary (Miransky & Langer, 1978) was also said to provide evidence that people do

not engage in mindful behaviour with regard to household security with few of the Manhattan residents interviewed indicating that they used all the locks on their doors.

Langer (1978) also suggests that mindfulness is an important cognitive strategy for effective adaptation to environments. In this section of her paper she reviews research which demonstrates that mindfulness can give people perceived control and that this control is valuable in adaptation to various stressful situations such as major surgery (Langer, Janis & Wolfer, 1975), crowding (Langer & Saegert, 1977) and living in a nursing home (Langer & Rodin, 1976; Rodin & Langer, 1977). The latter studies of aged residents of a nursing home are perhaps the most famous of Langer's studies. In the first study (Langer & Rodin, 1976) a group of residents were given control over various aspects of their routines and lives and encouraged to be mindful. Comparisons with a control group indicated that the mindful group were more alert, active and happy, and in a follow-up study conducted 18 months later (Rodin & Langer, 1976), 13 out of 44 participants in the control group had died as compared to 7 out of 47 in the mindful group. Langer continued this work with the aged in several later studies (Alexander, Langer, Newman, Chandler & Davies, 1989; Langer & Avorn, 1981; Langer, Chanowitz, Palmerino, Jacobs, Rhodes, & Thayer, 1988; Langer, Rodin, Beck, Spitzer & Weinman, 1979).

Mindfulness/mindlessness were further extended by Langer in an experiment published in 1979. In a study conducted with Newman (Langer & Newman, 1979) social psychology students were randomly assigned to groups and given a handout describing a speaker as cold or as warm. After listening to the speaker the students were given a questionnaire which tested

their recall of the content of the talk and elicited ratings of the speaker. It was hypothesized that students who had better recall of the content, the mindful students, would be less likely to conform to the label given to the speaker. The results confirmed this hypothesis and suggested that mindlessness was related to the acceptance of labels. This supported the results of a previous study (Langer & Abelson, 1974) of clinical psychologists and their judgement of an interviewee labelled as either a job applicant or a patient. The label patient resulted in more negative judgements from the clinicians than the label job applicant. This work on labelling was extended in a study of perceptions of deviance and again it was found that mindful subjects more accurately described characteristics of a target individual than did mindless subjects whose perceptions were guided by the cues given with labels.

The importance of labels in inducing mindlessness was the focus of a series of studies into learned helplessness. In the first study (Langer & Benevento, 1979) subjects were asked to complete a task and were then given either a label of worker or no label at all and asked to work on another series of tasks. Subjects with the inferior label did not perform as well as those without a label even though all subjects had been equally competent at the first series of task. A second study published in 1979 (Langer & Imber, 1979) also investigated the relationship between mindfulness and perceived incompetence. In this study the authors demonstrated that repetition or overlearning of a task induced mindless performance of a task and that the mindless subjects could not recall the details of the task and they saw themselves as incompetent. This connection between mindlessness and perceived incompetence and lack of control is further discussed by Chanowitz and Langer in 1980. Here it is proposed that mindfulness is

essential for control as mindfulness involves constant monitoring of the environment which allows the individual to anticipate problems and reorient action.

In 1981 Chanowitz and Langer first used the term premature cognitive commitment to explain a second route to mindlessness not dependent on scripts. In 1980 Langer had suggested that two conditions can induce mindlessness, repetitive exposure to a situation which allows for mindless use of scripts and where "the individual does not sufficiently scrutinize the information available ... reduced cognitive activity occurs because the person finds nothing about which to think" (pp. 6-7.). Premature cognitive commitment refers to the second condition where the context of the initial exposure to information can induce mindlessness and thus prevent further processing of the information and the ability to recall and/or use the information for later tasks. There are two features of the context of initial exposure to information which may result in mindlessness. The first is the provision of labels and the second is the presentation of the information as personally irrelevant.

In the case of the use of labels the structure of the situation is borrowed from another source (Bandura, Langer & Chanowitz, 1984). This mechanism for inducing mindlessness has parallels in the work of Petty and Cacioppo (1986) and Chaiken and Stangor (1987) in the area of attitude change or persuasive communication. These researchers propose that there are two routes to attitude change, one which focuses on the context of a persuasive communication (called heuristic processing by Chaiken and Stangor, and peripheral routes by Petty and Cacioppo) and one which focuses on the content of the message (called systematic processing by

Chaiken and Stangor, and central routes by Petty and Cacioppo). In the first case, for example, the individual is persuaded by the expertise, authority or credibility of the communicator and does not process the information in the message, a classic example of mindlessness through premature cognitive commitment. These parallels are recognised by Langer and her colleagues in an article on attitude change (Palmerino, Langer & McGillis, 1984). In this article evidence is presented that mindful attitude change is more durable.

The second feature of the initial exposure to information referred to previously was the perception of the information as irrelevant. Chanowitz and Langer (1981) conducted an experiment in which subjects were given information about two fictitious perceptual disorders, after being told either that the disorders were common or that they were rare. Thus one group believed it unlikely that they would be personally affected by these disorders, and therefore the information given was irrelevant to them. Subsequently all subjects were told that they had one of the disorders. Further testing indicated that the subjects who believed that the information given was irrelevant had not processed it and were unable to use it. It seemed that these subjects mindlessly followed through the experimental procedures.

Following on from this work on premature cognitive commitment Langer began a series of studies to investigate the potential value of mindfulness in a number of different social situations. In 1985 the results of an experiment involving mindfulness training for children were published (Langer, Bashner & Chanowitz, 1985). This mindfulness training involved asking children to write several answers to a series of questions about the potential skills of people with various handicaps. A comparable low mindfulness group of children were asked to provide only a single answer.

Various dependent measures were then taken including a measure of avoidance of handicapped people, and judgement of activities that handicapped people might be able to participate in. It was found that the high mindfulness group made less inappropriate judgements and were less likely to avoid the target handicapped individuals than the low mindfulness group. In another study (Langer & Piper, 1987) Harvard undergraduate students were asked to think about new objects either conditionally (this could be an x) or unconditionally (this is an x). The first condition was predicted to encourage mindfulness. This was supported by results which indicated that the conditional learning group did better on a creativity test. Langer and Piper concluded that " a conditional understanding of the world seems to prevent mindlessness" (p. 280). In her book on mindfulness Langer (1989a) also reviews evidence that suggest that choice can also encourage mindfulness.

At this point it is useful to summarise Langer's work on mindfulness/mindlessness. This work began with the proposition that much complex social behaviour can be, and is, conducted mindlessly. That is, with minimal information processing. According to Langer, in familiar or repetitive situations a particular aspect of the setting acts as a cue for a script which is then used to guide behaviour. Although Langer recognises that several theorists have used similar concepts, it is scripts which dominate her discussions. Mindlessness can also be triggered in seemingly novel situations through premature cognitive commitment. Langer discusses this as a single process but it can be seen as covering at least two paths to mindlessness which depend on the context in which the individual initially receives information. In one instance the individual may be able to use labels

or cues which allow them to borrow a script from elsewhere, while in the other the individual may make an initial decision that the information is irrelevant and not engage in any further information processing. Mindfulness, on the other hand, involves active information processing and the creation of new categories and schema. Mindfulness is likely to occur in novel or unfamiliar situations where no script exists, when a script is interrupted or where considerable effort or cost to the individual is involved. Initially Langer believed that mindlessness might be an adaptive mechanism for dealing with limited capacity to process information, however, in a recent review of her work (1989b) she states that she is now of this opinion that there are no limits to processing capacity. In this vein she proposes that on the whole mindlessness has only negative consequences, including poor recall of information, perceived incompetence and loss of control, poor judgement and negative health consequences. Mindfulness, however, is likely to result in better judgement and learning, higher self-esteem, control and better health. Indeed in her 1989(b) review Langer discusses a study in which mindfulness appears to related to better immune systems in humans. Mindfulness can be enhanced by conditional learning, where information is given as one of several options rather than as a single fact, and by individuals having control in settings and thus the ability to choose information or activities that are personally relevant.

1.3 Further Extensions and Some Limitations of Mindfulness and Mindlessness

The concepts of mindfulness and mindlessness have been employed by a number of researchers from a range of disciplines. The work of Salomon

and his colleagues on understanding responses to different learning media is perhaps the most extensive published programme building upon Langer's work (see Salomon, 1983 & 1984; Salomon & Globerson, 1987; Salomon & Leigh, 1984). In this work it is argued that mindfulness is similar to Craik and Lockhart's (1972) concept of deep processing in that both require "effortful, nonautomatic elaboration of the encountered material" (Salomon, 1983, p. 44). Salomon goes on to propose that the number of such elaborations, as measured by self reports of mental effort and activity, provides a measure of the amount of invested mental effort (AIME) that is given by a learner when dealing with a unit of material. This AIME depends upon the motivation of the learner, the self-efficacy of the learner and the learner's perception of the source of the information. It is this feature that Salomon has investigated in detail. He argues that sources of information differ in terms of how easy or difficult to comprehend they are perceived to be. Specifically, he provides evidence that children perceive television to be easier than print to learn from and as a consequence of this perception invest less mental effort in learning from television than from print (Salomon, 1983, 1984; Salomon & Leigh, 1984). Salomon would seem to be suggesting that mindfulness corresponds to high AIME scores. While Langer would argue that mental effort is required only to move from a mindless to a mindful state and that mindfulness itself does not require effort, the rest of the argument is consistent with Langer's work. Indeed Salomon extends her work in that the initial judgement of a source of information as easy or difficult to learn from can be seen as another form of premature cognitive commitment specific to learning situations.

Additionally, in the field of health and medicine Langer's research on helping individuals deal with pain and ageing has had great impact (Peterson & Stunkard, 1989; Suls & Wan, 1989). Mindfulness and mindlessness have also been used in consumer research to understand the processing of information in product warning labels (deTurck & Goldhaber, 1989), and consumer reactions to advertising and experience of products (Hoch & Deighton, 1989; Hoch & Ho, 1986).

In several areas of social psychology mindlessness has been used to explain research results. In the area of helping behaviour, Katzev and Brownstein (1989) found that giving subjects information about social compliance techniques had no influence on their behaviour when presented with these techniques. Katzev and Brownstein concluded that their subjects were behaving mindlessly. Cunningham (1989) also concluded that mindlessness could be an explanation for the behaviour of male subjects in several experiments on responses to heterosexual opening gambits. The argument put forward was that responding to opening gambits was a low cost activity for males and thus males were likely to be mindless and not process the content of the gambit. The results indicated that in the field experiments there were no differences in male responses to different opening lines. Douglas (1984) refers to Langer in his study of successful and unsuccessful communication behaviours.

Larsen (1989) reports evidence to support Langer's proposition that mindfulness is linked to happiness through control. Larsen found evidence "that a generalized sense of control is important to well being in daily life" (p. 775). Langer's work has also been used by environmental psychologists with Fuhrer's (1989) work on crowding. In this research, evidence is

presented which supports Langer and Saegert's (1977) prediction that mindfulness can help people cope with crowding. Researchers in organizational behaviour have also found value in the mindfulness/ mindlessness concept for explaining research results. For example, in a study comparing different types of decision makers in the management of microcomputer companies, Eisenhardt (1989) proposes that several strategies used by the successful decision makers, such as attention to detail, constant monitoring of the business environment and the use of complex and creative strategies, resulted in "a sense of mastery and control that imparts the confidence to act" (p. 572). It is here that Eisenhardt makes reference to Langer and implies that the successful decision makers have more control over their business environments as a result of being mindful. Gioia and Manz (1985) also refer to mindlessness in their examination of organizational behaviour.

One line of criticism of Langer's work exists in Folkes' (1985) extension of the Langer, Blank and Chanowitz (1978) photocopying study. Folkes widened the range of excuses used in the requests to include reasons which were either controllable by the confederate (because I need to see my boyfriend) or uncontrollable (because I feel really sick). Folkes found lower compliance for the controllable excuse and argued that this was evidence that subjects were mindful. Eiser (1986) and Langer, Chanowitz and Blank (1985) point out, however, that levels of compliance were high in all conditions and thus the evidence does not refute Langer's claim that in some instances people are mindless.

Eiser (1986), however, does suggest that the results of Langer's work should be treated with caution. He points out that in Langer, Blank and

Chanowitz's (1978) experiments quite subtle experimental manipulations are linked to crude outcome measures. As Valentine (1982) points out, we should be careful to avoid a situation where a classification is also explanatory. Valentine uses the example of making the statement that someone is an extravert because they like going to parties. If liking parties is the only indicator available for extraversion then the construct extraversion explains nothing. While in several studies (Alexander et al., 1989; Langer, Bashner & Chanowitz, 1985; Langer & Imber, 1980; Langer & Piper, 1987) the mindfulness manipulation is checked using creativity or recognition tests, on the whole Langer uses relatively simple behavioural indicators of mindfulness. In her 1989(b) Langer indicates that she is developing a scale for measuring mindfulness/mindlessness, but this is yet to be published.

Several other questions about mindfulness/mindlessness have still to be answered by Langer and her colleagues. These include the relationships between motivation and affect and mindfulness and mindlessness. In the case of motivation several possible connections are hinted at by Langer. For instance Langer suggests that in high cost situations and with effort individuals can be mindful (1978a, 1989a, 1989b). Langer (1978a) also refers to Berlyne's work on arousal thus seeming to borrow his motivational framework, but this is not discussed in detail. Voss and Keller (1983) review theoretical approaches to curiosity including Berlyne's work. In this review curiosity and exploratory behaviour appear to be very much like mindfulness. Voss and Keller propose that there are two types of curiosity, that which arises from the properties of the environment and that which arises from within the individual. In the latter case, curiosity can be goal oriented or it can be a trait of the individual, like sensation seeking. This discussion

would seem to suggest three routes to mindfulness. The first is mindfulness as a response to novelty in the environment or an interruption to a script, which would seem to be an innate or reflexive involuntary activity. The second is where mindfulness is the result of the effort or cost required for the activity, or goal oriented mindfulness. Finally it could be proposed that mindfulness can be a trait-like approach to functioning which is intrinsically motivating. Indeed, while Langer and her colleagues usually treat mindfulness and mindlessness as states, some of their most recent work (reported in Langer, 1989a) links personality characteristics such as charisma, to mindfulness and therefore it is possible to suggest that some individuals may be predisposed to a more mindful approach to life in general than others. Cacioppo and Petty's (1982 and Cacioppo, Petty & Morris, 1983) development and use of a *Need for Cognition Scale* is based on a similar idea. While discussing motivation it is important to recognise that various levels of motivation can be in operation for any given social situation. Harré and Secord (1972) would argue that we need to consider the larger social framework to understand an individual's actions in a specific setting. They propose that a particular social situation may be guided by goals which extend beyond that situation and that these goals may influence behaviour. Thus in any social situation it would be necessary to consider several levels of motivation in order to understand behaviour.

The clearest prediction of a relationship between motivation and mindfulness/mindlessness arising from the literature, however, is that between arousal and mindfulness/mindlessness where increased arousal is linked to a greater likelihood of mindfulness. Arousal, according to Berlyne (1960, 1966, 1967) and more recently Mehrabian and Russell (1974), is

positively correlated to information rate in the environment where information rate is based upon the complexity, diversity, meaningfulness, congruity and novelty of the environment. That is, the more novel, complex, incongruous, diverse and/or unfamiliar a setting, the higher the information rate and the higher the level of arousal. The Yerkes-Dodson Law, however, states that arousal has a curvilinear relationship with performance such that poor performance occurs at both low and high levels of arousal (Eysenck, 1984). Langer's prediction that familiar settings, or settings with a low information rate, are likely to induce mindlessness is consistent with the previous assertions about arousal. It is also appropriate to predict that moderate levels of arousal, which would be based on increasing information rate, are likely to induce mindfulness. But what of the case of very high arousal? Langer would argue that in this instance individuals are still mindful but this is a situation where mindfulness does not result in enhanced performance. Mindfulness can be considered a necessary but not sufficient condition for enhanced performance.

This discussion of arousal also leads to the question of the relationship between affect and mindfulness/mindlessness. While it has been proposed that mindfulness results in positive affect and mindlessness in negative affective responses, there has been little discussion of how the individual's affective responses to a situation could influence their cognitive state. It has been generally accepted that affect has an arousal component (Eysenck, 1984; Fiske, 1981; Harré , Clarke & De Carlo, 1985; Kristal, 1982; Russell, 1978, 1980; Toates, 1986; Wessman, 1979). Thus it might be suggested that affectively charged situations should be mindfulness inducing. Several more recent discussions of the relationship between affect and cognition, however,

suggest that arousal need not necessarily be seen as a core component of affect and that negative and positive affective states may have quite different relationships to cognition (Isen, 1987; Petty, Cacioppo, Sedikides & Strathman, 1988). Petty, Cacioppo, Sedikides and Strathman (1988) argue that affect is best seen "as a superordinate construct to encompass emotions and relatively transient moods and feelings" (p. 357) and should be distinguished from arousal. To support this argument evidence is presented that people can express differences in emotion without any detectable differences in arousal.

The authors go on to propose that in the domain of attitude change, affect can act as a peripheral cue, a persuasive argument and/or influence the extent and type of information processing that is engaged in by an individual. Isen (1987) focussed on this latter aspect in detail in her discussions of affect and cognition. In this instance the research reviewed indicated that positive affect can result in positive evaluations of situations and in

> *a broader or more integrated organization of cognitive material, wherein more diverse ideas are seen as potentially related or similar or bearing upon one another. Moreover, more movement or interchange among categories, material, and approaches may be possible, resulting in more flexible thinking.* (p. 232)

On the basis of this evidence it could be suggested that positive affect should be conducive to a mindful cognitive state. The influence of negative affect on cognition, however, is much less clear with the existing research suggesting primarily that negative affect does not necessarily produce an opposite effect than that of positive affect (Isen, 1987).

In summary, the existing evidence suggests that arousal and affect could have independent effects on mindfulness/mindlessness. Specifically it is predicted that moderate to high levels of arousal and positive affect should be conducive to mindfulness and that low levels of arousal should result in mindlessness. The relationship between negative affect and mindfulness/ mindlessness, however, is open to exploratory investigation.

One final issue which arises from Langer's discussions of mindfulness/mindlessness is her use of scripts. As noted previously scripts dominate Langer's discussions of mindlessness. However, scripts as defined in Abelson's work (Abelson, 1976, 1981) can include activities which are mindful. A note to this effect is included at the end of the Langer, Blank and Chanowitz 1978 article, but in following publications Langer continues to use scripts without this qualification.

In concluding this section on the extended use of mindfulness/ mindlessness and the questions which remain to be answered there are three important points to be made. Firstly, while the concepts are clearly becoming more widely used for the explanation of social activity, Langer has not yet suggested that a full theory exists. Rather the work should be seen as an emerging field and thus there are many issues yet to be resolved. Secondly, it is important to continue research which applies this concept in new areas as this allows for the development of the concept. Finally, it should be noted that while this work questions many of the assumptions of earlier schema and information processing it is derived from this literature and represents a move towards more ecologically valid and molar approaches to understanding social behaviour. Thus in the 40 or so years since we left Robinson and

Melton and their research into the behaviour of museum visitors, psychology has moved towards a type of theory that may explain their results.

1.4 A Mindfulness/Mindlessness Model of Visitor Behaviour and Cognition in Museums

The major proposition to be put forward in the present thesis is that Langer's concepts of mindfulness/mindlessness can be usefully applied to understand and predict visitor behaviour and cognition in museums. The International Council of Museums defines a museum as

> *a permanent establishment administered in the public interest, with a view to conserve, study, exploit by various means and, basically, to exhibit, for the pleasure and education of the public, objects of cultural value.* (quoted in Hudson, 1975, p.)

This is a broad definition and thus in the present discussion museums will be used as a general term which includes zoos, art galleries, visitor or interpretive centres, gardens, and historic sites.

If we return to the summary of the early psychological research in museums presented at the end of section 1.0, it could be argued that these results suggest that visitors quickly became mindless and engaged in a simple routine of glancing briefly at exhibits and moving on. Visitor attention was enhanced by those elements of the exhibits that were novel, unexpected or which gave visitors some measure of control over the setting, which is as Langer would predict. The use of mindfulness/mindlessness to explain visitor behaviour in museums was first suggested by the author in a report on exhibit design (Moscardo, 1985) and then in an article on evaluation in

museums (Moscardo & Pearce, 1986a). This idea was further elaborated in an article on visitor research in interpretive or visitor centres (Moscardo & Pearce, 1986b) where the need for theoretical or conceptual guidance in conducting research in these settings was emphasised. In particular it was argued that much of the research that had been conducted in this area measured visitor learning with simple recall tests and that the mindfulness concept suggested a broader view of visitor cognition that could improve research methodology in this area. The authors then conducted a secondary analysis of data collected by the Countryside Commission (1978) from visitors to 17 interpretive centres throughout Britain. In this analysis four questions in the original survey were seen as indicators of mindfulness:- whether or not visitors felt they had learnt anything new from their visit (called subjective knowledge gain), a score on a six question quiz test about the content of the centres, whether or not visitors wanted more information about the centre's content area, and whether or not the visitors wanted more information in the centre. These four questions were chosen as indicators of an "active, questioning cognitive state" (p. 97) and were combined to give a single index of mindfulness. Correlation analyses revealed a positive Pearson Product Moment Correlation of 0.402 ($n = 17$, $p < 0.05$) between mindfulness and visitor ratings of enjoyment of their visit. This was compared to a correlation of -0.013 between the quiz test score and enjoyment reported in the original analysis. The authors concluded that the use of mindfulness to guide research gave a better indicator of the cognitive state of visitors than the simple recall measures previously used and that subjective knowledge gain was the clearest indicator of mindfulness.

While these articles suggested a role for mindfulness/mindlessness in guiding research into visitor behaviour and cognition, no detailed connections were drawn between mindfulness/mindlessness and visitor behaviour and cognition. In 1986 (see Moscardo, 1987) the author proposed some of these connections with a simple model of the museum visit based on mindfulness/mindlessness. **The major goal of this thesis is to present and investigate a more detailed model of visitor behaviour and cognition which hopes to explain and predict visitor activity in museums.** Figure 1.3 summarises the proposed model. The model puts forward two sets of factors which influence visitors in museums; Exhibit/Setting Factors and Visitor Factors. These two sets of factors influence the likely cognitive state of the visitor for the duration of their visit. That is, these factors combine to determine whether visitors will be mindful or mindless. The model proposes that mindful visitors will be more likely than mindless visitors to enjoy their visit and express satisfaction with their visit and should learn more from their visit.

In the case of Exhibit/Setting Factors the model proposes that the following factors are likely to induce mindlessness:-

1. Repetitive exhibit media and/or design, which allow visitors to quickly develop and use a mindless script.

2. Content which is perceived by the visitor to be irrelevant or unimportant to them, which puts in place the context for premature cognitive commitment.

3. Extremely low levels of complexity.

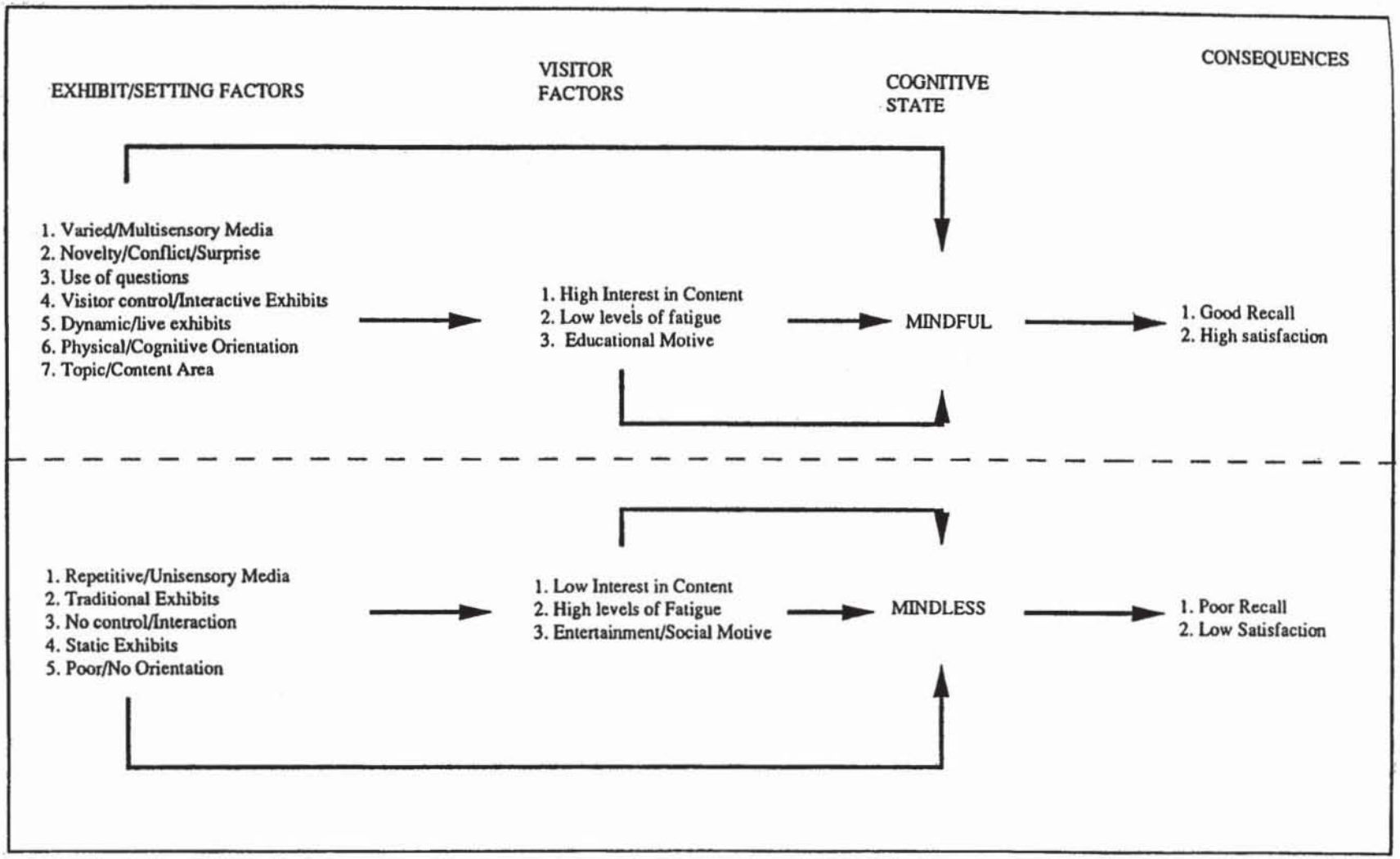

Figure 1.3: Mindfulness/Mindlessness Model of Museum Visitor Behaviour and Cognition

4. Exhibit designs which do not allow the visitors to control the information they receive.

5. Inanimate exhibits.

6. Poor physical and cognitive orientation systems in the setting.

Mindfulness, however, is more likely when:-

1. there is a variety of exhibit media including multi-sensory exhibits, and exhibits with extreme physical properties,

2. there is content which is perceived by the visitors to be personally relevant, vivid, or affectively charged,

3. the content and/or the exhibit media are novel, unexpected, or surprising,

4. questions are used to create conflict or ambiguity,

5. there is an opportunity for the visitor to control the information that they receive (This is most likely in interactive/participatory exhibits),

6. exhibits are dynamic or animate and give visitors the opportunity for direct contact with objects/topics,

7. the visitor finds it easy to physically orient themselves in the setting, and

8. there is a structure underlying the organisation of the content and/or the exhibits.

In addition to the Exhibit/Setting Factors the model includes several Visitor Factors which can influence the visitors' cognitive state. Specifically, visitors are more likely to be mindful if they have a high level of interest in the content area and if they are not fatigued. Visitors who have a low level of interest in the content area and who are fatigued are likely to be mindless. A third Visitor Factor is that of the visitors' specific goals for their visit.

Langer's work does not provide any guidance in this area, but the model proposes that visitors with educational goals will be more likely to be mindful than those with social goals.

There are several explanatory comments that need to be made with regard to the model. Firstly the model includes predictions about the influence of orientation systems. These predictions do not come directly from Langer's work, but rather they are derived from research in environmental psychology which indicates that people who have difficulty orienting themselves experience feelings of loss of control and anxiety (see Bell, Fisher & Loomis, 1978; Pearce, 1988; and Pearce & Black, 1984, for reviews of this research). It seems reasonable to propose that while people may be mindful about their orientation in a situation with poor orientation systems, this factor will interfere with the attention they pay to the exhibits. The model also introduces the idea that a structure underlying the content or organisation of the exhibits, or cognitive orientation system, combined with novelty, surprisingness, conflict, will induce mindfulness and result in learning. This proposal recognises work in educational, cognitive and environmental psychology which indicates that learning is enhanced by the presence of a structure to organise new information (Bransford & McCarrell, 1977; Carey, 1986; Hammitt, 1981, 1984; Hock, Romanski, Galie & Williams, 1978; Kaplan & Kaplan, 1978; Nahemow, 1971; Nasar, 1989; Neisser, 1976; Spiro, 1977). The model also recognises that when there is too much novelty, conflict, or information in a setting, mindfulness will not result in enhanced cognitive performance.

The model proposes that the two sets of factors, Exhibit/Setting Factors and Visitor Factors can combine in a number of ways to produce the visitor's

cognitive state. For example, a visitor with a very high level of interest in a topic may be mindful regardless of the Exhibit/Setting Factors, while a visitor who has no interest in a topic and who is fatigued may be mindless regardless of the Exhibit/Setting Factors. A visitor with low levels of interest may become mindful, however, with the appropriate configuration of Exhibit/Setting factors, that is, in a setting where it is easy to find their way around, with a variety of media, and the opportunity to interact with exhibits. Further, it should be noted that the model proposes that mindful visitors are more likely to be satisfied with their visit, but it is possible that in some instances mindful visitors may find the presentation of a topic offensive or negative in some way and thus express dissatisfaction with their experience. Indeed it could be suggested that mindful visitors may be more critical of an institution than their mindless counterparts. Finally it is proposed that an additional variable, familiarity with museums, should be placed in the model. At this stage, however, it is not clear what relationship this variable has with other sections of the model. It could be suggested that familiarity with museums might induce mindlessness as repeated experiences of a setting is likely to produce a well developed script to guide behaviour. It could also be suggested, however, that familiarity might induce mindfulness as it is could reflect an educational motive or specific interests.

1.5 Aims and Overview of the Research Programme

As stated in the previous section the major aim of the research programme reported in this thesis is to investigate the value of the author's Mindfulness/Mindlessness Model for explaining and predicting the behaviour and cognition of visitors in museums. Like the early psychological research in museums the present programme aims to provide data useful both for the development of better design in museums, and for extending our understanding of concepts such as mindfulness and mindlessness. The programme involves studies which test predictions from the model, investigate further relationships which the model does not yet clearly spell out, and attempts to answer questions which arise from the use of mindfulness/mindlessness as the base for the model. Thus, although the model guides the research, it may change as a result of the research. In order to achieve these goals the programme of research to be discussed in this thesis consisted of five major components.

The first component, described in Chapter 2, involves an investigation of the value of the model for explaining previous research. From the 1970s to the present there has been a proliferation of studies into visitor behaviour and cognition in museums, but there has been little in the way of integration or attempts to explain the results. If the Mindfulness Model is to be of value in this field its predictions must be consistent with previous research results. Chapter 2, therefore, presents a review of the existing literature in this area and an examination of the results of previous research and how they relate to the model's predictions.

The second component, reported in Chapter 3, focuses on the scripts that people have for museums. A major question which arises from the use

of mindfulness/mindlessness as the base for the model is that of the content of the scripts that visitors may have for museums. A study was thus conducted investigating the scripts that people have for museums. This study examined the expectations that people for museums and their inclusion of mindful elements in their museum scripts. It also provides an initial emic description of a museum visit and so provides information on basic elements of the Mindfulness Model.

The next step in the research programme was to test aspects of the Mindfulness Model in a range of settings. To achieve this goal, data was collected at two institutions; an exhibition at the Museum of Victoria, entitled Semaphore to Satellite, sponsored by Telecom Australia and the Gallipoli and Sinai and Palestine Galleries of the Australian War Memorial. These two settings covered different topic areas and allowed for data to be collected for a broad range of exhibit types. Additionally, the galleries of the Australian War Memorial provided an opportunity to investigate the importance and role of affect in the model, as the War Memorial specifically seeks to induce an emotional response in its visitors.

Observational studies were conducted at both the Semaphore to Satellite Exhibition and the galleries of the Australian War Memorial. These studies systematically investigated the links between Exhibit/Setting Factors and Mindfulness/Mindlessness. The results of these studies are described in detail in Chapter 4. Surveys were also conducted at both these institutions. These surveys focussed on the Visitor Factors and examined the relationships between Mindfulness/Mindlessness, Visitor Factors and Outcomes of the Visit. These surveys also explored a range of different measures of mindfulness. Chapter 5 describes these surveys and their results. The final

chapter then provides a summary of the research programme and its implications for the Mindfulness Model, for museum exhibit design and for future research in both museums and other settings.

Table 1.2

Description of Settings for Survey and Observation Studies

1. Semaphore to Satellite Exhibition, Museum of Victoria, Melbourne.

The Museum of Victoria is the state museum for Victoria and is located near the Melbourne city centre. As part of Victoria's celebrations of 150 years of statehood the Museum held several temporary exhibitions focussing on aspects of life in the state during the last 150 years. One of these exhibitions was sponsored by Telecom Australia, an organisation which then provided all telecommunication services within Australia. The exhibition, titled *Semaphore to Satellite* housed a single small gallery, presented both the history of communications in Victoria and gave a background to the history of communications in general. The exhibition then discussed current and future technologies to be used in Australia. Some photographs of the exhibition are available in Appendix B.

2. Gallipoli and Sinai and Palestine Galleries, Australian War Memorial, Canberra.

The Australian War Memorial is a major monument to Australia's defence forces and is located in the nation's capital, Canberra. It is a shrine of remembrance for Australians killed in war and a major museum and archive documenting Australian involvement in both World Wars and battles in Korea, Malaysia and Vietnam. Australia's experiences during the Gallipoli campaign, part of World War I, provided the original impetus to create the Australian War Memorial and is the first major gallery. The Sinai and Palestine Gallery is the second gallery. (Further details are provided in Chapter 4). Both galleries provide information on the historical details of the two campaigns: descriptions of the major battles and conditions for the Australian forces and displays on individuals associated with the campaigns. Some photographs of the exhibits in these galleries are available in Appendix B.

CHAPTER 2

Research in Museums: Developing a Database of Visitor Behaviour and Cognition

> *We have all experienced that moment of curiosity in a museum; the beginning of our "conversation" with the exhibits or personnel. Something in the museum sparks our curiosity and inspires a question, opening up the mind to learning.*
>
> (Weinland & Bennett, 1984, p. 39)

2.0 Reviews and Theoretical Discussions of Visitor Studies

Melton's 1936 study of visitor attention at the New York Museum of Science and Industry, described in the previous chapter, marked the end of a substantial period of psychological research activity in museums. Shettel (1989) in a brief history of museum visitor research describes Melton and Robinson as the "'fathers' of museum visitor studies" (p. 129), and also notes the decline in visitor studies through the 1940s and 1950s. In the late 1960s there was an increase in the publication of visitors studies and Shettel argues that this increased activity was due to two major factors, the changes in psychology away from behaviorism and toward cognitive studies and increased political pressure on museums to be accountable and to demonstrate their achievements in order to justify their funding. In 1988 Bitgood (1988d) provided a more quantitative history of visitor studies based on a bibliography of visitor studies published by the International Laboratory for Visitor Studies in 1988. Table 2.1, section A, contains a summary of his publication frequency table. In this table a steady increase in publications is shown.

Bitgood's (1988d) table included publications concerned with theoretical issues and advocating the need for visitor studies. Table 2.1, section B, contains publication data from the ILVS Bibliography only for those studies which involved some form of data collection. This section of the table also shows a steady increase in visitor studies and suggests that there exists a body of data on visitors which can be examined.

Table 2.1

Visitor Study Publication Frequency Information.

A. Summary of Bitgood's (1988d) Analysis (Based on all publications reported in the ILVS Bibliography (1988), excluding Background Section).

Years	**Number of Publications**
Before 1940	13
1940 - 1969	47
1970 - 1979	75
1980 - 1984	114
1985 - 1987	97

B. Visitor Studies Publication Frequency Based on ILVS Bibliography (1988) (Categories of Audience Studies, Behavior Studies, Experiments and Evaluation Studies Only).

Years	**Number of Publications**
Before 1940	13
1940 - 1969	44
1970 - 1979	75
1980 - 1984	88
1985 - 1987	75

Several bibliographies of this material have been published (see Elliott & Loomis, 1975, and Screven, 1984), but few extensive reviews of the findings of the research have been undertaken. Zyskowski (1983) provided a brief review concentrating on the work of Melton and Robinson, and the Royal Ontario Museum (1976) and Stansfield (1981) have both attempted reviews with the aim of providing guidelines for exhibit design. These latter two reviews, however, often moved beyond the actual research results into the realm of popular belief about what makes a successful exhibit. Screven (1986a) also provides a review concentrating on the design implications of results. Additionally this review investigated the results of research in other areas of psychology and education, and discussed theoretical issues, although only in relation to motivation and certain exhibit characteristics.

The work of Bitgood and his associates represents the most extensive and systematic attempt to review research in the area of visitor behaviour and cognition. While several of the group's publications focus on specific aspects of the museum experience, for example, labels (Bitgood, 1989), visitor behaviour at zoos (Bitgood & Benefield, 1987; Bitgood, Patterson & Benefield, 1988), and physical orientation systems (Bitgood & Patterson, 1987a), they have also attempted to draw together the broader range of research results into what they refer to as principles of visitor behaviour (Bitgood & Patterson, 1987b; Bitgood, Patterson, Benefield & Landers, 1986; Patterson & Bitgood, 1988). In their first article a set of ten principles of visitor behaviour was identified, but this was expanded in later articles into fifteen principles organised into three categories. These categories were labelled Exhibit/Object Factors, Architectural Factors and Visitor Factors. Table 2.2 is a summary of these fifteen principles.

While this work represents a valuable attempt to provide some order to this research field, these principles, as noted by the authors, "are more empirical than theoretical" (Patterson & Bitgood, 1988, p. 40). The authors also discuss some of the limitations of this empirical approach pointing out the difficulty of investigating the relationships between the principles.

Several authors have noted the lack of theory in museum visitor research (Loomis, 1973a, 1973b; Martin & O'Reilly, 1988, 1989; McManus, 1990a; McNamara, 1990; Schmid, 1973; Shettel, 1973, 1989), with many suggesting that the atheoretical nature of the research has resulted in poor methodology (Loomis, 1973a, 1973b; Martin & O'Reilly, 1988, 1989), and limited impact on exhibit design (McNamara, 1990; Shettel, 1989). There have been some attempts to correct this situation. As noted before, Screven (1986) referred to several concepts from psychology, in particular motivation, and education in his discussion of exhibit design guidelines, but he did not attempt to systematically apply a single theoretical approach to the full range of visitor studies. In a similar vein, Alt and Griggs (1984), Chambers (1990), Greenglass (1986), and Schouten (1984a, 1984b), have all discussed various concepts from psychology and described how these might be used to guide research into particular aspects of museum visitor behaviour and/or cognition. As with Screven's article these do not constitute attempts to provide a broad, coherent, theoretical framework for the field as a whole.

One group of researchers, based at the Florida State Museum and lead by John Koran, Jr., and Mary Lou Koran, have attempted to develop such a

Table 2.2

Summary of Patterson and Bitgood's (1988) Principles of Visitor Behavior.

EXHIBIT/OBJECT FACTORS

1. SIZE. Larger size results in longer viewing times and better recall.

2. MOTION. Moving elements in an exhibit result in better attracting power (percentage of visitors passing an exhibit who stop at the exhibit) and holding power (the length of time visitors spend at an exhibit).

3. AESTHETIC FACTORS. Shapes, colours and patterns of exhibit objects are related to visitor attention.

4. NOVELTY/RARITY. There is an inherent attraction in novel/rare objects.

5. SENSORY FACTORS. Multi-sensory exhibits produce longer viewing times.

6. INTERACTIVE FACTORS. Interactive exhibits result in better attracting and holding power.

VISITOR FACTORS

1. VISITOR PARTICIPATION. Visitor participation is associated with better attracting and holding power, recall and preference.

2. OBJECT SATIATION AND FATIGUE. Repetition of content or exhibit style is related to decreased attracting and holding power.

3. SPECIAL INTERESTS. Visitors are more likely to select exhibits related to their interests.

4. DEMOGRAPHIC FACTORS. Factors such as age, educational level and group composition are related to visitor behaviour.

5. OTHER PSYCHOLOGICAL FACTORS. Includes perceptions of the attractiveness of exhibits, crowding and visitor comfort.

ARCHITECTURAL FACTORS

1. VISIBILITY OF EXHIBIT. Barriers to visibility reduce viewing times.

2. PROXIMITY OF EXHIBIT. The closer visitors can get to exhibits, the longer they stay.

3. REALISM. Naturalistic exhibits provide more memorable experiences.

4. SENSORY COMPETITION. Exhibit stimuli compete for visitor attention.

framework (Falk, Koran, Dierking & Dreblow, 1985; Koran & Koran, 1983; Koran, Koran & Foster, 1986, 1988, 1989; Koran, Longino & Shafer, 1983). In 1983 Koran, Longino and Shafer discussed the need for a framework for categorizing exhibits and guiding research and they offered a taxonomy of exhibits based on a continuum from static to dynamic exhibits with links drawn to observed visitor behaviours. Table 2.3 contains examples of exhibits at three points along the continuum, their characteristics, and their relationships with observed visitor behaviours.

Table 2.3

Koran, Longino and Shafer's (1983) Framework for Conceptualizing Museum Exhibits

Exhibit Continuum	**Example of Exhibit**	**Sensory Modes**	**Visitor Behaviours Distinctive to Exhibit**
Static exhibits	Display of shells	Vision (hearing)	Low verbal interaction Walk by and scan Slow, continuous move-ment past exhibits
Walk-through	Recreated Cave	Vision Hearing (Touch Smell)	Much verbal inter. Walk slowly,stop often Touch objects
Dynamic Exhibits	Hands on shell collection	Vision Hearing Touch (Taste Smell)	Most verbal inter. Touch & manipulate objects

Note: Brackets indicate possible but not common sensory modes.
Based on Figures 1 and 2, Koran, Longino and Shafer, 1983.

Koran, Longino and Shafer also suggested in this article that novel, complex or ambiguous exhibit stimuli should attract visitor attention and produce curiosity, and that this curiosity combined with a coherent structure in the exhibit content would result in learning. This proposed relationship is also discussed in Koran and Koran, 1983.

In 1985 these ideas were expanded in an article in which it was proposed that there were three perspectives on, or approaches to, understanding visitor behaviour (Falk, Koran, Dierking & Dreblow, 1985). The first of these was the Exhibit Perspective, the dominant perspective in visitor studies, which held that exhibit characteristics determine visitor behaviour. In contrast to this perspective was the Visitor Perspective which argued that visitors bring with them to museums differences in knowledge, attitudes, interests and concerns, and that these features determine visitor behaviour. Proponents of this perspective believe that observation studies cannot provide any valuable information on visitor behaviour (see Alt and Griggs, 1984, for an example of this argument). Falk and his colleagues argued that if this Visitor Perspective was accurate, it should not be possible to detect any consistent patterns in observational data on visitor behaviour. The third or Setting Perspective was based on principles from environmental psychology and proposed that visitor behaviour could be best understood by investigating both characteristics of visitors, such as their expectations for the setting, and characteristics of the physical setting. The article then reported the results of an observational study of visitors to the Florida State Museum which indicated that there were consistent patterns to visitor behaviour and that these could be best interpreted using a Setting Perspective. Specifically the authors concluded that

> *The data suggest that adult visitors to FSM allocated their attention in a consistent pattern. Visitors spent the first few minutes orienting themselves, the next half-hour intently attending to exhibits, and the remaining 15 to 30 minutes "cruising" through the balance of the museum, stopping occasionally to look carefully at some of the exhibits. This behavior pattern appears to be constant across subjects, exhibit format, and exhibit content. Of the three perspectives outlines earlier, the Setting Perspective emerges as most consistently fitting the data. (p. 255).*

Based on this research Koran, Koran and Foster (1986) proposed a framework for understanding visitor behaviour which described four sets of variables impinging on visitor behaviour; the characteristics visitors bring with them to the setting, the types of exhibits in the setting, the sorts of information processing activities that visitors engage in, and the desired outcomes for the experience (see Figure 2.1). This framework is also described in later articles (Koran, Koran & Foster, 1988, 1989) where the authors expanded on the visitor characteristics and information processing activities sets of variables.

It is interesting to note that in both of these articles, Salomon's concept of Amount of Invested Mental Energy (AIME) is seen as an important variable in the framework. Recommendations for improving AIME scores for exhibits, such as offering different perspectives on material, modeling appropriate behaviour at exhibits, providing instructions on how to learn

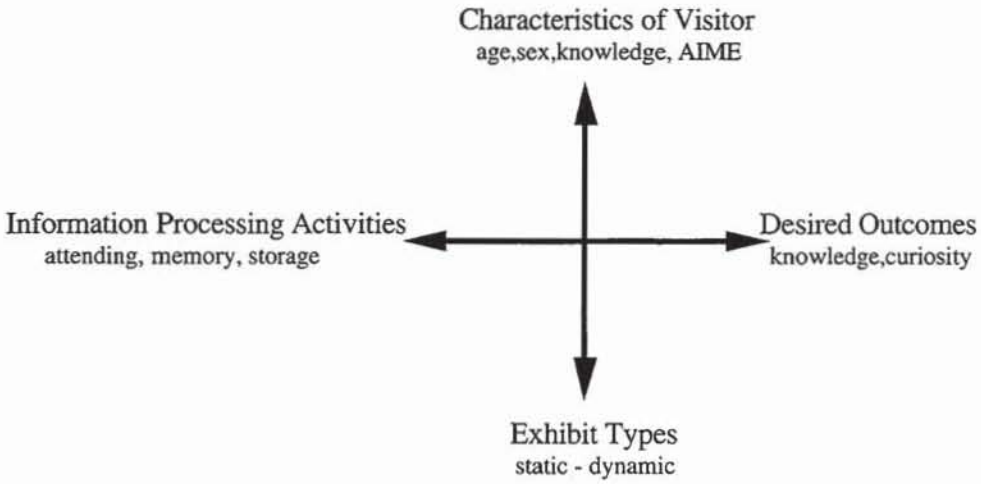

Figure 2.1: A Framework for Exploring Museum Education Research (Koran, Koran & Foster, 1988, p. 71)

from an exhibit and using questions in exhibit labels are included in the articles. As previously noted, Salomon sees AIME as the basis for Mindfulness/Mindlessness and the use of the concept by Koran, Koran and Foster is an indication that they are seeking such a concept. In a similar fashion Chambers (1990) describes Csikszentmihalyi's (1975) concept of flow experiences and argues for its use in understanding visitors. Csikzentmihalyi examined in detail a range of intrinsically rewarding activities and found that participants in these activities frequently described the activities as giving them a "sense of discovery, exploration, and problem solving, a feeling of novelty and challenge, of opportunity to explore and expand the limits of their ability" (Sax, 1980, p. 56). The similarities to mindfulness are clear.

Although this series of articles constitutes the most advanced attempt to develop a framework for understanding visitor behaviour and cognition, it is

still not a coherent framework in that it does not fully explore the potential interactions or relationships between the sets of variables outlined. This body of work, however, does identify several key components that a broad, coherent framework should have. Such a framework should both guide future research and integrate existing research results (Koran, Koran & Foster, 1989; Koran, Longino & Shafer, 1983). The framework should also be based within the Setting Perspective (Falk et al., 1985) and must include concepts from cognitive psychology in order to describe visitor learning (Koran, Koran & Foster, 1988, 1989).

The Mindfulness/Mindlessness Model of Visitor Behaviour and Cognition, as set out in Chapter 1, is consistent with these requirements. The conclusions Falk, Koran, Dierking and Dreblow (1985), drew from their observations of visitors, and quoted previously, also closely match the behaviour that would be expected from mindless visitors.

This chapter will now examine the value of the Mindfulness Model for integrating and interpreting the results of existing visitor studies. Specifically the following sections will review sets of visitor studies to determine whether or not the data already collected supports predictions derived from the Mindfulness Model. Table 2.4 contains these predictions. These predictions are divided into the two major sections, Exhibit/Setting Factors and Visitor Factors, corresponding to the two sections set out in Figure 1.3, the Mindfulness Model of Museum Visitor Behaviour and Cognition. The use of two sections differs from the work of Patterson and Bitgood (1988) who set our three major sections, Exhibit/Object Factors, Architectural Factors and Visitor Factors. The Mindfulness Model combines the first two of these categories on the basis that visitors do not encounter or deal with exhibits in

isolation from each other or the context in which they are found. It is also difficult to see how the decision is made to state that the realism of the exhibit is an architectural rather than exhibit factor.

Further in the present review the following are seen as indicators of mindfulness:-

1. Increased attention to exhibits as indicated by both attracting and holding power. Attracting power is defined as the proportion of visitors passing an exhibit who are attracted to stop at that exhibit, while holding power refers to the length of time that visitors spend at an exhibit. It should be noted that attention is a necessary although not sufficient condition for mindfulness.
2. Higher levels of preference for exhibits and their contents.
3. Higher levels of interest in exhibits and their contents.
4. Greater recall of, and learning from, exhibits.
5. Greater satisfaction with, or enjoyment of exhibitions.

All these have been referred to as indicators of mindfulness in Langer's research.

2.1 Review of Studies of Exhibit/Setting Factors

As noted by Falk, Koran, Dierking and Dreblow (1985) research into the influence of Exhibit/Setting Factors on visitor behaviour and cognition has dominated the field of museum visitor studies. In particular, studies comparing traditional exhibits with other types of exhibits and/or exhibit

Table 2.4

Predictions for Visitor Behaviour and Cognition Derived From the Mindfulness/ Mindlessness Model of Museum Visitor Behaviour and Cognition.

1. Predictions for Exhibit/Setting Factors.

Any exhibit which differs in some way from traditional museum exhibits (which are static, objects in cases with labels or text and/or illustrations) will be likely to induce mindfulness, and this will be manifested in greater attracting and holding power for the exhibit, better recall of the exhibit and its contents and higher levels of preference for, and interest in, the exhibit and its contents.

Interactive/participatory exhibits, exhibits which give visitors control over the type and amount of information they receive (this includes the use of exhibit adjuncts such as quiz cards, exploratory games, brochures or guides which direct attention and learning), multi-sensory, dynamic or living exhibits, and exhibits with features which are extreme in size, colour or sound will all be more likely than traditional exhibits to induce mindfulness. The more participation and control that visitors have, the more likely it is that visitors will be mindful.

In terms of attracting and holding power, preference ratings and measures of learning, the model predicts that the greatest difference will lie between traditional/expected exhibits and any change to an exhibit, and that increasing participation and control will be reflected in increases in these measures.

Repetition of exhibit media or structure will induce mindlessness. This will be reflected in a pattern of decreased attention to exhibits as visitors move through a setting and in poor recall, learning and satisfaction with exhibits.

Effective cognitive orientation devices will enhance learning. Museum settings with moderate levels of information will be more likely to result in learning in mindful visitors.

Museum settings with effective physical orientation systems will be more likely to result in learning in mindful visitors.

2. Visitor Factors.

Visitors who are interested in a particular topic or content area will be more likely to be mindful than other visitors and this will be reflected in the attention they pay to exhibits.

Visitor goals for their visit should be related to their cognition and behaviour. Specifically visitors with an educational goal will be more likely to be mindful than visitors with other goals.

It was also suggested that familiarity with museums may be a variable related to mindfulness/mindlessness, but no specific predictions were made with respect to this variable.

adjuncts have been most common. Most of these studies compare several types of exhibits in a single study. Table 2.5 summarises a comprehensive selection of these comparative studies noting the size and basic composition of the sample, the exhibit conditions studied, the dependent measures used and the major conclusions drawn by the authors. As previously noted, this area of research is characterised by poor methodology and reporting of results. For instance, several authors claim to have collected evidence supporting the value of exhibit features such as participation on the basis of examining a single exhibit with no comparison to a control condition (for example, Carlisle, 1985; Eason & Friedman, 1975; Gottfried, 1980; Gudeman & Johnson, 1989; Hammitt, 1984; Herbert, 1981; and Wright, 1980). These studies have not been included in the present review. A further consequence of problems with the design and reporting of studies is that several of the studies reported in Table 2.5 do not have complete details describing sample size or statistical analyses.

Overall the conclusions presented in Table 2.5 provide support for the prediction that audio-visual, multi-sensory, dynamic, live, and/or participatory exhibits have greater attracting and holding power, and are related to greater learning and higher satisfaction than traditional exhibits and thus are effective in inducing mindfulness in visitors. The Mindfulness Model is very specific in its prediction that any change away from traditional exhibits will be likely to make visitors mindful. An examination of those studies in Table 2.5 which compared several different exhibit conditions (indicated by an asterisk) reveals that there is support for this prediction with most studies in this category concluding that the significant or greatest

Table 2.5

Summary of Selected Studies Comparing Exhibit Types

	Authors (Date)	Sample (n) Location of Study	Comparison Studied	Dependent Measures	Conclusions
1	Abrahamson, Gennaro & Heller (1983) (see also Abrahamson, Heller & Ahlgren, 1983)	Women & Boys (120) Zoo Lab, Minnesota Zoological Gardens	Visitors were observed at a variety of exhibits.	Attracting Power (the proportion of visitors who stop at an exhibit). Holding Power (the length of time spent at exhibits.)	Significantly greater attracting and holding power for exhibits which could be touched.
2	Birney (1988)	Adults & Children (527) Flying Walk Exhibit Brookfield Zoo	Visitors using a participatory exhibit which simulates bird wing movement were compared to visitors to the exhibit area prior to the installation of the participatory exhibit.	Observation of Visitors. Interviews measuring knowledge of exhibit content, including a physical demonstration of bird wing movement.	Visitors using the participatory exhibit were more knowledgeable than visitors to the area prior to the exhibits installation.
3	Bitgood & Benefield (1987) (see also Bitgood, Patterson & Benefield, 1988)	General Visitors (4381) 13 Zoos (United States)	Visitors were observed at a variety of exhibits.	Attracting Power. Holding Power.	Viewing times were approximately twice as long when animals were active. Larger species of animals generated longer viewing times then smaller species. Presence of an infant doubled viewing times.
4	Blud (1990)	Adult-Child Dyads (72) Science Museum, London	1. Static Exhibit. 2. Push-button Exhibit. 3. Interactive Exhibit.	8 questions on exhibit contents.	Visitors to the static exhibit had lower test scores than visitors to the push-button exhibit which produced lower test scores than the interactive exhibit.
5	*Borun (1977)	1 General Visitors (500) Franklin Institute Science Museum	Visitors using a question game, quiz sheet, brochure which highlighted exhibits were compared to visitors using no handouts.	Tests of knowledge and affective responses to the museum.	There were significant improvements in attitude and quiz scores for the question game and quiz sheet but not for the brochure.
		2 General Visitors (not given) As above.	Observation of visitors in different halls and short survey of visitors.	Attracting power and preference for exhibits.	Visitors prefer complex halls to simpler halls. Visitors prefer interactive exhibits.
6	*Brockmeyer, Bowman & Mullins (1982)	Senior Citizens (60) City Park, Colombus	Visitors on a sensory hike (guide encouraged touch, smell) compared to visitors on a non-sensory hike.	Observation of Visitors. Surveys measuring enjoyment and learning.	More verbal and social interaction in non-sensory group. Better recall in the sensory group.

cont.

Table 2.5 (cont.)

	Authors (Date)	Sample (n) Location of Study	Comparison Studied	Dependent Measures	Conclusions
7	*Brooks & Vernon (1956)	Children (140) Children's Gallery, Science Museum, London	Visitors were observed at a variety of exhibits.	Attracting power. Holding power. Interviews measuring preference and learning.	Dynamic exhibits had greater attracting and holding power and preferences than static exhibits.
8	Cone & Kendall (1978)	Family Groups (26) Anthropology Hall, Science Museum of Minnesota	Visitors were observed at a variety of exhibits.	Attracting power. Holding power. Interviews measuring recall of exhibits.	Large dioramas had greatest attracting and holding power and recall.
9	Derwin & Piper (1988)	General Visitors (1070) African Rock Kopje Area, San Diego Zoo	Several multisensory and participatory exhibits were compared to traditional animal exhibits.	Observation of Visitors. Interviews measuring recall, learning and evaluation of exhibits.	Visitors who used the interactive exhibits had better scores for learning than those who did not.
10	*DeWaard, Jagmin, Maisto & McNamara (1974)	General Visitors (120) Age of Man Exhibit, Milwaukee Public Museum	Compared visitors to the traditional exhibits to visitors who had quiz cards directing attention to the exhibits. 4 types of quiz were used, low versus high levels of information by feedback versus no feedback on questions.	12 question multiple choice test on exhibit content.	Quiz groups did significantly better on test than visitors not given the quiz cards. No significant differences between the experimental groups.
11	Diamond, Smith & Bond (1988)	General Visitors (100 groups) Discovery Room, California Academy of Sciences	Traditional exhibits (objects in cases, text and illustration panels) were compared to objects that could be touched and interactive games.	Observations of Visitors. Interviews on preferences.	Visitors preferred interactive objects and objects which could be touched.
12	*Dowell & McCool (1985)	Boy Scouts (14) Missoula Forest	Compared a slide show, booklet, slide show and booklet to a control group with no information on minimum impact camping.	Questionnaire assessing knowledge, skills, beliefs, attitudes and behavioural intentions.	All three information conditions were better than no information on all measures. The slides and book and slides were better than the book for knowledge and skills, attitudes and behavioural intentions.
13	*Eason & Linn (1976)	Children (740) Optics exhibit, Lawrence Hall of Science	Compared children seeing no exhibits to those using an exploratory booth where they could manipulate objects or participate in an experiment.	16 questions on exhibit contents.	Both groups using the exploratory booth did significantly better on content test than the control. There was not a significant difference between the exploratory groups.

cont.

Table 2.5 (cont.)

	Authors (Date)	Sample (n) Location of Study	Comparison Studied	Dependent Measures	Conclusions
14.	* Foster, Koran, Koran, Stark, Blackwood & Landers (1988)	General Visitors (621) Jacksonville Zoological Park	Visitors were observed at 10 different exhibits.	Attracting power.	Most successful exhibit was the largest and allowed for some interaction.
15	Gillies & Wilson (1982)	Children (1423) and General Visitors (295) Science Circus, Science Museum, London, Ontario	33 exhibits, some traditional and a range of interactive exhibits.	Observation of Visitors. Questionnaires measuring learning and enjoyment.	Participatory exhibits were more popular than traditional exhibits both in questionnaires and observations.
16	Goins & Griffenhagen (1957)	General Visitors (100) Gallery of Medical History, Smithsonian Institution	Visitors were observed at a variety of exhibits.	Attracting power. Holding power.	Location of exhibits influences attracting power. Unusual objects attract attention.
17	Hayward (1988)	General Visitors (3296) Estimating Game, Boston Children's Museum	Variety of interactive exhibits with range of participation.	Observation of Visitors.	More visitors used the more interactive exhibits.
18	Hilke, Hennings & Springuel (1988)	General Visitors (not given) Laser at 25 Exhibit, Smithsonian Institution's Traveling Exhibition Service	Visitors to a display with an interactive computer exhibit were compared to visitors to the display when the computer was not on.	Observation of Visitors and questionnaires measuring recall.	Computer had highest attracting power. Visitors stayed longer in the display when the computer was on. Visitors who used the computer had better recall scores than those who did not.
19	Hirschi & Screven (1988)	Visitors in Family Groups (172) Milwaukee Public Museum	1. Traditional exhibits. 2. Exhibits with questions in labels.	Observation of Visitors.	Mean label reading time was significantly higher when labels had questions.
20	Horn (1980)	Visitors taking guided tours (not given) Museum of Fine Arts, Boston	Two types of guided tours were compared, a traditional tour where guide gives a lecture, and an inquiry tour where guide asks visitors questions and encouraged discussion.	Questionnaire evaluating the tour.	Higher enjoyment ratings for the inquiry tour.
21	Houlding (1989)	General Visitors (394) Collection Gallery, Miami Museum of Science	Gallery contains traditional objects in cases, exhibits, pull-out drawers which contain small objects, objects which can be touched and books to read.	Observation of Visitors.	Proportion of time spent in the gallery at the 4 types of exhibits were as follows: Pull-out drawers 55.7% Display cases 21.9% Books 12.8% Objects 9.6%

cont.

Table 2.5 (cont.)

	Authors (Date)	Sample (n) Location of Study	Comparison Studied	Dependent Measures	Conclusions
22	*Jacobson (1988)	General Visitors (1194) Kinabula Park, Malaysia	Compared visitors in the following conditions: guided walk, self-guided walk with booklet, self-guided walk with signs along the trail and a control group with no interpretation on the trail.	Multiple-choice test.	The scores for the guided walk tour were significantly higher than for the other two groups, while all three groups were significantly higher than the control.
23	*Kearns (1940)	General Visitors (150) Hall of Man, Peabody Museum of Natural History, Yale University	Visitors to the hall were placed into 1 of 3 groups. One group was given a leaflet drawing attention to certain exhibits, one group was given the leaflet and directions from a guide, and one group acted as a control.	Observation of Visitors.	Leaflet alone did not influence behaviour. Leaflet and guide resulted in more visitors stopping at the target exhibits.
24	*Koran, Koran & Longino (1986)	General Visitors (131) Object gallery, Florida State Museum	Traditional objects in cases exhibits where cases were open and objects could be touched and exhibits where objects could be looked at with microscopes.	Observation of Visitors.	Highest mean time spent at microscope exhibit, lowest mean time spent at traditional exhibit.
25	Koran, Morrison, Lehman, Koran & Gandara (1984)	General Visitors (234) Object gallery, Florida State Museum	Traditional objects in cases exhibits were compared to exhibits where objects could be touched.	Observation of Visitors.	Greater attracting power for objects which can be touched.
26	*Korn (1988)	General Visitors (-) Japanese Garden, Chicago Botanic Garden	Three groups of visitors were studied. Those using a self-guiding brochure, those using a brochure with questions, and a control group.	Test of knowledge.	Both brochures were better than the control. No significant difference between the brochures.
27	*Landay & Bridge (1982)	General Visitors (282) Brooklyn Museum	4 groups were compared: a video display, a video display and wall panel display, a wall panel display, no displays.	Observation of Visitors. Questionnaire measuring knowledge and preference for exhibits.	All three information conditions increased knowledge, video conditions were better than wall panel display alone.
28	Mallon & Bruce (1982)	Children (556) Planetariums in Pennsylvania, Texas, Minnesota, California and Nevada	Participatory astronomy show where lecturer encourages question and discussion was compared to traditional lecture only show.	Test of knowledge and attitudes.	In all places the participatory show was better for knowledge. Positive impact on attitudes in 2 places.

cont

Table 2.5 (cont.)

	Authors (Date)	Sample (n) Location of Study	Comparison Studied	Dependent Measures	Conclusions
29	Markowitz (1979)	No details given. Washington Park Zoo	Visitors at traditional animal displays were compared to visitors participating in a response time game against mandrills.	Observation of Visitors.	Visitors spent more than twice as long at the Mandrill Exhibit.
30	*Moscardo (1988)	General Visitors (120) National Parks Interpretive Centre, Cardwell	Visitors were observed at different exhibits.	Attracting power.	Greater attracting power for interactive exhibits.
31	*Moscardo (1989)	General Visitors (300) 4 Australian museums	Visitors were observed at six different computers.	Holding power. Behaviour at exhibits.	Greater holding power and participation for exhibits allowing for greater control over the information.
32	*Moscardo (1990)	1. General Visitors (n=3847) Great Barrier Reef Aquarium, Townsville	Visitors were observed at different exhibits.	Holding and attracting power	Interactive, audiovisual and living exhibits had greatest attracting and holding power.
		2. General Visitors (n=952) as above	Visitors were surveyed about whole experience and components.	Satisfaction. Interest. Learning. Evaluative scales	Greatest satisfaction and interest in large, living exhibits.
33	Olson, Bowman & Roth (1984)	General Visitors (1141) 4 Ohio State Nature Preserves	1. Control group with no education program. 2. Brochure. 3. Signs. 4. Guides.	Survey including questions on knowledge of, and attitudes towards, management policies and regulations.	All three education programs were better than the control and both the brochures and guides were better than the signs.
34	*Parsons (1965)	General Visitors (2000) Milwaukee Public Museum	Compared 1. Question labels to declaration labels. 2. Different numbers of objects in display. 3. Different colours in exhibit.	Interviews measuring learning and evaluation of exhibits.	1.No differences between question and declarative labels. 2. Preference for minimal colours. 3. Preference for greater numbers of objects.
35	*Peart (1984)	General Visitors (280) Teamwork Exhibit, British Columbia Provincial Museum	A single exhibit was systematically changed as follows and visitors to each condition were compared to a control group who did not see the exhibit. Conditions: label only; picture only; object only; object and label and object, label and sound.	Questionnaires measuring knowledge and attitudes. Observation of Visitors.	All the experimental groups except the object only group had significantly higher knowledge scores than the control group, with the highest scores in the sound exhibit. No differences for attitudes between the groups. The sound exhibit had significantly greater attracting power than the other exhibits.

cont.

Table 2.5 (cont.)

	Authors (Date)	Sample (n) Location of Study	Comparison Studied	Dependent Measures	Conclusions
36	Prince (1982)	General Visitors (550) Visitor centres in North York Moores National Park	The following exhibit types were compared: Text only Text/photographs Text/photographs/slides Text/drawings Text/photographs/drawings Text/artefacts/models Text/photographs/models/ artefacts Text/artefacts/models/ drawings Text/photographs/models/ artefacts/drawings Text/slides Sight/sound Sight only	Interviews measuring preference for exhibits, recognition/recall of exhibits.	The audiovisual exhibits were most preferred, followed by exhibits with models. Exhibits with models were best in the recall tests (audiovisuals not included in recall test).
37	Roper, Bitgood, Patterson & Benefield (1986)	General Visitors (not given) Predator House, Birmingham Zoo	Visitors were observed at a variety of exhibits.	Attracting and holding power of exhibits.	Attracting and holding power were positively correlated with animal size and activity.
38	Rosenfeld & Terkel (1982)	Family groups (39) Mini-zoo	Interactive exhibits which allowed visitors to compare their own skills and features to those of other animals were compared to traditional animal exhibits.	Observation of Visitors.	Mean time spent at traditional exhibits of 96 seconds. Mean time spent at interactive exhibits of 156 seconds.

cont.

Table 2.5 (cont.)

	Authors (Date)	Sample (n) Location of Study	Comparison Studied	Dependent Measures	Conclusions
39	*Screven (1974a&b)	1. General Visitors (405) Age of Man Exhibit, Milwaukee Public Museum	The following conditions were studied: 1. Control group who saw traditional exhibits. 2. Control group who saw traditional exhibits after completing a quiz game. 3. Visitors using an audio-cassette which directed attention to exhibit details and asked questions. (Pauses after questions.) 4. Visitors using an audio-cassette and a punchboard quiz game. 5. Visitors using an audio-cassette without pauses after questions. 6. Visitors using audio-cassette without questions. 7. Visitors using card with instructions on how to approach the exhibits. 8. Visitors using a booklet with questions about the exhibits.	12 quiz questions on exhibit content.	Significant difference between the control group and all the other conditions. There were few differences between the experimental groups. Conditions 3 and 4 had higher mean scores than condition 2, condition 5 had a higher mean score than condition 6.
		2. General Visitors (276) Animism-Shamanism Exhibit, Milwaukee Public Museum	Compared conditions 1, 2, 3, 4 and 8 above.	As above.	Pattern of results similar to that in the previous study.

cont.

Table 2.5 (cont.)

	Authors (Date)	Sample (n) Location of Study	Comparison Studied	Dependent Measures	Conclusions
40	Screven (1975)	General Visitors (736) Renwick Gallery, Smithsonian Institution	The following conditions were studied. 1. Control group who were given a pre-test and then saw the traditional exhibits. 2. Control group who were given a booklet only. 3. Traditional exhibits with labels. 4. Exhibits with labels which include more detailed information. 5. Exhibit with labels with questions. 6. Condition 5 and a punchboard quiz game. 7. Condition 3 and audiotape - pace set by visitor. 8. Condition 3 and audiotape - pace set by tape. 9. Condition 8 but no questions on tape. 10. Condition 3 with booklet of questions.	Quiz test. Evaluation of exhibits.	All conditions from 4 to 10 were significantly better on quiz than the normal exhibit condition. All conditions with punchboard and tape were significantly better on quiz than previous condition. Tapes with questions were better than tapes without. Subjects preferred the paced audio most.
41	Serrell (1977 & 1981)	General Visitors (347) John G Shedd Aquarium	Visitors were observed at a variety of exhibits.	Attracting and holding power.	Visitors spent more time at larger tanks and at exhibits of exotic species.
42	Sneider, Eason & Friedman (1979) (also Friedman, Eason & Sneider, 1979)	Children (138) Star Games Exhibit, Lawrence Hall of Fame	Children in the traditional gallery were compared to children using a participatory exhibit.	Quiz to measure learning and attitudes towards astronomy and a psychomotor skills test.	Children using the participatory exhibit had greater knowledge of, and preference for, astronomy and better psychomotor skills than other children.
43	Thompson & Bitgood (1988)	Visitor Groups (5822) Predators Building, Birmingham Zoo	1. Compared labels of 30, 60, 120 and 240 words. 2. Compared labels with different type sizes. 3. Compared labels on and off paths.	Attracting power. Holding power.	Decrease in attracting and holding power as words increased. Increase in attracting power with larger type. Greater attracting power for on-path signs.

cont

Table 2.5 (cont.)

	Authors (Date)	Sample (n) Location of Study	Comparison Studied	Dependent Measures	Conclusions
44	*Van Rennes (1978)	Children (560) Science Museum	The following four conditions were compared: 1. Control group who saw traditional exhibits. 2. Teacher led inquiry program. 3. Quiz with questions and instructions for using displays - feedback for answers. 4. Quiz with no feedback.	Quiz test.	Teacher was the most effective condition.
45	Washburne & Wagar (1972)	General Visitors (552) Four visitor centres in the Pacific North West	Compared a variety of exhibit types including audiovisuals, models, objects which could be touched, photographs and flatwork.	Interviews assessing preference for exhibits.	Increased preference for audiovisual and dynamic exhibits.
46	White & Barry (1984)	Family Groups (1260) National Zoological Park	Visitors to traditional animal exhibits were compared to visitors in Herplab area containing interactive and audiovisual objects.	Questionnaires on preference for exhibits and description of experience.	Visitors preferred interactive exhibits, Herplab visitors more likely to describe their experience as fun/educational.
47	Worts (1989 & 1990)	General Visitors (265) Viewpoints Exhibition, Art Gallery of Ontario	Visitors to traditional gallery were compared to visitors to the gallery after the installation of several interactive displays.	Observation of Visitors. Interviews on attitudes to the gallery.	Increase in average viewing time from 5 mins 21 secs to 16 mins 9 secs with the interactive devices. 70% of those who experience interactive devices rated exhibit above average, compared to 23% with no interactive devices.

Table 2.6

Mean Scores on Dependent Measures for Various Exhibit Conditions for Those Studies from Table 2.5 Reporting Sufficient Results

Study	Dependent Measures	Exhibit Conditions	Mean Scores*
Borun (1977)	Quiz questions on knowledge. Rating scales for affective responses.		Attitudes / Knowledge
		1. Control	68 / 55
		2. Brochure	69 / 56
		3. Quiz game	63 / 59
		4. Question sheet	72 / 59
Dewaard *et al.* (1974)	12 questions on exhibit content	1. No exhibit	3.6
		2. Traditional exhibit	4.25
		3. Quiz cards (high info & feedback)	8.4
		4. Quiz cards (high info, no feedback)	8.75
		5. Quiz cards (low info, feedback)	7.5
		6. Quiz cards (low info, no feedback)	7.9
Eason & Linn (1976)	16 questions on exhibit content	1. Control	38.46
		2. Exploratory booth (could touch objects)	44.12
		3. Interactive optics display	56.99
Jacobson (1988)	Multiple-choice test on trail area	1. Trail only	3.88
		2. Signs on trail	6.34
		3. Booklet with questions	6.59
		4. Guided walk	9.32
Koran, Koran & Longins (1986)	Attracting power	1. Traditional exhibit	22.8
		2. Objects could be touched	33.9
		3. Interactive exhibit	32.5 (% of visitors stopping at the exhibit)
Korn (1988)	Test of knowledge	1. No brochure	1.14
		2. Declarative brochure	2.0
		3. Inquisitive brochure	1.88
			Quiz / Holding Power
Landay & Bridge (1982)	Holding power & quiz test	1. Traditional exhibit	3.6 / 5.7
		2. Wall panel	4.8 / 7.8
		3. Video	5.2 / 7.7
		4. Panel & video	5.4 / 9.3
Peart (1984)	Test on exhibit content	1. Control (no exhibit)	38.4
		2. Object only exhibit	39.0
		3. Object & label exhibit	63.4
		4. Picture only exhibit	68.6
		5. Label only exhibit	59.5
		6. Object, label & sound exhibit	71.4

Study	Dependent Measures	Exhibit Conditions	Mean Scores*
Screven (1974)	1. 12 question test on exhibit content	1. Traditional exhibits	4.37
		2. Traditional exhibits after quiz game	6.8
		3. Audiocassette (pauses after questions)	8.61
		4. Audiocassette & punchboard quiz	8.74
		5. Audiocassette (no pauses)	8.61
		6. Audiocassette (no questions)	8.83
		7. Instruction card	5.92
		8. Booklet of questions	7.29
Screven (1974)	2. 12 questions on exhibit content	1. Traditional exhibits	4.94
		2. Traditional exhibits after quiz	5.86
		3. Audiocassette	7.79
		4. Audiocassette & punchboard	7.83
		5. Booklet with questions	6.56
Screven (1975)	17 questions on exhibit content	1. Control - no exhibits	4.18
		2. Booklet & no exhibits	8.24
		3. Traditional exhibits with labels	3.78
		4. Traditional exhibits with detailed labels	7.73
		5. Exhibit with labels with questions	8.05
		6. Cond 5 with punchboard quiz	10.14
		7. Cond 3 with audiocassette (visitor controls pace)	12.43
		8. Cond 7 (tape controls pace)	12.53
		9. Cond 8 (no questions)	11.15
		10. Cond 3 with booklet of questions	12.17

Study	Dependent Measures	Exhibit Conditions	Attitudes	Knowledge
Olson, Bowman & Roth (1984)	Likert scales measuring attitudes towards, and knowledge of, reserve management	1. Control	-0.11	-0.26
		2. Signs (most common educational device)	0.47	0.17
		3. Brochures	1.13	1.13
		4. Guides	0.86	0.69
			(Pre-Post differences)	

Notes:
1. As Standard Deviations were rarely reported they have not been included in the Table.
2. Lines indicate major or significant differences in results.

differences on the dependent measures lay between the control groups and all other groups, with increased scores on the dependent measures usually associated with increased opportunities for visitor participation. Table 2.6 reports the means on the dependent measures for the various exhibit conditions for those comparative studies in which results were reported in sufficient detail. The pattern predicted by the Mindfulness Model is apparent in most of these studies. In all studies any change away from traditional exhibits results in the greatest changes on the dependent measures.

The second prediction of the Mindfulness Model is that repetitive exhibits will induce mindlessness. In observation studies this would be seen in a pattern of decreasing attention paid to exhibits and in visitor surveys it should be reflected in poor memory for the exhibits and their contents. Data from several studies do support this prediction. The observational studies of Robinson (Bitgood, 1988a), Melton (1972), Serrell (1977), Falk, Koran, Dierking and Dreblow (1985) and Weiss and Boutourline (1969) all provide evidence of decreasing visitor attention for repetitive exhibits. Figure 2.2 graphs the results of an observational study of visitors to an Aquarium showing a consistent drop in attracting power for repetitive exhibits (Moscardo, 1990).

Several of the studies in Table 2.5 (see numbers 10, 19, 20, 26, 28, 31, 36, 37 and 41) included conditions in which questions were placed in exhibit labels, or in associated quiz games or brochures. In most cases the use of questions was effective in increasing visitor attention and learning and this conclusion is consistent with the conclusions drawn by Bitgood (1989) in his review of studies into the effectiveness of questions. In those cases

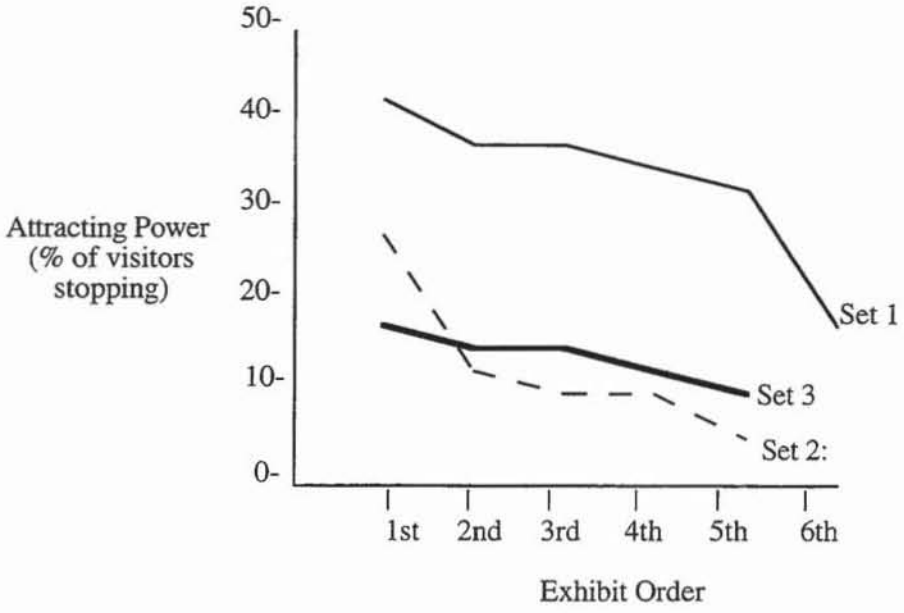

Figure 2.2: Graphs of Attracting Power for Sets of Repetitive Exhibits (Moscardo, 1990)

where questions did not appear to be effective, for example Parsons (1965), it is likely that visitors did not read the labels at all and were not exposed to the questions. These findings are consistent with the Mindfulness Model, as the use of questions can create conflict or ambiguity and thus induce mindfulness. It could also be argued that the use of questions is rare in museums and thus constitutes a novel or unexpected feature which can induce mindfulness.

Two studies provide evidence that questions may also act as cognitive orientation devices and thus enhance learning. Koran, Lehman, Shafer and Koran (1983) provided one of the following instructions to three groups of high school students visiting the Florida State Museum:-

(1) Treatment I - Study the wall panel which is part of the cave exhibit...Continue into the cave and study the habitat. When you exit the cave you will be given a test to see how much you learned.

(2) Treatment II - Enter the cave and study the habitat. When you exit at the other end, study the wall panel which is part of the cave exhibit... After studying this panel you will be given a test to see how much you have learned.

(3) Control - You will take a walk through exhibits depicting a variety of Florida Habitats... Then you will be given a test to determine how much you know about one type of exhibit (p. 341).

The wall panels referred to in the instructions for the two treatment groups contained information and questions about the exhibit. It could be argued that as all students were told they would be tested, that they would all be likely to be mindful and that there would be no significant differences between the three groups on a test based on the exhibit content. The results, however, found that both treatment groups had significantly higher mean scores than the control group, and that the first treatment group had the highest mean score. Thus it seems that questions did enhance learning, particularly if they were presented before the exhibit was experienced.

In a similar study also conducted at the Florida State Museum (Lehman & Lehman, 1984), undergraduate students were given instructions to observe the cave exhibit carefully, read the information and answer questions given to them with the instructions, or to observe the cave, read the information, generate their own questions and answer these. As in the previous study

both groups who answered questions did better on a test on the exhibit content than a control group who did not answer questions, and the groups answering the questions given to them before the exhibit was experienced did best of all three groups. Both Florida State Museum studies suggest that questions can provide a structure for mindful visitors to enhance their learning. This is especially the case when questions are placed at the beginning of an exhibit, and is supported by research results in cognitive and educational psychology (see Ausubel, 1960; Bull, 1973; Gall, 1970; and Natkin & Stahler, 1969).

The use of questions is one way of providing structure to material, others include the use of guided tours, pre-visit instructions and the organisation of exhibit material. In the case of guided tours, Stronck (1983) compared primary school students taking a structured tour to those taking an unstructured tour on a test of comprehension of, and attitudes towards, the exhibits in a natural history museum. He found that the structured tour did result in more learning, but the unstructured tour produced more positive attitudes towards the museum. Gennaro (1981) and Gennaro, Stoneberg and Tanck (1984) provided evidence from several studies of school children supporting the value of pre-visit instructions on how to visit a museum for enhancing learning from a museum.

Several studies have examined the way in which content in exhibits is presented or structured and how this influences visitor behaviour and cognition. Washburne and Wagar (1972) found that visitors expressed highest levels of interest in exhibits which showed cause-and-effect relationships, parts making a story, or which related information to the immediate surroundings. Exhibits which presented isolated facts were least

preferred. This pattern of results was also reported in a similar study by Prince (1982), and indicates the value of providing a comprehensible structure to material presented in exhibits. This is further supported by Walker's (1988) results which indicated that visitors preferred objects to be placed within a story or theme.

It is possible that the effectiveness of these various cognitive orientation devices results from their power to reduce the amount of information in a museum setting and give visitors control over their experience. The work of Falk and his colleagues (Balling & Falk, 1980; Falk, 1983a; Falk, Martin & Balling, 1978) supports the argument that novel environments are high in information and difficult to deal with effectively. Other studies also provide evidence that the amount of information in a museum setting influences visitor behaviour and cognition. Robinson (Bitgood, 1988a) concluded that visitors were more likely to pay attention to paintings in low density galleries than in high density galleries. Barnard, Loomis and Cross (1980) found that students visiting a small museum and they found that students had better recall of exhibits if they were exposed to only a subset of exhibits than if they were exposed to all exhibits. Parsons (1965), however, presented evidence that too little information can have a negative impact on visitor evaluation of an exhibit. In summary, the available evidence supports the Mindfulness Model's third predication for Exhibit/Setting Factors.

The final prediction for Exhibit/Setting Factors refers to the importance of effective physical orientation systems. This prediction is based on the argument that visitors who have difficulty orienting themselves in the physical setting may be mindful, but this active information processing will be directed towards finding their way rather than towards the exhibit

contents. While many authors have suggested that museums need effective physical orientation systems (see Guthrie, 1984; Miles, Alt, Gosling, Lewis & Tout, 1982; and Screven, 1986), very little data is available either to support this claim, or to suggest what makes for effective physical orientation systems. Cohen, Winkel, Olsen and Wheeler (1977) found that in a museum without orientation devices, 71 percent of visitors were unaware of the existence of entire halls, 86 percent had no idea what was the nearest hall, and 41 percent had been forced to backtrack at some point in their visit. The authors surveyed visitors at the same museum after the installation of maps, signs or both, and found that all conditions improved visitor orientation. This study also revealed that visitors preferred to use maps and signs than to approach museum staff. Bitgood and Patterson (1987c) and Bitgood and Richardson (1987) also found that visitors preferred to use maps and signs than contact with staff and results from the latter study indicated that visitors using hand-held maps viewed more exhibits than visitors without maps. In a review of a study of visitor orientation at the British Museum of Natural History (Griggs, 1983) it was noted that visitors do use maps and signs to find their way in exhibit halls. A recent study compared the use of a map installed on a wall of the Royal Ontario Museum with a map set into the floor (Lockett, Boyer-Tarlo & Emonson, 1989). The results from observations of, and interviews with, visitors found a marked increase in the use of the map and preference for the map when placed on the floor. The two most common answers given to the question "What drew your attention to the map?" were its bright colours and its unusual position, which is as would predicted by the Mindfulness Model.

2.2 Review of Research into Visitor Factors

The Mindfulness Model predicts that exhibits which display objects or topics of interest to visitors will be likely to induce mindfulness. The results of several studies seem to suggest that certain topics may be interesting to a broad range of visitors. Goins and Griffenhagen (1957), for example, stated that

> *the most popular exhibits in this study show cutaway manikins with the organs of the human body, scenes of ancient surgery, scenes of diseases resulting from vitamin deficiencies, and a type of nursing bottle which strapped on to the mother as a brassiere (p. 3).*

Washburne and Wagar (1972) reported that visitors were most interested in themes of violence or destruction, while Moscardo (1986) found a marked increase in attention paid to an exhibit of nineteenth century dentistry and Koran, Foster and Koran (1989) noted that students showed most interest in a poisonous snakes exhibit. It would appear that themes of violence and pain have a broad appeal. It should be noted that it is possible that these results could be confounded by the exhibit media used for these topics. That is, it may be that these themes lend themselves more easily to interactive, dynamic and/or audiovisual exhibit techniques.

As with physical orientation systems, many authors have proposed that visitors bring with them to museums their own individual interests and that these interests direct visitor attention (see Falk, 1983b; Koran, Foster & Koran, 1989; Miles et al., 1982; Screven, 1986). There is some evidence to support this argument. Bechtel (1967), for example, found that preference rankings for prints in art gallery was highly correlated (Spearman's Rho =

0.93) with the ranking of prints according to their attracting power, while Boggs (1977) found that visitors had the highest recall for information that they could link to their own personal experiences. Koran, Foster and Koran (1989) claim to have collected data showing a correlation between level of interest in a topic and attention paid to exhibits on that topic, but as interest in the topic was measured after subjects had viewed exhibits it is not clear if this interest was a cause or an effect of the attention paid to exhibits.

On the whole, studies which have measured visitor characteristics other than demographics, are fewer than those concerned with Exhibit/Setting Factors. These studies of Visitor Factors have mostly been concerned with three interrelated variables, familiarity with museum settings, reasons or goals for visits and social interaction during visits. In the case of familiarity with museums the work of Falk is predominant. In three articles (Balling & Falk, 1980; Falk, 1983a; Falk, et al., 1978), it was demonstrated that students who were familiar with a setting, that is, had visited the setting before, were more likely to learn something than those who were unfamiliar with the setting. These results were consistent with those of Borun (1977) and Prince (1982).Falk's argument is that familiar visitors are better oriented and thus can focus more attention on the exhibits. Barnard, Loomis and Cross (1980) and Korn (1988), however, found no advantage in learning for visitors who were familiar with a museum. There is no clear support for a prediction with respect to familiarity and mindfulness/mindlessness. The advantage of better orientation from familiarity could be conducive to mindfulness, however, repeated exposure to a setting is a classic condition for mindlessness.

The key to understanding the role of familiarity in mindfulness/ mindlessness may be in understanding visitors' goals. Surveys of visitors to

museums usually ask for the reasons for the visit and a selection of some of the answers given to these questions is given in Table 2.7. Once the general curiosity reasons are removed from the analyses, and these occur most often in response to open-ended questions in long surveys, the reasons given for museum visits tend to fall into two major clusters - specific interest/education and social interaction. These two clusters are generally accepted as the two major motives for museum visitors (Hayward, 1989; Martin & O'Reilly, 1989; Miles, 1986). In addition to these two sets of reasons, a social status goal has been put forward as important (Graburn, 1984; Pearce, 1988), although no empirical evidence has been presented to support its existence.

The Mindfulness Model predicts that visitors with an educational goal will be more likely to be mindful than visitors with a social goal. As with many of the previous predictions little data on this question is available. One study (Edwards, Loomis, Fusco & McDermott, 1990) cluster analysed visitor responses to a series of questions including reasons for visiting, the kind of experience sought and use of interpretive aids. In this study the authors contrasted High Involvement visitors, who were likely to be repeat visitors and value educational opportunities, with Low Involvement visitors, who were more likely to be novice visitors and to value social interaction. Further evidence was presented which suggested that the High Involvement visitors

Table 2.7

Reasons for Visiting Museums

Study	Reasons	Frequency of responses (%)
Alt (1980) (1979 survey only)	General interest and curiosity To bring the children Came to see something specific Sightseeing To revisit the museum with friends/family Visiting by accident Filling in time	40 16 10 9 8 7 2 4
Bitgood, Patterson & Nichols (1986)	Relax/be at ease Being with people Participation Challenge Learning Worthwhile activity	15 20 25 29 32 53 (Approximate as taken from bar chart.)
Borum (1977)	Several Questions Family outing Touring area Show a visitor/friend Group tour To see what's in museum To see Planetarium show To see specific exhibits For fun To learn about science Because like museums	 56 11 15 10 38 30 32 33 48 19
English Tourist Board (1982) (3 sites)	Historical/specific interest Family/social outing Sightseeing/fill in time	45 46 53 (3 sites) 50 50 43 45 37 42
Gallagher (1983)	Somewhere to go General interest Specific interest Peace/relax	42 12 18 8
Moscardo (1990)	Education (general) Something unusual/different Show friends/family Sightseeing	36.7 36.5 12.3 3.7
Wolf & Tymitz (1979b)	Tradition Place of importance Relaxation Entertainment Education	No statistics presented.

were more likely to provide responses indicating mindfulness than the Low Involvement visitors. Hood's (1989) work on museum visitation by families which found that families were not as interested in education as other groups of visitors and did not enjoy museums experiences as much as visitors with educational goals supports also provides some support for the Mindfulness Model.

Another area of research that provides support for the predictions of the Mindfulness Model is that of general surveys of museum visitors. Alt (1980) reviewed four years of visitor surveys at the British Museum of Natural History which collected data on visitor demographics, motivation, expectations and general evaluations of galleries. Alt notes that in these surveys the highest levels of interest were given for the Hall of Human Biology which had been recently renovated and which included numerous and varied interactive exhibits, in contrast to the traditional exhibition techniques used elsewhere in the museum. In a study conducted at the Hall of Human Biology, Alt and Shaw (1984) asked visitors to generate lists of characteristics of exhibits and then to decide which of these characteristics were applicable to their ideal exhibit. In their analysis of the characteristics which were seen as applicable to an ideal exhibit, the authors suggest that visitors process exhibits in two steps, first their attention is drawn to the exhibit, and then a decision is made as to whether to stop or move on. The decision to stop is based on characteristics such as "it involves you." Using a similar methodology, Griggs (1990) surveyed 770 visitors to the British Museum of Natural History and asked them to describe exhibits in both a traditional and a new interactive gallery. Visitors described the new galleries as using a variety of techniques, using familiar objects and having an obvious

structure. The traditional galleries were described as having too much information, as being not realistic, and as having insufficient explanation of exhibits.

A research programme conducted at the various museums which form the Smithsonian Institution also provides results consistent with the Mindfulness Model (Cave & Wolf, 1983; Wolf, Munley, & Tymitz, 1979; Wolf & Tymitz, 1978, 1979a, 1979b, 1980, 1981). These researchers engaged in what they refer to as naturalistic evaluation, which involves participant observation of, and unstructured interviews with, groups of visitors. In a 1978 study of the Ice Age Mammals and Emergence of Man Exhibit, Wolf and Tymitz noted that visitors enjoyed exhibits which provided information relevant to their own experience and that

> *many visitors noted their interest in the Ice Age was partly stimulated by the severe weather conditions that had been occurring in the months during which the study was conducted (p. 19).*

In a similar vein, a study of Discovery Corners in the National Museum of History and Technology found the features visitors most liked about the corners were the opportunity to get information relevant to their own personal concerns, the opportunity to touch objects, and that the corners were different from the usual activities available in the museum (Wolf, Munley & Tymitz, 1979). Another common theme in visitor comments was the need for physical and cognitive orientation (Cave & Wolf, 1983; Wolf & Tymitz, 1979a, 1979b; 1980).

A survey of visitors to the Anniston Museum of Natural History (Alabama) also found that orientation was important, being the most common

improvement suggested by visitors. Further, the most liked and most memorable exhibits were those which were different from the other exhibits either in style, for example, interactive, or size (Bitgood, Patterson & Nichols, 1986). Two surveys conducted in the United Kingdom emphasised visitor preference for information that could be linked to the familiar or which could be made personally relevant (English Tourist Board, 1982; Gallagher, 1983).

In summary this survey research provides evidence that visitors prefer being able to make links to the familiar or personally relevant, that there is a need for physical and cognitive orientation and that visitors prefer exhibits which are in some way different from traditional or expected exhibits.

2.3 Other Findings on Visitor Behaviour and Cognition

The research review also identified several features of visitor behaviour and cognition not predicted by the Mindfulness Model, as described at the end of Chapter One. In reviewing the studies summarised in Table 2.5, two features seemed worthy of further attention. Firstly, guided tours, or contact with a guide, were found to be very effective in increasing visitor learning (see Jacobson, 1988; Kearns, 1940; and Van Rennes, 1978). There are several possible explanations for this effectiveness of guides. It could be that they provide physical orientation, or that through their ability to answer questions they can make the material presented personally relevant for visitors. Research describing guided tours in other settings emphasises both these points (see Fine & Speer, 1985; Gatto, 1977; Pearce, 1982; and Schmidt, 1979). It could also be the case that certain types of visitors, particularly those with an educational motive, are more likely to take a guided

tour or ask questions of guides. An interesting variation of this feature was described by Diamond, Smith and Bond (1988) where they observed that children were more likely to participate with exhibits in a Discovery Room when accompanied by an adult. In this instance the authors pointed to the role of the adults in providing personal links to the objects displayed. In summary, it could be proposed that the presence of guides in a museum should result in more mindful visitors.

The second feature noted by several authors was the difference between social behaviour and learning associated with different exhibit conditions. In some instances participatory/interactive exhibits were associated with increased learning but decreased social interaction (see Brockmeyer et al., 1982; Gillies & Wilson, 1982), suggesting that interactive exhibits compete successfully with social companions for visitor attention. Hilke, Hennings and Springuel (1988) and Blud (1990), however, found increased social interaction for interactive exhibits. Further, Hilke (1989) conducted a detailed observation study of families in two settings, a Discovery Room with interactive exhibits, and a traditional museum gallery with objects in cases and panels of text. While there appeared to be no major differences in behaviour between the two settings, families in the Discovery Room took the opportunity for joint hands-on activities and families in the Traditional Hall engaged in more verbal interaction. These results suggest that it may be that exhibits influence the type of social interaction rather than simply the quantity.

Hilke (1989) also commented that there was very little solitary behaviour exhibited by family members and that most interaction was cross-generational, that is, between adults and children rather than between adults or between children. This raises the question of how social group

composition might influence individual visitors' behaviour. This question was first put forward by Robinson (1928 reported in Diamond, 1986) and has since been taken up in several studies. Diamond (1986) concentrated her observations on family groups and found that adults often kept children at exhibits, and engaged in instructive behaviours such as reading and interpreting labels for children. Adults also terminated exhibit interaction and appeared to control the length of the visit. Laetsch, Diamond, Gottfried and Rosenfeld (1980) also observed families and found, like Hilke (1990) that adults and children spent more time together than either children with children or adults with other adults. These authors also observed that in family groups considerable time was given to group management. Cone and Kendall (1978) in their examinations of the behaviour of family groups in a museum concluded that the most frequent behaviour in parent-child interactions was that of the parent explaining exhibits to children.

While families in museums have prompted much recent attention (see Hirschi & Screven, 1988, and a whole volume on the topic edited by Butler and Sussman, 1989), only one study has examined the influence of various group compositions on visitor behaviour. McManus (1987, 1988) observed 641 visitor groups at the British Museum of Natural History. She found that social units could be placed into four categories which had distinctive patterns of behaviour:- groups with children, individuals alone, couples and adult peer groups. Groups with children had the longest visits, longest periods of conversation and were the most likely to use interactive exhibits and least likely to read text. As with the studies of families discussed previously, McManus suggested that adults modified their behaviour to suit children. Couples had the lowest levels of conversation, high levels of reading, long

visits and low use of interactive exhibits. Adult peer groups had the lowest levels of attention to exhibits and few consistent patterns of behaviour, while adults alone had the shortest visits, low use of interactive exhibits and displayed the most comprehensive reading of labels. McManus also found that groups with good social cohesion, as measured by the distances maintained between group members, read more and had longer conversations than those with low levels of groups cohesion.

McManus also examined the proximity of strangers and its influence on group behaviour and reported no major conclusions with respect to this variable. Koran, Koran, Foster and Dierking (1988), however, did find evidence that strangers can influence visitor behaviour. In two studies visitors were observed at either a static or an interactive exhibit. For half the samples a confederate acted as a visitor and modelled various behaviours. these models were successful in producing changes in visitor behaviour. Specifically, the models were able to increase the number of visitors interacting with exhibits.

This research on social groups composition and strangers or the presence of other visitors suggests that these variables be included in the Mindfulness Model as factors influencing visitor behaviour and cognition. It might be tentatively proposed that groups with children should be more likely to be mindful than other social groups. In the case of strangers or other visitors in the setting no prediction seems obvious from either theoretical or empirical grounds. Clearly, further research needs to investigate these variables. The relationship between group composition and motivation is not clear, but it is likely that such a relationship exists and may influence mindfulness/mindlessness in museums.

Several of the previously discussed in this chapter also analysed other demographic variables and their influence on visitor behaviour and cognition. Table 2.8 summarises the results of a selection of these studies. Overall, no consistent relationships appear to exist between these variables and visitor behavior and cognition.

Another area that requires further investigation is that of expectations for a museum visit. Prince (1985, 1990) has argued that motives for, and expectations of, museums are linked. In several surveys of visitors and non-visitors to museums, non-visitors were more likely than visitors to believe that museums were boring and that museums should be more entertaining, exciting and friendlier. The Mindfulness Model would propose that visitor expectations for a museum visit should influence whether to not they are mindless. This is one question addressed in the next chapter which investigates museums scripts.

Table 2.8

Summary of Results of Analyses of Demographic Variables

Study	Demographic Variables Analysed	Dependent Measures	Conclusions
Birney (1988)	Sex Age (children)	Knowledge of exhibit content. Motor skills.	No differences for sex. Older children did better on motor skills test.
Blud (1990)	Sex Children vs adults	Knowledge of exhibit content.	Girls did better than boys. No age differences.
Borun (1977)	Age Educational level Occupation	Knowledge of exhibit content. Enjoyment. Attitudes to science.	No difference for occupation. No consistent patterns for age or education on attitudes to science. Children and those with less education learn more.
Jacobson (1988)	Sex Age Education Language Residence	Knowledge of exhibit content.	No consistent patterns found.
Kern (1988)	Sex Age Occupation Education	Knowledge of exhibit content.	No consistent patterns found.
Landay & Bridge (1982)	Education	Knowledge of exhibit content. Preference for exhibits.	More education is related to better knowledge and greater preference.
Olson, Bowman & Roth (1984)	Education Membership of conservation groups	Knowledge of park policies.	Greater knowledge related to more education and group membership.
Prince (1982)	Social class Membership of special group	Recall and recognition of exhibits.	No differences for social class or group membership.
Sneider, Eason & Friedman (1979)	Age (children Sex	Knowledge of exhibit content.	Boys did better. Older children did better.

2.4 Summary of Research Review

The preceding sections have indicated that the existing data on visitor behaviour and cognition supports the predictions of the Mindfulness Model. In particular, the results of studies of Exhibit/Setting Factors demonstrate that any change away form traditional exhibits produces higher levels of attention, learning and enjoyment. In the case of Visitor Factors, although relying on a much smaller body of evidence, the conclusions were also consistent with the Mindfulness Model's predictions. Further, the review indicated several additional variables to be added to the Mindfulness Model, namely the presence of guides, the composition of social groups, the presence of other visitors and expectations for museum visits, and that social composition and motivation may be interrelated. Figure 2.3 shows the revisions to the Mindfulness Model as a result of the research review.

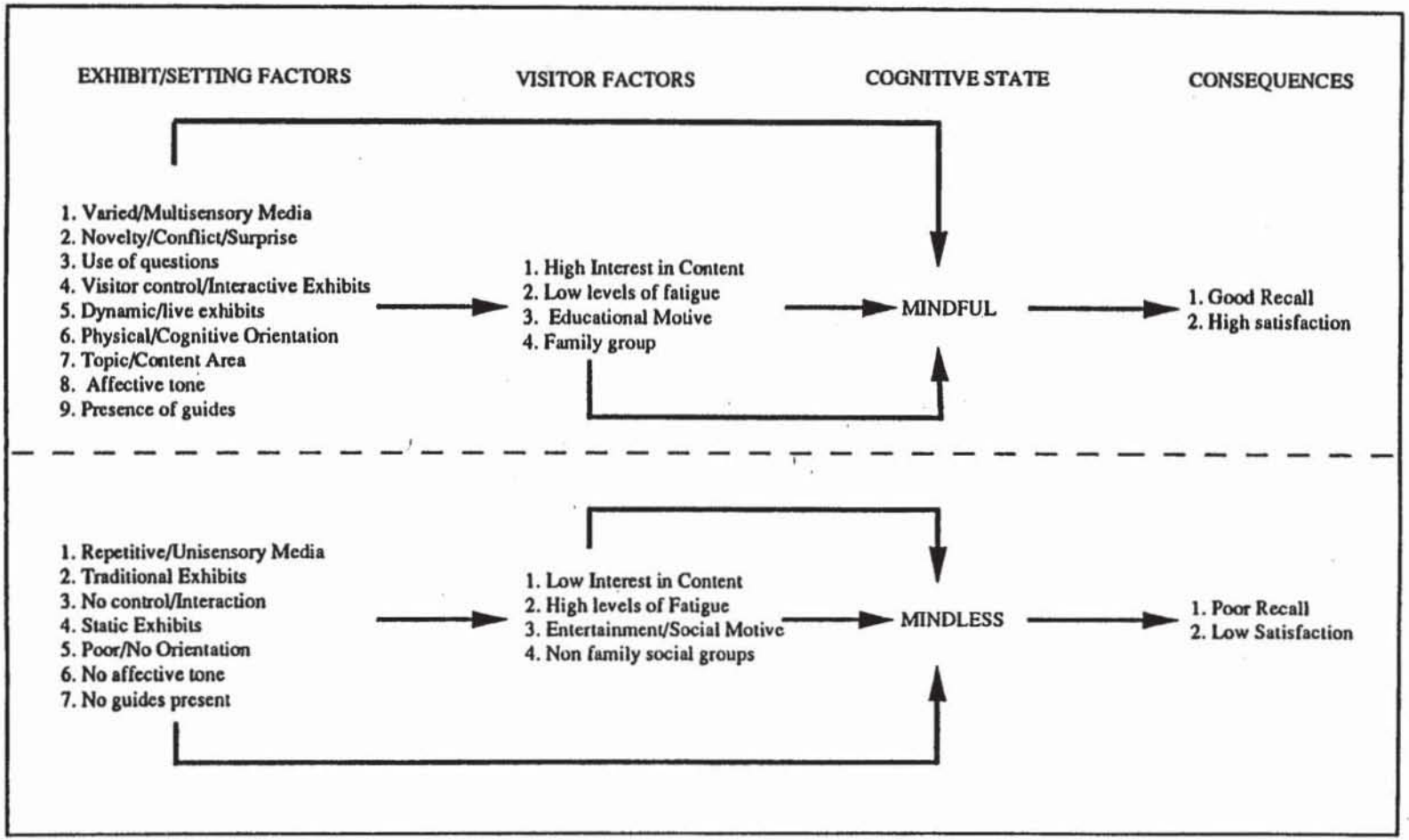

Figure 2.3: Revised Mindfulness/Mindlessness Model of Museum Visitor Behaviour and Cognition

CHAPTER 3

Scripts for Museums: Understanding Visitor Expectations for their Behaviour and Cognition

The data further suggest that most visitors came with a mental set to look at exhibits rather than to learn about fossils or learn about mesic hammocks. They looked at exhibits until they got tired and/or bored: for most visitors, these reactions occurred at about the same time. Although all visitors were clearly unique individuals, their behavior did not appear to be overwhelmingly idiosyncratic. Viewed as a whole, visitors behaved in a normal (in a statistical sense) rather than a random way.

(Falk et al., 1985, p.255)

3.0 Museum Scripts: Introduction

In a conference paper titled "Museum Recollections", Falk (1988) presents several recurring themes from visitors' recollections of past museum attendance. A sample of 11 individuals were asked to describe in some detail all that they could remember from past museum visits. These respondents reported clear and detailed memories of their companions on the visits, the time spent in the museums, and of their moods during the visits. Their recollections of the exhibits, however, were much less detailed. Falk also touches upon the way these individuals appeared to store their museum experiences in memory. In discussing the single example given, he says that "seemingly, this lady 'housed' several museum experiences in a single

location in her brain " (p. 64). What Falk appears to be suggesting is that this lady had a museum schema or museum script.

The present chapter reports a study of museum scripts and thus focuses directly on the central section of the Mindfulness Model, the Visitor's Cognitive State. It also examines visitor expectations and motivations and their relationship with the Visitor's Cognitive State.

This study of museum scripts is driven by several questions or issues. The major force is that of the issue of whether or not the museum script is a mindless one. That is, is there a common museum script that can be enacted with minimal attention paid to the setting? An analysis of Schank and Abelson's definitions of a script and their theoretical discussions of scripts indicates that scripts can be applicable both to mindless and mindful behaviour. In their book on the topic, a script is defined as "a structure that describes appropriate sequences of events in a particular context" (Schank & Abelson, 1977, p. 41). Further, much space is given to the discussion of a system to describe the concepts underlying actions, referred to as the primitive acts of Conceptual Dependency. This system or language is described in Table 3.1 and includes two elements MTRANS and MBUILD. MTRANS is defined as "the transfer of mental information between animals or within an animal" (Schank & Abelson, 1977, p.I4). This can involve moving information from the various sense organs into short term memory and from short to long term memory. Examples given include "'tell' (which) is MTRANS between people, . . . 'learn' is MTRANSing of new information to LTM" (p. 14). MBUILD is the "construction . . . of new information from old (or existing) information. Thus, 'decide', 'conclude', 'imagine',

Table 3.1

Primitive Acts in Schank and Abelson's (1977) Conceptual Dependency Scheme

Label	Meaning	Example
ATRANS	Transfer of possession, ownership or control	"BUY" "GIVE"
PTRANS	Transfer of physical location of an object	"PUT" "GO"
PROPEL	Application of physical force to an object	"PUSH" "KICK"
MOVE	Movement of a body part of an actor by that actor	"KISS" "SCRATCH"
GRASP	Grasping of an object by an actor	"HOLD" "THROW"
INGEST	Taking in of an object by an actor	"EAT" "BREATHE"
EXPEL	Expulsion of an object from the body of an actor	"CRY" "SPIT"
*MTRANS	Transfer of mental information between actors or within an actor	"SEE" "LEARN"
*MBUILD	Construction by an actor of new information from old information	"CONCLUDE" "CONSIDER"
SPEAK	Actions of producing sounds	"SAY" "SCREAM"
ATTEND	Action of focusing a sense organ towards a stimulus (Attend is nearly always referred to as the instrument of MTRANS)	"LISTEN" "SMELL"

* These elements can be seen as prerequisites for mindfulness.

'consider' are common examples of MBUILD" (p. 14). Both of these elements imply active information processing and are involved in learning. These two elements are clearly inappropriate in mindless behaviour. If museum scripts can include these MTRANS and MBUILD elements they cannot be exclusively connected to mindlessness. Thus, one question that has to be addressed before Langer's concepts can be used to explain museum visitor behaviour is that of the structure and content of the museum visit script. Does the museum script contain opportunities for mindfulness?

A second force driving this study of museum scripts is to provide some ecological validity for the Mindfulness Model. Several authors (Cohen, 1979; Pearce, 1988; Ross, 1987) have argued that research into visitor or tourist behaviour should be emic, contextual, processual and longitudinal. Forgas (1982) presents a similar argument as the basis for his work on episode cognition. Ross (1987) and Pearce (1988) emphasised in particular the need to examine visitors' understanding and expectations of their behaviour and of the setting under study. The use of the scripts concept to understand visitor expectations of a museum and visitor perceptions of the appropriate behaviours for a museum visit is one method for providing this information. Pearce (1984, 1988) has demonstrated the value of examining in detail the concepts and cognitive structures of tourists for understanding difficulties which can arise in social situations encountered by tourists. In studies of six guided tours using social situations analysis (see Argyle, Furnham & Graham, 1981, for a detailed discussion of this approach to social situations) Pearce (1984) demonstrated that for a successful tour, both the guides and tourists have to know how to behave in the setting. Although he did not directly discuss scripts, his definition of concepts and cognitive

structures as the "shared definitions and understandings needed to operate in social situations" (p. 132) is one which fits the scripts concept. In a later study of the social situations encountered in farm holidays he was able to set out the problems which arose when the script the visitors had for a farm visit did not match that of the farm hosts (Pearce, 1988). These examples suggest that examination of museum scripts may provide insights into visitor behaviour and cognition not likely to arise out of other research approaches.

Finally, this study of museum scripts had the goal of providing information on the links between visitor motives, expectations and behaviour in museums. These links have been suggested, but not explored, by several authors (Alt, 1980; Miles, 1989; Prince, 1985, 1990).

In summary, the present study had two major goals:

1. To elicit an emic description of museum scripts. That is, to investigate the perceptions that are held of museums and the sequences of actions seen as appropriate for a museum visit. This description of museum scripts should give both a more detailed understanding of visitor behaviour and cognition in museums, and address the issue of whether or not museum scripts can induce mindlessness.

2. To explore the relationships between visitor motives for, expectations of, and behaviour and cognition in, museum settings.

3.1 Museum Scripts: Method

Sample

A total of 348 people were surveyed using a limited snowball sampling procedure. First year psychology students at James Cook University of North Queensland were requested to participate in the research for course credit. The students were required to complete a survey form themselves and then to act as interviewers and to ask three non-university acquaintances to complete the survey. The sample was composed of 158 (45.4%) males and 190 (54.6%) females with an age range of 3 to 73 years. The mean age was 24.4 years (SD=12.72) with 63 (17.0%) of the sample aged 12 or less. 130 (37.4%) of the sample were university students, the remaining 209 (62.4%) came from a variety of occupations. The sample included both people who had been to a museum (n = 297, 85.3%) and people who had never been to a museum (n = 51, 14.7%). The sample included a broad range of experience with museums. The mean number of museum visits was 5 and the median 3 (SD = 5.8). Of those who had been to a museum, 31 (10.6%) had visited local museums only, 117 (39.9%) had visited museums throughout Australia and 140 (47.8%) had been to museums both within Australia and in overseas countries.

Survey forms

Adult participants were required to complete a survey form, while children below 10 years were interviewed using the same questions as for the adult survey and their answers were recorded by the interviewers (see Appendix A for a copy of the Survey Form). The first section of the survey form requested that people contemplate for a few minutes a visit to a museum. The second section contained questions eliciting information about

the museum visit being contemplated. The participants were asked to consider who they would be with, how long the visit would be and the purpose of the visit. These questions were designed to establish a context for the major task in the survey, which was to "describe what you would do on a visit to a museum". A large space was left for this task and respondents were told that they could continue on the back of the form if necessary. The final section of the survey form elicited demographic information and included questions on the number and location of museums visited by the respondents. It was decided to use this open-ended, unstructured approach to provide as few cues on the social desirability of responses as possible. It is the method commonly used in studies into script development (Douglas, 1984; Fivush, Hudson & Nelson, 1984; Martin, Harrod & Siehl, 1980). Table 3.2 contains some examples of the responses given.

3.2 Museum Scripts: Results

Participants were asked several questions aimed at establishing a context for their descriptions of a museum visit, including the reason for the visit and who they would be visiting with. The answers to these two questions were also seen as important variables for further analyses. Answers to the question concerned with reason for visit were placed into four categories; relaxation (n=41, 16%), entertainment (n=57, 22%), education (n=112, 44%), and social outing (n=44, 17%). Answers to the question concerned with who the participant would be visiting the museum with were placed into six categories; alone (n=29, 10%), with a partner (n=107, 38%),

Table 3.2

Examples of Description of a Museum Visit

1.	Rush through until we see something that interests us. Have a good look, read a few facts about that item. Inspect the next display carefully because we are now concerned with the wealth of knowledge available. Then get bored and hurry around so we can say we have seen everything.
2.	Pay. Obtain catalogue, look at exhibits, look longer at those I find interesting and less at those I find less interesting. Find the exit and leave.
3.	Look at things, look at more things.
4.	Go in, have a look around, go out.
5.	Look, read, learn, think, remember.
6.	Briefly check out what the museum has to offer. Quickly buzz around to find what interests me most. Spend more time on the displays I'm most interested in. Check out the facts. Reflect on new information, possibilities of new discoveries. Go for coffee and find out what my friend thought. Leave.
7.	Walk into the museum, through impressive heavy doors. The museum is a place that is a grey, cold place. The artifacts or whatever the museum is about, rest on a stone wall. The floors echo the sound of visitors' feet, because there is no carpet. It is a shiny floor. There is a man who stands near important artifacts, who wears a uniform, he is old. There are a lot of people visiting, they murmur quietly, no-one talks aloud. People view each item and move onto the next, there are some who stay more than others. Sometimes there is a man who takes guided tours. It is very interesting and you leave happy.
8.	Find the playground and play. See the dinosaurs and all the old bones. Then go home and tell dad.
9.	Look at the skeletons and dead animals.

with family (n=75, 27%), with friends (n=38, 14%), with family and friends (n=21, 7%), and with a tour group (n=11, 4%).

Table 3.3 is the list of all the actions included for the total sample of museum visit descriptions and the number and percentage of respondents including these actions in their museum script. The actions are in the sequential order that all respondents followed. The mean number of actions included in a script was 3.7 (SD = 2.3) with a median of 3 and a range from 1 to 13. The five most common actions were, in order - *arrive, get pamphlets, get to the exhibits, look at the exhibits* and *leave.* None of the other behaviours were included by 20% or more of the sample. The actions in Table 3.3 do include those that could be categorised as, or offer opportunities to be, MTRANS or MBUILD elements using Schank and Abelson's (1977) scheme. These are *get pamphlets, look at a map, decide on a plan for the visit, reading information, thinking or learning about the information, watching a film, interacting with exhibits, discussing exhibits* and *asking staff questions.* However, only one of these actions, *get pamphlets* is included by more than 20% of the sample. Further, the major element of concern to museum educators, that of *thinking or learning about the information* in exhibits, was included by only 13.8% of the total sample.

Table 3.4 demonstrates the differences between adult and child (12 years and under) descriptions of a museum visit. Children include the elements of *seeing dinosaurs and/or old bones, playing,* and *telling parents what they had seen.* The four major actions for a child's museum script are *seeing dinosaurs and/or old bones, getting to exhibits, looking at exhibits,* and *interacting with exhibits.* This is reflected in the finding that children

Table 3.3

Total List of Actions Included in Museum Visit Descriptions and Frequency Distribution of Respondents Including Actions in Description

Action	**Number of Respondents Including Action in Description**	**Percentage**
Arrive	119	34.2
Pay	53	15.2
Get pamphlets	83	23.9
Look at a map	60	17.2
Take a guided tour	20	5.7
Decide on a plan for visit	54	15.5
Get to exhibits	109	31.3
Read labels	58	16.7
Think/learn	48	13.8
Look at exhibits	286	82.2
Look at dinosaurs/old bones	50	14.4
Watch film/audiovisual	17	4.9
Interact with exhibits	24	6.9
Discuss visit/exhibits with companions	62	17.8
Rest	13	3.7
Ask staff questions	29	8.3
Get pamphlets/brochures	10	2.9
Go to bookshop	40	11.5
Go to coffee shop/restaurant	52	14.9
Make a donation	3	0.9
Leave	118	33.9
Play	4	1.1
Tell parents about exhibits	4	1.1
	(n = 348)	

have a significantly lower mean number of actions in their scripts, 2.5 (SD = 1.5), as compared to 3.9 (SD = 2.3) for adults, T = 5.26, df = 346, $p < 0.05$. Children also differed from adults in their experience of museums. The mean number of museum visits for children was 1.6 (SD = 2.2), while for adults it was 5.2 (SD = 5.0). A Mann-Whitney U-Test indicated that this was a significant difference, z = -6.89, $p < 0.05$. Because of the major substantive differences in the scripts for children and adults, children were excluded from further analyses.

A comparison of the museum scripts of males and females is given in Table 3.5 and the difference that is apparent is that females are more likely to include MTRANS or MBUILD elements. However, a series of chi-square analyses indicated that there was only one instance in which the difference between the two groups was significant at the 0.01 level, that of *get pamphlets*. For chi-square analyses of the inclusion of elements in scripts by different groups a significance level of 0.01 was set as a large number of analyses were conducted. For all other analyses the level was set at 0.05. A t-test conducted on the number of actions included in the descriptions of males and females indicated that females had a significantly higher mean number of actions, 4.3 (SD = 2.3) as compared to 3.4 (SD = 2.3) for males, T = -3.14, df = 282, $p < 0.05$. There was not a significant difference between males and females for the number of museums visited. Females had a mean of 4.9 (SD = 4.8) and males had a mean of 5.6 (SD = 4.8) (Mann-Whitney U-Test, z = -0.88, $p > 0.05$). A crosstabulation analysis of sex by motive for visit also failed to indicate any differences between males and

Table 3.4

Frequency Distribution for Inclusion of Actions in Description for Adults and Children (12 years and under)

Action	Adults (n = 285) Number	Percent	Children (n=63) Number	Percent
Arrive	113	39.6	6	9.5
Pay	49	17.2	4	6.3
Get pamphlets	83	29.1	-	-
Look at a map	60	21.1	-	-
Take a guided tour	18	6.3	2	3.2
Decide on a plan for visit	54	18.9	-	-
Get to exhibits	93	32.6	16	25.4
Read labels	52	18.2	6	9.5
Think/learn	44	15.4	4	6.3
Look at exhibits	225	78.9	61	96.8
Look at dinosaurs/old bones	-	-	63	100.0
Watch film/audiovisual	15	5.3	2	3.2
Interact with exhibits	9	3.2	15	23.8
Discuss visit/exhibits with companions	58	20.4	4	6.3
Rest	13	4.6	-	-
Ask staff questions	24	8.4	5	7.9
Get pamphlets/brochures	10	3.5	-	-
Go to bookshop	32	11.2	8	12.7
Go to coffee shop/restaurant	50	17.5	2	3.2
Make a donation	3	1.1	-	-
Leave	115	40.4	3	4.8
Play	-	-	5	7.9
Tell parents about exhibits	-	-	5	7.9

Table 3.5

Frequency Distribution for Inclusion of Actions in Museum Visit Descriptions for Males and Females

Action	**Males (n = 120)**		**Females (n=164)**	
	Number	**Percent**	**Number**	**Percent**
Arrive	40	33.3	73	44.5
Pay	19	15.8	30	18.3
Get pamphlets	22	18.3	61	37.2*
Look at a map	26	21.7	34	20.7
Take a guided tour	6	5.0	12	7.3
Decide on a plan for visit	21	17.5	33	20.1
Get to exhibits	42	35.0	51	31.1
Read labels	18	15.0	34	20.7
Think/learn	14	11.7	29	17.7
Look at exhibits	87	72.5	137	83.5
Watch film/audiovisual	7	5.8	8	4.9
Interact with exhibits	2	1.7	7	4.3
Discuss visit/exhibits with companions	21	17.5	37	22.6
Rest	5	4.2	8	4.9
Ask staff questions	9	7.5	15	9.1
Go to bookshop	12	10.0	20	12.2
Go to coffee shop/restaurant	16	13.3	33	20.1
Leave	45	37.5	70	42.7

* Chi-square significant, $p < 0.01$

females(Chi-Square = 6.2, df = 3, $p > 0.05$). A crosstabulation of sex by the composition of the visiting group did indicate that females were more likely than males to visit with a partner and with family and friends (see Table 3.6).

Table 3.6

Crosstabulation Analysis of Sex by Social Composition of Visiting Group

		Respondent would visit with						
	n Row % Col %	**Alone**	**Partner**	**Family**	**Friends**	**Family & Friends**	**Tour Group**	**Total**
Sex	**Males**	14 11.8 48.3	40 33.0 37.4	36 30.5 48.0	22 18.6 57.9	2 1.7 9.5	4 3.4 36.4	118
	Females	15 9.2 51.7	67 41.1 62.6	39 23.9 52.0	16 9.8 42.1	19 11.6 90.5	7 4.3 63.6	163
	Total	29	107	75	38	21	11	281

Chi-square = 15.7, df = 5, $p < 0.05$.

Table 3.7 has the lists of actions for a museum visit for these four groups. The major difference that can be seen is for *discuss the exhibits or visit with companions*" which is significantly higher for those with an educational aim. Further, as might be expected, those who state an educational aim are more likely to include the MBUILD element of *thinking/learning about the information*. But even for this group this element is included by only 23.2% of the respondents. A one-way analysis of variance failed to find a significant difference between the groups for the number of actions in their scripts ($F = 1.17$, df = 3,250, $p > 0.05$). The

Table 3.7

Frequency Distribution for Inclusion of Actions in Description for Four Reasons for Visit Groups

Action	Relaxation		Entertainment		Education		Social Outing	
	n	%	n	%	n	%	n	%
Arrive	15	36.6	23	40.4	42	37.5	20	45.5
Pay	9	22.0	8	14.0	23	20.5	5	11.4
Get pamphlets	11	26.8	15	26.3	37	33.0	12	27.3
Look at a map	9	22.0	13	22.8	22	19.6	9	20.5
Take a guided tour	2	4.9	3	5.3	6	5.4	3	6.8
Decide on a plan for visit	6	14.6	14	24.6	23	20.5	8	18.2
Get to exhibits	12	29.3	23	40.4	40	35.7	10	22.7
Read labels	7	17.1	13	22.8	20	17.9	7	15.9
Think/learn	5	12.2	6	10.5	26	23.2	4	9.1*
Look at exhibits	34	82.9	44	77.2	87	77.7	35	79.5
Watch film/audiovisual	1	2.4	4	7.0	5	4.5	2	4.5
Interact with exhibits	-	-	3	5.3	4	3.6	1	2.3
Discuss visit/exhibits with companions	5	12.2	10	17.5	23	20.5	18	40.9*
Rest	1	2.4	2	3.5	6	5.4	3	6.8
Ask staff questions	4	9.8	2	3.5	15	13.4	3	6.8
Go to bookshop	1	2.4	4	7.0	20	17.9	3	6.8*
Go to coffee shop/restaurant	5	12.2	11	19.3	19	17.0	10	22.7
Leave	14	34.1	23	40.4	53	47.3	17	38.6
	(n=41)		(n=57)		(n=112)		(n=44)	

* Chi-square significant, $p < 0.01$

mean numbers of actions for the four groups were as follows: Relaxation, 3.5 (SD = 2.2), Entertainment, 3.9 (SD = 2.3), Education, 4.3 (SD = 2.5) and Social Outing, 4.0 (SD = 2.0).

A crosstabulation of the reason for the visit and the social composition of the group who would be with the respondent at the museum, is given in Table 3.8. For all types of social group, education is given as the reason for the visit by the majority of respondents. The patterns of reasons, however, differ for the various social groups. For Couples and Families, the second most common reason is that of a social outing, with entertainment as a close third motive for Families, and relaxation a close third for Couples. Those respondents visiting with Friends give almost equal support for education and entertainment. Finally, entertainment is the second reason for Family and Friends, and education is the major reason given by respondents visiting with a Tour Group. Table 3.9 shows the frequency distributions for actions included in the museum scripts of the six different types of social group. No major differences appear to exist between the scripts of these different groups. This is reflected in the results of a oneway analysis of variance which failed to find any significant differences in the number of steps included in the scripts of the six groups ($F = 1.58$, $df = 5,251$, $p > 0.05$). The mean numbers of actions for the groups are given at the bottom of Table 3.9.

The final distinction investigated was that of experience with museum visits. Four groups were distinguished in this instance, those who had never been to a museum, those who had been once, those who had been 2 to 5 times, labelled Low Experience, and those who had been more than 5 times,

Table 3.8

Crosstabulation of Reason for Visit with Social Composition of Visiting Group.

Respondent would visit with

	n Row % Col %	Alone	Partner	Family	Friends	Family & Friends	Tour Group	Total
Motive	**Relax.**	6 15.0 23.1	22 55.0 22.4	8 20.0 12.3	2 5.0 5.9	2 5.0 10.5	2 0.0 0.0	40
	Enter.	7 12.5 26.9	18 32.1 18.4	12 21.4 18.5	14 25.0 41.2	5 8.9 26.3	0 0.0 0.0	56
	Educate	12 10.7 46.2	34 30.4 34.7	31 27.7 47.7	15 13.4 44.1	10 8.9 52.6	10 8.9 100.0	112
	Social	1 2.3 3.8	24 54.5 24.5	14 31.8 21.5	3 6.8 8.8	2 4.5 10.5	0 0.0 0.0	44
	Total	26	98	65	34	19	10	252

Chi-square = 35.3, df = 15, $p < 0.05$

labelled High Experience. This categorisation of experience was based on research conducted in the area of script development which suggests that important changes in scripts occur at certain levels of experience. These changes occur at the following points, one experience of an event, two to five experiences and more than five experiences. (See Martin et al., 1980, and Smith & Houston, 1986, for a review of this area). Table 3.10 contains the lists of actions and frequency of inclusion in scripts for these four groups. Chi-square analyses indicated that there were significant differences at the .01

Table 3.9

Frequency Distribution for Inclusion of Actions in Descriptions for Six Visiting Groups

Action	Alone		Couple		Family		Friends		Family/ Friends		Tour Group	
	n	%	n	%	n	%	n	%	n	%	n	%
1	10	34.5	41	38.3	38	31.4	20	45.5	6	23.1	3	20.0
2	5	17.2	14	13.0	15	12.4	6	13.6	9	34.6	4	26.7
3	5	17.2	29	26.9	23	19.0	13	29.5	10	38.5	2	13.3
4	6	20.7	29	26.9	14	11.6	5	11.4	4	15.4	1	6.7
5	1	3.4	5	4.6	7	5.8	2	4.5	2	7.7	3	20.0
6	5	17.2	26	24.1	14	11.6	6	13.6	2	7.7	1	6.7
7	12	41.4	31	28.7	44	36.4	10	22.7	8	30.8	2	13.3
8	6	20.7	20	18.5	13	10.7	11	25.0	6	23.1	1	6.7
9	3	10.3	19	17.6	10	8.3	6	13.6	5	19.2	4	26.7
10	26	89.7	82	75.9	99	81.8	37	84.1	22	84.6	15	100.0
11	1	3.4	4	3.7	7	5.8	3	6.8	1	3.8	1	6.7
12	1	3.4	6	5.6	12	9.9	3	6.8	1	3.8	1	6.7
13	1	3.4	25	23.1	21	17.4	8	18.2	6	23.1	1	6.7
14	2	6.9	9	8.3	1	0.8	1	2.3	0	0.0	0	0.0
15	2	6.9	7	6.5	10	8.3	4	9.1	3	11.5	2	13.3
16	2	6.9	14	13.0	14	11.6	4	9.1	5	19.2	0	0.0
17	4	13.8	18	16.7	22	18.2	5	11.4	2	7.7	1	6.7
18	8	27.6	41	38.0	25	20.7	22	50.0	13	50.0	7	46.7
	(n=29)		(n=108)		(n=121)		(n=44)		(n=26)		(n=15)	
Mean No. of Actions (S.D.)	3.52 (2.1)		3.93 (2.3)		3.29 (2.2)		3.86 (2.6)		4.31 (2.4)		3.27 (1.3)	

level between the four groups for the elements, *look at a map, decide on a plan for visit, look at exhibits* and *ask staff questions*. Increasing experience is related to a greater likelihood of including the actions, *get pamphlets, look at a map, decide on a plan for visit* and *go to the coffee shop/restaurant.* Increasing experience is also related to decreasing inclusion of *looking at the exhibits*. The mean number of actions in the scripts increases with experience, for those who have never been the mean is 3.0 (SD = 2.0), while it increases to 3.7 (SD = 2.0) for those who have been once and is 3.7 (SD = 2.1) for those with Low Experience and is 4.6 (SD = 2.5) for those in the High Experience group. As a Pearson correlation indicated a slight but significant positive relationship between age and experience with museums ($r = 0.29$, $p < 0.05$), age was included as a covariate with levels of experience as the independent variable in an analysis of variance for the number of actions in the scripts. Table 3.11 is the source table for this analysis and indicates that there are significant differences between the levels of experience for the number of actions in the scripts. Age, however, does not have a significant influence on the dependent variable. Further, a Scheffe post-hoc test indicated that there were significant differences between the High Experience group and the other three groups.

Crosstabulation tables were also constructed to explore possible relationships between levels of experience with museums and motives for visit (Table 3.12) and between levels of experience with museums and social composition of the visiting group (Table 3.13). In neither case did a significant pattern emerge.

Table 3.10

Frequency Distribution for Inclusion of Actions in Descriptions for Four Levels of Experience with Museum Visits

Actions	Never Been		Once		Low		High	
	n	%	n	%	n	%	n	%
Arrive	15	44.1	17	48.6	40	35.1	41	40.2
Pay	2	5.9	7	20.0	19	16.7	21	20.6
Get pamphlets	8	23.6	10	28.6	26	22.8	39	38.2
Look at a map	2	5.9	3	8.6	23	20.2	32	31.4*
Take a guided tour	2	5.9	1	2.9	5	4.4	10	9.8
Decide on a plan for visit	3	8.8	1	2.9	15	13.2	35	34.3*
Get to exhibits	5	14.7	9	25.7	41	36.0	38	37.3
Read labels	6	17.6	3	8.6	19	16.7	24	23.5
Think/learn	2	5.9	4	11.4	18	15.8	20	19.6
Look at exhibits	34	100.0	28	82.9	90	78.9	72	70.6*
Watch film/audiovisual	0	0.0	2	5.7	8	7.0	5	4.9
Interact with exhibits	1	2.9	0	0.0	4	3.5	4	3.9
Discuss visit/exhibits with companions	6	17.6	5	14.3	24	21.1	23	22.5
Rest	0	0.0	2	5.7	4	3.5	7	6.9
Ask staff questions	0	0.0	2	5.7	16	14.0	6	5.9
Go to bookshop	0	0.0	5	14.3	7	6.1	20	19.6*
Go to coffee shop/restaurant	2	5.9	8	22.9	14	12.3	26	25.5
Leave	12	35.3	14	40.0	46	40.4	43	42.2
	(n=34)		(n=35)		(n=114)		(n=102)	

* Chi-square significant, $p < 0.01$

Table 3.11

Source Table for Analysis of Variance of Number of Actions in Museum Scripts

Source of Variance	SS	df	MS	F	Sig.
Covariates					
AGE	8.36	1	8.36	1.66	0.199
Main effects					
EXPERIENCE	82.04	3	27.35	5.43	0.001
Explained	90.40	4	22.60	4.49	0.002
Residual	1409.59	280	5.03		
Total	1499.99	284	5.28		

3.3 Museum Scripts: Discussion

The major question guiding the present study was to investigate the content of the script for a museum visit. The results of the survey indicated that the script for a museum visit has a very basic set of three elements - *arrive at the museum, look at the exhibits* and *leave*. These were the only three actions included in descriptions of a visit to a museum by more than one-third of the sample. It is likely that in a more structured approach that more elements would be seen as important for a visit to a museum but the three listed above would appear to be the only actions in a museum visit that are sufficiently salient to be included in an unstructured description. Further, this script fits the patterns obtained in observations of visitors.

The study was specifically concerned with the inclusion of BUILD and MTRANS elements in the museum visit script. The results indicated that some respondents did include in their museum visit descriptions, actions

Table 3.12

Crosstabulation of Levels of Experience by Reason for Visit

Experience	n / Row % / Col %	Motive: Relax	Entertain	Educate	Social	Total
Never been		2 6.5 4.9	10 32.3 17.5	14 45.2 12.5	5 16.1 11.4	31
Once		5 17.9 12.2	7 25.0 12.3	11 39.3 9.8	5 17.9 11.4	28
Low		19 17.9 46.3	22 20.8 38.6	46 43.4 41.1	19 17.9 43.2	106
High		15 16.9 36.6	18 20.2 31.6	41 46.1 36.6	15 16.9 34.1	89
Total		41	57	112	44	254

Chi-square = 4.3, df = 9, $p > 0.05$

which could have been seen as MBUILD or MTRANS elements, but the highest percentage of inclusion for the total sample was 23.9% for the action of *get pamphlets*. Only 13.8% included any action involving thinking or learning about the material in the museum. It could be argued that respondents might have believed it to be socially desirable to include some indication of thinking about the exhibits, although no evidence exists to support this. If this is the case, the inclusion rate for thinking/learning may be inflated. Even when respondents explicitly stated that they had an

Table 3.13

Crosstabulation of Levels of Experience by Social Composition of the Visiting Group

Respondent would visit with

	n Row % Col %	Alone	Partner	Family	Friends	Family & Friends	Tour Group	Total
Experience	Never	4 12.1 13.8	13 39.4 12.1	6 18.2 8.0	7 21.2 18.4	0 0.0 0.0	3 9.1 27.3	33
	Once	5 14.3 17.2	14 40.0 13.1	8 22.9 10.7	5 14.3 13.2	2 5.7 9.5	1 2.9 9.1	35
	Low	5 4.5 17.2	39 34.8 36.4	31 27.7 41.3	18 16.1 47.4	15 13.4 71.4	4 3.6 36.4	112
	High	15 14.9 51.7	41 40.6 38.3	30 29.7 40.0	8 7.9 21.1	4 4.0 19.0	3 3.0 27.3	101
	Total	29	107	75	38	21	11	281

Chi-square = 24.9, df = 15, $p > 0.05$

educational purpose for their museum visit, only 23.2% included the think or learn action. Thus the examination of the content of a museum visit script supports the proposal that museum visitors are often mindless and this is consistent with the results of previous survey and observational research (Moscardo, 1988). This also provides support for the mindlessness/ mindfulness model for visitor behaviour and cognition.

The second question guiding the analysis was that of the potential relationship between motives and scripts for museum visits. The most common reasons given for a museum visit were educational. It seems likely

that this is partly due to a perception on the part of respondents that it is socially desirable to state educational motives for visits. As might be expected, the respondents giving an educational motive were the most likely to include the actions *think/learn, get pamphlets,* and *go to the bookshop.* Although, as previously noted, these did not have high inclusion rates. Those respondents seeking entertainment in their visit had the highest inclusion rates for *read labels, watch audiovisuals,* and *interact with exhibits.* It is possible that visitors do not associate audiovisual and interactive exhibits with education. Why this group should have the highest inclusion rates for *read labels* is not clear. Visitors with social motives had low inclusion rates for the MBUILD and MTRANS elements, but the highest inclusion rates for *discuss with companions* and *visiting the coffee shop.* Several studies (Hilke, 1989; McManus, 1988, 1989) have suggested that discussion of exhibits with companions may be a vehicle for learning. If this is the case in the present study it is not reflected in the inclusion of any comments related to thinking or learning. Further, Table 3.8 suggests that reasons for visits and the social composition of groups are related. Examination of the elements of scripts provided by the different types of social group, however, did not reveal any significant differences. This suggests that motives for visits may be more important in determining expectations of museums than social group.

The data also identified differences between the scripts of other groups within the sample. The scripts of those who have never been to a museum suggest that museum visitors do not expect to think or learn in their visit and this may partly explain why they then do not appear to pay much attention to the information provided in museums. Edwards, Loomis, Fusco and McDermott (1990), in their study of art gallery visitors, concluded that more

frequent visitors were more likely to have educational goals than other visitors. It could therefore be proposed that more frequent visitors would be more likely to be mindful visitors. In the present case experience with museum visits is linked to higher rates of inclusion for various actions that could be MBUILD or MTRANS elements, but, the action of think or learn is still not seen by more than 80 percent of the sample as sufficiently important or critical to the experience to be included in a description of a museum visit. Further, experience was not related to a greater likelihood of reporting educational goals. Experience with museums is linked to more detailed scripts, but not necessarily more mindful behaviour.

An important set of concerns do appear with experience of museum visits, that of orientation. Those with experience of museums are much more likely to include the elements of *look at a map*, and *work out a plan to get to the exhibits* and tackle the museum visit. This is rarely seen as necessary for those who have never been to a museum. This supports previous arguments (Guthrie, 1984; Screven, 1986; Miles et al., 1982) that attention needs to be paid to the issue of orientation systems for museums. Cognitive resources used by visitors to orient themselves and find what they want to see are resources that could be spent thinking or learning about exhibits.

Abelson (1975) pointed out that much of the work in cognitive science is hypothesis rather than data-driven, suggesting that research using scripts could have important implications for the further development of theory. Schank (1980) in reviewing the history of his work in this area goes further describing a specific example of how research using scripts (Bower, Black & Turner, 1979) was valuable in developing his ideas about the ways in which scripts could work in cognition. The differences found in the present study

between scripts based on vicarious experience and scripts based on direct experience have some implications for the study of scripts in general. In most writing concerned with scripts there is an underlying assumption that people must directly experience a situation to have a script. there has been no explicit concern with the possibility of vicarious experience with a script. Yet much of the research into scripts examines scripts for stories about various social situations (see Martin, Harrod & Siehl, 1980, for a review of the methods used in script research). It is likely that at least some of the subjects in these experiments have not directly experienced the portrayed social situations and thus are building and describing scripts based on vicarious experience.

The present set of results revealed that those who have never been to a museum had shorter scripts and were much less likely to include the MBUILD or MTRANS elements than those with some experience of museums. This might be expected as these would be the most difficult aspects of an experience to appreciate vicariously. These findings have important implications for the use of stories as a method for eliciting scripts. It seems likely that in many research studies at least some of the participants will construct stories of situations of which they have only vicarious experience. In this instance their stories may not include various actions or elements and this may be biased towards the exclusion of MBUILD and MTRANS elements as these are the hardest to understand vicariously. Additionally, in the present study those with vicarious experience had a higher inclusion rate for the action *looking at exhibits* than the other participants. This suggests the possibility that research based on stories where participants who have only vicarious experience of a situation may see

some elements or actions as more important to the script than they actually are.

Other results of interest were the differences between adults and children and between males and females. In the first instance all children sampled believed that a museum visit involved seeing dinosaurs and/or old bones. This may reflect both their experiences with museums and the image museums have in the media and literature. The desirability or otherwise of this image is not of concern to the present research except to point out the potential for disappointment for children not finding these objects in a museum. It should also be noted that very few children (6.3%) saw museums as places for thinking or learning, yet children had a much higher inclusion rate (23.8%) for *interacting with exhibits*. As noted in Chapter 2, it is a popular belief among museum educators that interactive exhibits produce mental as well as motor activity on the part of the child. If this is so it might be expected that the inclusion rate for thinking and learning might have been higher for children. While it might be argued that children could have been limited in expressing these elements because of limits to their vocabulary, such limits were not obvious in their descriptions of other elements.

In the case of differences based on gender the results indicated that females were consistently more likely to include MBUILD or MTRANS elements. Elsewhere (Argyle et al., 1981) it has been noted that females are more sensitive to subtle social cues and thus may have been more influenced by a social desirability bias to include these elements. An alternative explanation may be that females visit museums with different groups. Perhaps they are more likely to visit with children and are thus more concerned with the educational aspects of museums. This is partly supported

both by the finding that females were more likely to visit with family and friends and that those who go to a museum with the purpose of a social outing were more likely to include the element of discuss the museum/exhibits with companions. However, in the latter case this did not seem to be related to higher inclusion rates of the MBUILD or MTRANS elements.

3.4 Museum Scripts: Summary

Although a major proportion of the previous discussion was concerned with examining the differences in museum scripts for various groups within the sample, it is the similarity of scripts across all these groups that dominates the findings. There are three basic elements in a museum script - *arrive, look at the exhibits* and *leave*. Only a small percentage of the respondents spontaneously included actions which could be indicative of a mindful cognitive state. These results are consistent with previous observational and survey data on visitor behaviour and learning.

This study did not demonstrate many significant differences between respondents with different reasons for their museum visit. Those with educational goals were more likely to include various MBUILD and MTRANS actions and those on a social outing were more likely to include *discussion with companions* in their scripts. The scripts for both these groups, however, were more similar than dissimilar. This is also a very apt description of the scripts for the different types of visiting groups - that they were more similar than dissimilar.

The study also investigated experience with museums and its relationship to scripts. This investigation revealed that orientation played an

important role in the scripts of experienced visitors, and that increasing experience was related to more detailed scripts. It seems possible to suggest from these results that the relationship between experience of museums and mindfulness is mediated by orientation. While it is not clear from these results that more experienced visitors are more mindful, these visitors place a greater importance on orientation or wayfinding in museums and thus allow themselves greater cognitive resources to devote to exhibits.

Overall, the results of this study of museum scripts provide support for the Mindfulness Model's prediction that museum visitors are more likely to be mindless than mindful. there is also support for the predictions that motives can influence cognitive states, and that orientation is important in determining cognitive state. Finally, it seems that experience with museums may be related to greater mindfulness, but it is not yet clear why this should be so.

3.5 Museum Scripts as Social Representations: A Post Script

The present study was based upon the work of Abelson and Schank on scripts, as this is one of the foundations of Langer's work on mindfulness/mindlessness. As with most studies, the data can be examined from several different perspectives. One such alternative perspective worth noting is that of social representations. This perspective is worthy of note both because of its current pre-eminence in social psychology (Augoustinos & Innes, 1990), and because the descriptions of museum visits obtained in the present study can be seen as social representations.

There are many similarities between scripts and social representations, a point noted by Farr (1987) and Augoustinos and Innes (1990). Both are

cognitive structures which are used for organising knowledge and guiding behaviour. The differences between the two concepts lie in the traditions of research that they are associated with and their emphasis. Scripts arise from a concern with the structure of knowledge storage in individuals, while social representations are concerned with the way in which knowledge is communicated and used in social contexts. The present study could be seen as falling between these two traditions with a focus both on the structure and the content of knowledge about museums. By focussing more on the descriptions of museums the study could have provided a more specific analysis of social representations of museums. Indeed this would be a valuable extension of this work. For the purposes of the present thesis, however, the use of scripts was judged more valuable in answering the questions set in the discussion. (For more detailed discussions of social representations, the reader is directed to Farr, 1987, and Moscovici, 1984.)

CHAPTER 4

Observation Studies in Australian Museums: Developing a Picture of Visitor Behaviour

Observational techniques are used, usually unconsciously, on a continuous basis in everyday communication.

(Risk, 1989, p. 120)

4.0 Observation Studies in Museums: An Introduction

The most basic of research methods is direct observation (Kerlinger, 1986). Unobtrusive observations have dominated visitor studies beginning with the work of Robinson and Melton (Falk, Koran, Dierking & Dreblow, 1985). This chapter reports on unobtrusive observation studies conducted at the two major research settings: - the Semaphore to Satellite Exhibition and the Gallipoli and Sinai Galleries of the Australian War Memorial. These studies focused on the Exhibit/Settings Factors section of the Mindfulness Model and explored links between Visitor Factors and Exhibit/Setting Factors.

The study reported in the previous chapter examined the museum visit from an emic perspective and collected data from visitors (and potential visitors) on their perceptions of what behaviours were appropriate in a museum visit. According to the sample surveyed, the major behaviours were to arrive, look at the exhibits and leave. This pattern is consistent with the results from many observation studies conducted in museums. Although these two different approaches to data collection produce consistent results, it is clear that each approach also produces data not accessible with the other. The open-ended survey technique provides interpretations of behaviour and these

emic accounts include descriptions of cognitive and affective responses to settings. Observational methods cannot provide this information but do allow for much more detailed analyses of behaviour. Data exists indicating that museum visitors have difficulty accurately recalling the amount of time they have spent in a museum (Bitgood & Richardson, 1986), and it is unlikely that visitors can recall accurately the sequence of their behaviour, or their behaviour in the detail available through observation (Elliott & Christopher, 1973). It was also noted in the previous chapter that the open-ended survey method was open to the possibility of a social desirability bias. Sechrest and Phillips (1979) and Kerlinger (1986) have argued that one strength of unobtrusive observation is reduced reactivity in data collection. Thus unobtrusive observation offers the opportunity to collect detailed information on visitor behaviour in museums.

4.1 Observation Studies in Museums: A Review

Both Melton (1933a, 1933b, 1936) and Robinson (Bitgood, 1988a) relied heavily on unobtrusive observation in their research, and this work set an example followed by many other museum researchers. Table 4.1 provides a summary of visitor studies using observation as a means for collecting data on visitors. The table classifies these studies into two categories according to the design of the study. These categories were taken from Kerlinger (1986) and are defined as follows.

A field experiment is defined as

> *a research study in which one or more independent variables are manipulated by the experimenter under as carefully controlled conditions as the situation will permit.* (Kerlinger, 1986, p.369)

The second category, exploratory field studies

> *are non experimental scientific inquiries...in real social structures (with)...three purposes: to discover significant variables in the field situation, to discover relations among variables, and to lay the groundwork for later, more systematic and rigorous testing of hypotheses.* (pp. 372-373)

An example of a field experiment is the study of Koran, Koran and Longino (1986, number 22) where the researchers created three different experimental conditions by changing an exhibit so that the objects in it could only be looked at, or could be touched, or could be examined with a microscope. Most of the studies in the field experiment category involved the manipulation of one feature of an exhibit, usually the degree of interaction offered to visitors, and focused data collection and analysis on this target exhibit.

Exploratory field studies, however, are the most common studies in Table 4.1. While the definition previously given might suggest that such studies would provide detailed descriptions of the exhibits or variables studied, on the whole this is not the case. With some exceptions these studies have not provided any systematic or detailed descriptions of the exhibits or variables studied. The exceptions include Cone and Kendall (1978, number 7) and McManus (1987, 1988, number 25), whose intentions were to examine visitor behaviour as a function of group composition rather than in

Table 4.1

Summary of Visitor Studies Using Direct Observational Techniques

	Study	Location (n)	Design	Type of observation	Dependent measures	Description of exhibits	Analysis of exhibit features	Demographic analysis	Psycho-logical measures	Analysis of psycho-logical measures
1.	Abrahamson, Gennaro & Heller (1983)	Zoolab, Minnesota Zoological Gardens (n=120)	Exploratory field study	Tracking	Attracting power Holding power Sequence of visit	Brief	Touch vs not touch	Compared women to boys	None	-
2.	Abrahamson, Heller & Ahlgren (1983)	As above	Field experiment	Exhibit targetted	Holding power No. of comments No. of touch activities	Brief	Touch vs not touch	As above	As above	-
3.	Bechtel (1967)	University of Kansas Museum of Art (n=241)	Field experiment	Tracking	Attracting power	None		None	Preference for exhibits	Related stated preference to actual behavour
4.	Birney (1988)	Bird Discovery Area, Brookfield Zoo (n=99 groups)	Exploratory field study	Exhibit targetted	Total time Holding power Behaviour at target exhibit	Details only for target exhibit		None	None	-
5.	Bitgood, Patterson & Benefield (1988)	13 US Zoos (n=30 at each exhibit)	Exploratory field study	Tracking	Holding power Reading behaviour	Yes	Activity size Distance from visitor Presence of infant	None	None	-

cont.

Table 4.1 (cont.)

	Study	Location (n)	Design	Type of observation	Dependent measures	Description of exhibits	Analysis of exhibit features	Demographic analysis	Psycho-logical measures	Analysis of psycho-logical measures
6.	Brooks & Vernon (1956)	Children's Gallery, Science Museum, London (n=50 children)	Exploratory field study	Tracking	Holding power	Yes	Type of media	Compared boys & girls	Motivation Familiarity Comprehension	None
7.	Cone & Kendall (1978)	Science Museum of Minnesota (n=26 families)	Exploratory field study	Tracking	Holding power Family interactions Attracting power	Brief	Type of media	Gender and family roles	Recall for exhibits	Related recall to type of media and holding power
8.	Derwin & Piper (1988)	African Rock Kopje Area, San Diego Zoo (n=500)	Exploratory field study	Tracking	Attracting power Total time Behaviour at exhibits	Brief	Interactive vs. not interactive	Compared adults to children	Enjoyment Comprehension	Related comprehension to exhibit features
9.	Diamond (1986)	Two Science Museums (n=28 families)	Exploratory field study	Tracking	Total time Conversation & social interaction	None	-	Compared adults to children	Enjoyment	None
10.	Diamond, Smith & Bond (1988)	Discovery Room, California Academy of Science (n=62 families)	Exploratory field study	Tracking	Attracting power Social interaction	Brief	Interactive vs. not interactive Touch vs. not touch	Compared adults to children	None	None

cont.

Table 4.1 (cont.)

	Study	Location (n)	Design	Type of observation	Dependent measures	Description of exhibits	Analysis of exhibit features	Demographic analysis	Psycho-logical measures	Analysis of psycho-logical measures
11.	Falk (1983b)	British Museum of Natural History (n=63 children)	Exploratory field study	Exhibit targetted	Holding power Behaviour	Brief	None	None	Comprehension	Related comprehension to attention and behaviour
12.	Falk, Koran, Dierking & Dreblow (1985)	Florida State Museum (n=69)	Exploratory field study	Tracking	Focus of attention noted every 3 minutes	None		None	None	-
13.	Foster, Koran, Koran, Stark, Blackwood & Landers (1988)	Jacksonville Zoological Park (n=621)	Exploratory field study	Exhibit targetted	Behaviour at exhibits	Yes	Variety of species	None	None	-
14.	Goins & Griffenhagen (1957)	Gallery of Medical History at Smithsonian Institution (n=100)	Exploratory field study	Tracking & Exhibit targetted	Attracting power Holding power	Yes	Content/topic Lighting Location	None	None	-
15.	Hayward (1988)	Estimating Game Exhibit, Children's Museum, Boston (n=3296)	Exploratory field study	Behavioural mapping	Attracting power	Brief	Interactive vs. not interactive	Compared age groups (not systematically)	None	-
16.	Hilke, Hennings & Springuel (1988)	Laser at 25 Travelling Exhibition (n=388)	Field experiment	Exhibit targetted	Attracting power Behaviour	Brief	Computer on vs. computer off	Compared adults & children, males & females	Recall	Compared recall for two experimental conditions

cont.

Table 4.1 (cont.)

	Study	Location (n)	Design	Type of observation	Dependent measures	Description of exhibits	Analysis of exhibit features	Demographic analysis	Psycho-logical measures	Analysis of psycho-logical measures
17.	Hirschi & Screven (1988)	Milwaukee Public Museum (n=40 groups)	Field experiment	Exhibit targetted	Holding power Reading behaviour	Brief	Questions in text vs. no questions in text	None	None	-
18.	Houlding (1989)	Collection Gallery, Museum of Science (n=394)	Exploratory field study	Tracking	Time spent in areas Total time	Brief	Type of media	None	None	-
19.	Kearns (1940)	Peabody Museum of Natural History (n=200)	Field experiment	Tracking	Circulation patterns. Attracting power.	Brief	-	-	-	-
20.	Koran, Foster & Koran (1989)	Florida Museum of Natural History (n=47 students)	Exploratory field study	Exhibit targetted	Holding power	Brief	Topic area	None	Comprehension	Related comprehension and interest to attention
21.	Koran, Koran & Foster (1988)	Florida State Museum (n=143)	Field experiment	Exhibit targetted	Touching behaviour at exhibit	Brief	None	Compared age groups & males & females	None	-
22.	Koran, Koran & Longino (1986)	Object Gallery, Florida State Museum (n=131)	Field experiment	Exhibit targetted	Holding power	Brief	Degree of interaction	As above	None	-

cont.

Table 4.1 (cont.)

	Study	Location (n)	Design	Type of observation	Dependent measures	Description of exhibits	Analysis of exhibit features	Demographic analysis	Psycho-logical measures	Analysis of psycho-logical measures
23.	Koran, Morrison, Lehman, Koran & Gandara (1984)	Object Gallery, Florida State Museum (n=234)	Field experiment	Exhibit targetted	No. of people in exhibit areas (Attracting power)	Brief	Touch vs. not touch	Compared age groups & males & females	None	-
24.	Landay & Bridge (1982)	Brooklyn Museum (Art Gallery) (n=not given)	Field experiment	Tracking	Holding power Order of viewing exhibits	Brief	Presence/ absence of audio-visual	None	Comprehension & evaluation of exhibits	Related comprehension & evaluation to different exhibits
25.	McManus (1987 & 1988)	British Museum (Natural History) (n=641 groups)	Exploratory field study	Tracking	Total time Time spent at exhibits & in conversation Interactive & reading behaviour	None	-	Detailed analysis of different types of social group	None	-
26.	Melton (1933a)	Pennsylvania Museum of Art (n=937)	Field experiment	Tracking	Holding power Total time Circulation pattern	Brief	No. & types of exhibits in a gallery	None	None	-
27.	Melton (1936)	New York Museum of Science & Industry (n=1150)	Field experiment	Tracking	Holding power Attracting power	Brief	Movement vs. no movement	None	None	-
28.	Melton (1936)	As above (n=682)	As above	As above	Holding power	Brief	Position of labels	None	None	-

cont.

Table 4.1 (cont.)

	Study	Location (n)	Design	Type of observation	Dependent measures	Description of exhibits	Analysis of exhibit features	Demographic analysis	Psycho-logical measures	Analysis of psycho-logical measures
29.	Moscardo (1988)	National Parks Interpretive Centre, Cardwell (n=120)	Exploratory field study	Tracking	Attracting power. Sequence of visit. Behaviour at exhibits.	Brief	Interactive vs not	None	None	-
30.	Moscardo (1989)	Several Australian Museums (n=300)	Field experiment	Exhibit targetted	Holding power. Behaviour at exhibits.	Yes	Degree of control	Compared families to other groups	None	-
31.	Moscardo (1990)	Great Barrier Reef Aquarium, Townsville (n=3847)	Field study	Tracking and exhibit targetted	Attracting and holding power. Sequence of visit. Behaviour at exhibits.	Yes	Dynamic vs not interactive size.	Sex Age Type of group	None	-
32.	Peart (1984)	British Colombia Provincial Museum (n=280)	Field experiment	Exhibit targetted	Holding power Attracting power Interaction	Detailed description of changes to a single exhibit	Changes to contents of single exhibit	None	None	-
33.	Robinson (1928) (from Bitgood, 1988a)	Art Galleries (n=not given)	Exploratory field study	Tracking	Total time No of paintings stopped at Holding power	None		None	None	-
34.	Russell (1989)	Science Centres (n=345)	Exploratory field study	Tracking	Holding power Behaviour at exhibits	Brief	Degree of interaction	Age groups	Comprehension	Related preference for exhibits to degree of interaction

cont.

Table 4.1 (cont.)

	Study	Location (n)	Design	Type of observation	Dependent measures	Description of exhibits	Analysis of exhibit features	Demographic analysis	Psycho-logical measures	Analysis of psycho-logical measures
35.	Thompson & Bitgood (1988)	Birmingham Zoo (n=5822 groups)	Field experiment	Tracking	Holding & attracting power Reading behaviour	Brief	Changes in length, size & proximity of labels	None	None	
36.	Worts (1990)	Viewpoints exhibition, Art Gallery of Ontario (n=265)	Field experiment	Tracking	Total time Attracting power	Brief	Degree of interaction	None	Satisfaction	Related satis-faction to presence/ absence of interactive components
37.	Yoshioka (1942)	Medicine & Public Health Building, New York World Fair (n=3005)	Exploratory field study	Tracking	Circulation patterns	None		None	None	

relation to exhibits, and Bitgood, Patterson and Benefield (1988, number 4), Foster, Koran, Koran, Stark, Blackwood and Landers (1988, number 12) and Goins and Griffenhagen (1957, number 13) where systematic and detailed analyses of exhibit features were provided.

The type of observational technique used in each study was classified in Table 4.1 using three categories, Exhibit Targetted, Tracking and Behavioural Mapping. Exhibit Targetted refers to studies where the observers collected data for visitors at a target exhibit. This technique allows for detailed data to be collected about a specific exhibit, but does not provide information on how this exhibit relates to other exhibits in the setting. Tracking involves observers following visitors through an entire gallery or area and noting their behaviour at all the exhibits in this area. This is the most common technique used, but it should be noted that it can be difficult for observers to record detailed information about visitor behaviour at individual exhibits with this technique, especially in large and/or crowded galleries. Finally, Behavioural Mapping refers to the technique of entering a gallery at regular intervals and counting the number of visitors in exhibit areas. It may also involve the recording of some details about the visitors and their behaviours. Each technique provides different data and it is worth noting that only one study reported in Table 4.1, Goins and Griffenhagen (1957, number 13), used more than one observational technique.

The lack of detail previously noted with regard to exhibits and settings is also parallelled in a lack of detail in describing visitors and their behaviours. Most studies report only holding power, which is the time spent at an exhibit, or attracting power, which is the number of visitors passing an exhibit who stop at that exhibit, with a brief set of categories for visitor

behaviour. Few studies have examined both the holding and attracting powers of exhibits.

Table 4.1 also includes information on whether or not the studies reported investigated demographic or psychological factors in relation to the visitors observed. Demographic factors were more commonly included in analyses than psychological variables as the latter require the use of some survey or interview technique in conjunction with observations and this is difficult to do. As with the previous categories used to describe these studies, there is a lack of systematic and detailed analyses of these demographic factors. The major conclusion that can be drawn from those studies which have examined demographic variables is that older visitors appear to read more than younger visitors (see numbers 1, 2, 7, 8, 15, 20 and 29). Additionally, early research suggested that males were more attracted to interactive exhibits than females (Brooks & Vernon, 1956, number 5; Cone & Kendall, 1978, number 6). More recent research, however, does not support this sex difference (Hilke, Hennings & Springuel, 1988, number 15). Only three studies in Table 4.1 examined in detail the composition of the visiting group and its influence in behaviour (Cone & Kendall, 1978; Diamond, 1986; McManus, 1987, 1988, numbers 6, 8 and 23). In these studies the analysis concentrated on patterns of interaction within groups of visitors with little attention paid to possible relationships between different types of groups and their behaviour at different exhibits. In summary, these studies concluded that in family groups adults control length of visits and behaviour at exhibits and often engaged in instructive behaviours such as reading labels. It was also found that larger groups of adults spent the least time attending to

exhibits as compared to adults alone or in pairs. (These patterns have been described in more detail in Chapter 2, section 23.)

With regard to psychological variables nine of the studies described in Table 4.1 combined observation with interviews with visitors (see numbers 6, 7, 8, 11, 16, 20, 24, 31 and 33). Again the research is characterised by a lack of detail and systematic analysis of the data. The studies of Bechtel (1967, number 3), Cone and Kendall (1978, number 7) and Russell (1989, number 31) related measures of recall of, and preference for, exhibits to attracting or holding power for a subsample of the exhibits studied. Their results suggested that greater attracting and holding powers were related to better recall of exhibits and greater preference for exhibits. Only two of the studies examined attempted to demonstrate a link between attention and learning; Falk (1983b, number 11) and Koran, Foster and Koran (1989, number 20). The latter study involved observing and recording the time spent by students at a set of exhibits and then testing these students for their comprehension of, and interest in, the contents of the exhibits. The results indicated that time spent at exhibits was the best predictor of learning from the exhibits and was positively correlated with interest in the exhibits. As noted in a previous discussion of this study in Section 2. , it is not possible from this study to determine whether interest in a topic resulted in greater attention, or was the result of greater attention, to an exhibit. Falk (1983b) observed children at a single exhibit and recorded time spent at the exhibit and the frequencies of behaviours such as looking at the graphics and observing a peer interact with the exhibit. These children were then given a 14 item test to measure learning from the exhibit. A multiple regression analysis indicated

that both time and behaviour (transformed into an index) were significantly related to learning.

4.2 Observation Studies in Australian Museums: Aims of the Two Studies

Two major conclusions can be drawn from the previous review of observation studies in museums. Firstly, the research as a whole can be best described as piecemeal, with few attempts to describe exhibits or visitor behaviour in detail, or to systematically relate exhibit features to visitor characteristics or behaviours. Further, few studies have used multiple methods, or described visitor behaviour in larger settings in detail. The second conclusion that can be drawn is that attention to exhibits is related to learning and thus can be an indicator of mindfulness.

The two studies reported in this chapter had the following aims:-

1. to use multiple observation methods to systematically describe visitor behaviour in an entire gallery or setting,

2. to relate visitor behaviour to a series of exhibit variables such as content, type of media used, opportunity for interaction, and location , and

3. to examine whether or not these patterns of visitor behaviour and their relationships with exhibit variables are consistent with the predictions of the Mindfulness Model.

By using two settings it was hoped that a large sample and range of exhibits would be included in the analyses. The second study also had the aim of examining two galleries which differed in terms of familiarity of content and affective tone.

4.3 Observation of visitors to The Semaphore to Satellite Exhibition: Method

4.3.1 Observation strategies

Two observation strategies were employed in this study; Tracking and Exhibit Targetted. Before either strategy was commenced two observers (the author and a colleague) spent two days in the exhibition in a pilot observation of visitor behaviour in the exhibition area to determine a way of dividing the exhibition into individual exhibit areas which reflected the way visitors used the space. These pilot observations also provided an opportunity for the observers to practice using the observation schedule. In this particular setting the designers had organised clear spaces and boundaries between the exhibits and these appeared to be used by visitors. Figure 4.1 shows the division of the space into exhibits.

The Tracking strategy involved two observers unobtrusively following visitors as they passed through the exhibition. These observations were conducted over a five day period including a weekend. The observers began recording data with the first visitor judged to be over 15 years of age who entered the exhibition and the observers recorded the visitor's age (using categories which can be seen in Table 4.2), sex, the size of the group the visitor was with, the total time spent in the exhibition, the direction the visitor took, the exhibits that were stopped at and whether the visitor touched or interacted with the exhibit (if appropriate). When the visitor left the exhibition area the observers returned to the beginning of the exhibition and began recording data for the next visitor to enter the exhibition. Periodic checks between the observers did not indicate any major differences in judgements of

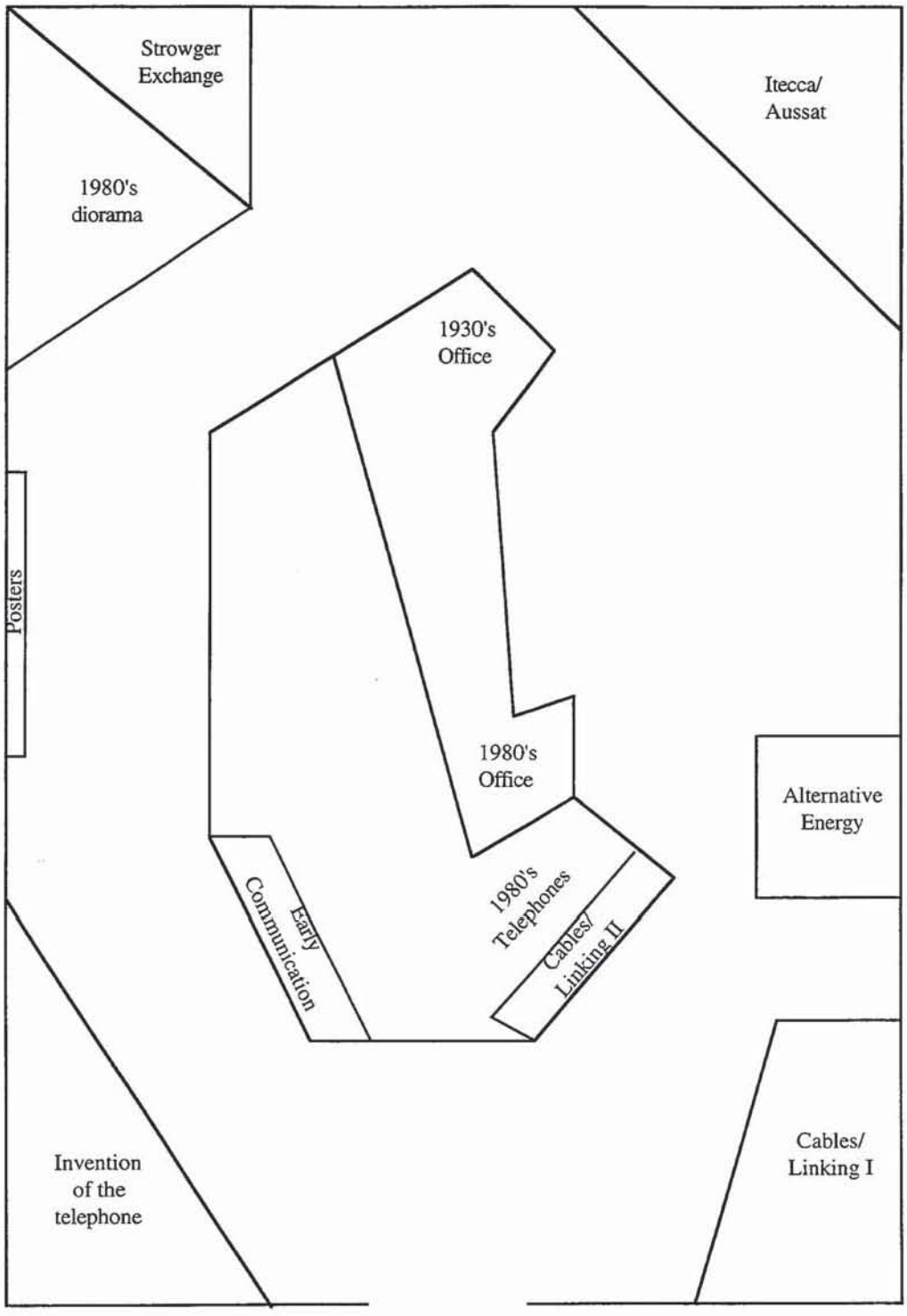

Figure 4.1. Breakdown of exhibits for Semaphore to Satellite Exhibition.

the visitors' ages or in the recording of visitor behaviours. Inter-rater reliability was checked for the age categories by correlating the scores of the two observers for a common sample of 40 visitors. The analysis resulted in a Spearman's Rho of 0.92. Examples of the data collection sheets used to record the observations can be found in Appendix A. Observers attempted to be as unobtrusive as possible and no visitors approached the observers or appeared to be aware of the observers. Sheppard (1960) provided evidence that visitors in exhibitions were rarely aware that they were being observed.

Visitors judged to be less than 15 years of age and school parties were not included in the observations as it was difficult to assess from observation if a child had stopped in front of an exhibit voluntarily or because of the choice of an accompanying adult. That is, a child may well find an exhibit unattractive but may stop because they have been instructed to by an adult.

The second observation strategy used was an Exhibit Targetted strategy in which each of the 12 individual exhibits was observed by two observers at different times of the day over a two day period. Observers began recording data with the first visitor (judged to be over 15 years of age) to stop at the target exhibit at the beginning of the time period. The observer recorded the age, sex, and number of other visitors with the observed visitor, as well as the time spent in front of the exhibit, whether or not the visitor touched or interacted with the exhibit and whether or not comments were made about the exhibit or its content. When the visitor left the exhibit the observers waited for the next visitor to stop at the exhibit and began recording again. This procedure was repeated until a total of 50 visitors had been observed at each exhibit. At the same time as recording the data on the observed visitors, the observers kept a tally of the total number of visitors who stopped at the

exhibit during the time period and the total number of visitors who passed by the exhibit during this time period. Again periodic checks failed to reveal any differences in the observations recorded by the two observers.

4.3.2 Samples

The total sample size for the Exhibit Targetted observations was 578. Fifty visitors were observed for each of the following exhibits: - Early Communication, Invention of the Telephone, 1880's Exchange Diorama, Strowger Exchnage, 1930's Office and the 1980's Telephones. Fifty-one visitors were observed for Alternative Energies, Cables and Linking, and Cables and Optical Fibres; 52 visitors were observed for the Aussat/Ittera exhibit; 40 for the Advertising posters and 33 for the 1980's Office. The last two exhibits had very low numbers of visitors stopping at them and this prevented the target sample size from being reached. In the Tracking strategy the sample size was 152.

The two samples were equally representative of males and females and were predominantly inn the 21 to 30 years age category. Most of the visitors observed were either alone or with one other person. It should be noted that this measure is not necessarily the number of people that the visitor came to the museum with, it is the number with the visitor at the time of observation. Table 4.2 gives a full demographic description of the two samples.

4.3.3 Exhibit description

Table 4.3 provides a brief description of each of the 12 exhibits observed in the present study. As a major aim of the study was to relate exhibit factors to visitor behaviour it was necessary to determine a set of

Table 4.2

Demographic Description of Semaphore to Satellite Samples

Exhibit targetted:	57% male	(n=329)	43% female	(n=249)
Tracking:	52% male	(n=79)	48% female	(n=73)

	Exhibit Targetted		Tracking	
Age	**n**	**Percent of sample**	**n**	**Percent of sample**
15-20	81	14	12	8
21-30	266	46	70	46
31-40	98	17	30	20
40-50	64	11	20	13
51-60	40	7	13	9
>61	29	5	7	5
Size of accompanying group				
Alone	248	43	56	37
1 other	231	40	56	37
2 others	64	11	21	14
3 others	23	4	11	7
4 others	6	1	5	3
5 others	6	1	3	2
Total		578		152

Table 4.3

Brief Description of Semaphore to Satellite Exhibits*

Exhibit	Description
1. Early communication	Static display of objects with text including a display of letters of the 1840's from London to the Port Phillip District; a scale model of the semaphore from the signal station at Flagstaff Hill, and a display of 1850's-1870's telegraph equipment.
2. Invention of the telephone	Display of objects with text and a video of the 1926 Vitaphone depicting A.G. Bell's assistant, H. Watson, describing how he and Bell invented the telephone. Objects include telephones from the 1890's to the 1920's.
3. Advertising posters	Static display with text and early posters advertising the use of telephone.
4. 1880's exchange diorama	Diorama of a woman using the equipment in Melbourne's telephone exchange in 1880. Also includes text explaining the technology and employment opportunities for women.
5. Strowger Step by Step Exchange	A participatory exhibit where visitors can dial a number on a telephone and watch the actions of the Strowger Exchange as it connects to another phone in the display. Visitors can then talk to each other with the phones.
6. Iterra/Aussat	A display of a country homestead with a life size domestic earth station and a 1/8 life size model of an Aussat satellite and video illustrating satellite communications.
7. 1930's office	Static display of a 1930's office with telephone, adding machine and typewriter with text.
8. 1980's office	Static display of a 1980's office with computer, phone and text.
9. 1980's telephones	Static display of current telephones with text.
10. Alternative energy	A dynamic display where visitors can push a button and watch a moving model demonstrate uses of wind and solar energy.
11. Cables/Linking I	A participatory model of laser communication. Visitors could interrupt the beam with their hands and this produced changes in the audio transmission.
12. Cables/Optical Fibres	A static display of text and models of various cables including a 500 times life size model of a fibre optic cable.

* Photographs of these exhibits are contained in Appendix B.

exhibit variables which could be used for further analyses. The previous literature and the theoretical background to the Mindfulness Model, in particular Berlyne's work on stimulus properties suggested two sets of exhibit variables for further consideration. The first set was of variables which could be measured without input from visitors and included such features as the type of media used and the topic of the exhibit. The second set consisted of features which could only be measured by surveying visitors and included such things as surprisingness, novelty and ambiguity. Such surveys could be conducted after the visitors had seen the exhibits or as visitors arrived at the exhibits. Both of these methods, however, are problematic. The first relies heavily on visitors' ability to recall exhibits in detail, while the second is subject to problems of reactivity as the presence of an interviewer asking detailed questions about an exhibit is likely to greatly alter the experience of the visitor. It was thus decided to to restrict the present study to those exhibit variables which could be measured without visitor input. As previously noted, few observational studies have attempted any systematic analysis of exhibit features. Thus the present study used a set of measures described by Washburne and Wagar (1972) in their study of visitor responses to exhibits in four National Park Visitor Centres in the United States. In this study the authors asked visitors to select the exhibits that they found to be most interesting. These interest ratings were then related to three categories of exhibit features - exhibit subject or topic, the strategy of communication used and the type of media used. The present study adapted the coding schemes used by Washburne and Wagar and the final coding scheme is contained in Table 4.4.

Table 4.4

Coding Schemes for Three Exhibit Variables From Washburne and Wagar (1972)*

A. Stimulus/exhibit media

1. Audio-visual
2. Audio only
3. Scale models
4. Objects
5. Flatwork (text and illustrations)
6. Text only
7. Text and objects
8. Schematic representations
9. Slides/transparencies
10. Photographs
11. Touch and manipulation
12. Paintings/drawings
13. Interactive
14. Dioramas

B. Strategies of communication

1. Cause-and-effect relationships
2. Parts making a story
3. Relating to immediate surroundings
4. Facts and identification

C. Subjects/topics

1. Human history/activity
2. Scientific investigation
3. Social impacts
4. Technology
5. Present human activity

* Some changes were made to Washburne and Wagar's (1972) categories. Firstly for all three variables categories were removed if not applicable to the exhibits studied, for example in subjects/topics categories such as ecological relationships and plants were not included. In some instances categories were added, for example, dioramas was added to the Exhibit Media variable.

4.4 Observation of Visitors to The Semaphore to Satellite Exhibition: Results

4.4.1 Tracking observations

The mean total time spent in the exhibition was 2 minutes 53 seconds (Standard deviation = 2 minutes 17 seconds, median = 2 minutes 11 seconds, mode = 27 seconds). Table 4.5 shows the frequency distribution of total times spent in the exhibition. The total time spent ranged from 20 seconds to 10 minutes 4 seconds.

Table 4.5

Frequency Distribution of Total Time Spent in the Exhibition

Time Spent	n	%
< 30 seconds	18	11.8
31 to 60 seconds	20	13.2
61 to 120 seconds	28	18.4
121 to 180 seconds	27	17.8
181 to 240 seconds	20	13.2
241 to 300 seconds	15	9.9
> 300 seconds	24	15.8
Total	152	

This observational strategy provides one measure of attracting power. Table 4.6 shows the numbers and percentages of the total sample stopping at each of the exhibits. The Strowger Exchange, Alternative Energies and the Cables and Linking exhibits had the highest attracting powers. Seventy

percent of the sample (n = 106) turned left as they entered the exhibition - so following the historical order of the exhibit. Table 4.6 also shows the numbers and percentages of left and right turning visitors stopping at each exhibit. Inspection of these two sections of the table indicates that with the exception of the 1980's Telephones and 1980's Office the right turning visitors are more likely than the left turning visitors to stop at exhibits. Figures 4.2 and 4.3 show the differences in behaviour between right and left turning visitors.

Table 4.6

Attracting powers for exhibits for total sample and for left and right turning visitors

Exhibit	**Total sample**		**Left turners**		**Right turners**	
	n	%	n	%	n	%
Invention of the telephone	36	23.7	22	20.7	14	30.4
Early Communication	40	26.3	26	25.2	12	26.1
Advertising Posters	19	12.5	12	11.3	7	15.2
1880's Exchange Diorama	54	35.5	36	33.9	18	39.1
Strowger Exchange	93	61.2	60	56.7	32	69.6
1930's Office	26	17.1	16	15.1	10	21.7
1980's Office	20	13.2	15	14.2	5	10.9
Aussat/Iterra	47	30.9	32	30.2	15	32.6
1980's Telephones	18	11.8	14	13.2	4	8.7
Alternative Energies	73	48.0	43	40.6	30	65.2
Cables/Linking	76	50.0	47	44.3	29	63.0
Cables/Optical Fibres	54	35.5	36	33.9	18	39.1

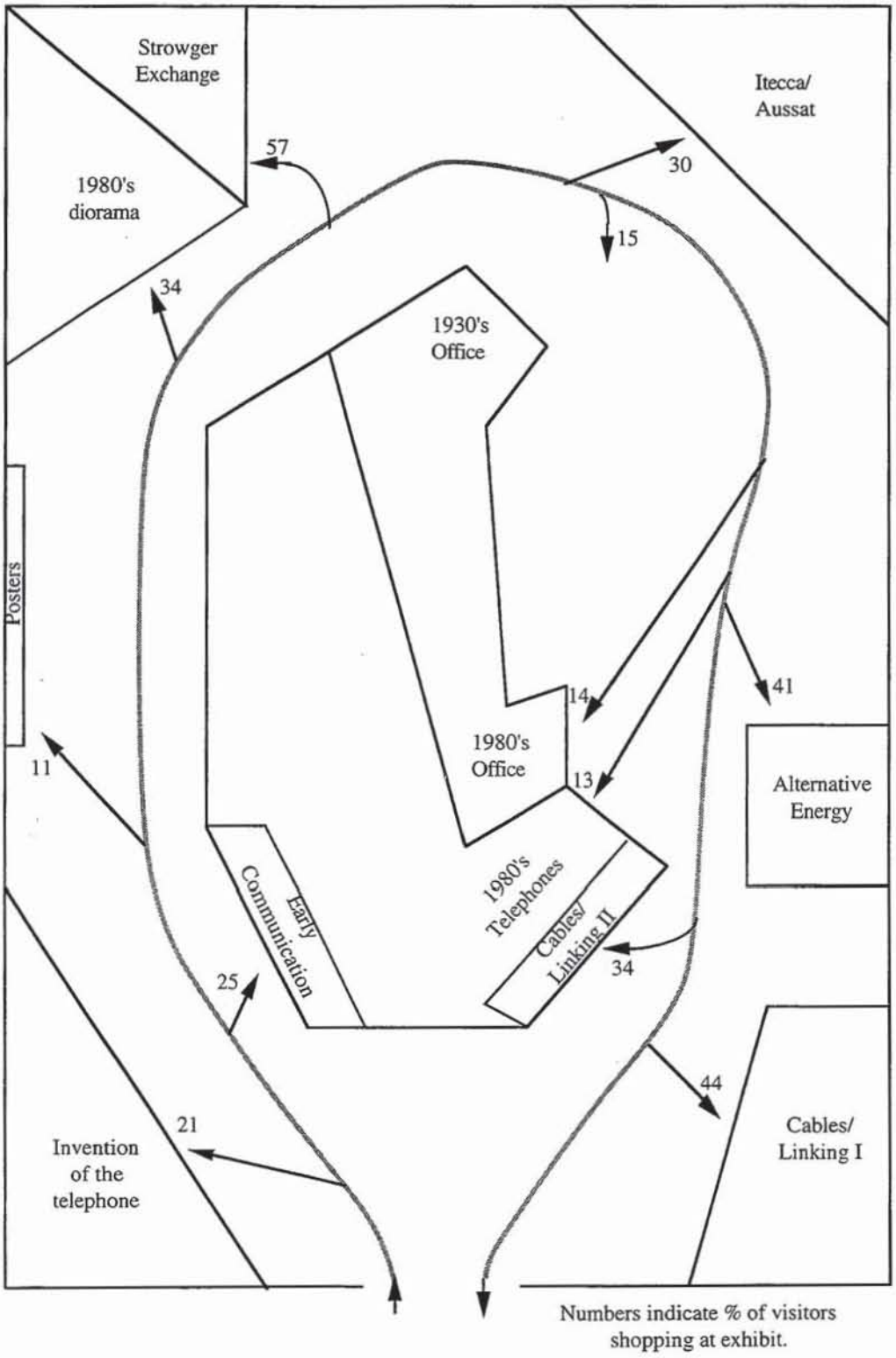

Figure 4.2. The left turning visitors and their attention patterns: Semaphore to Satellite Exhibition.

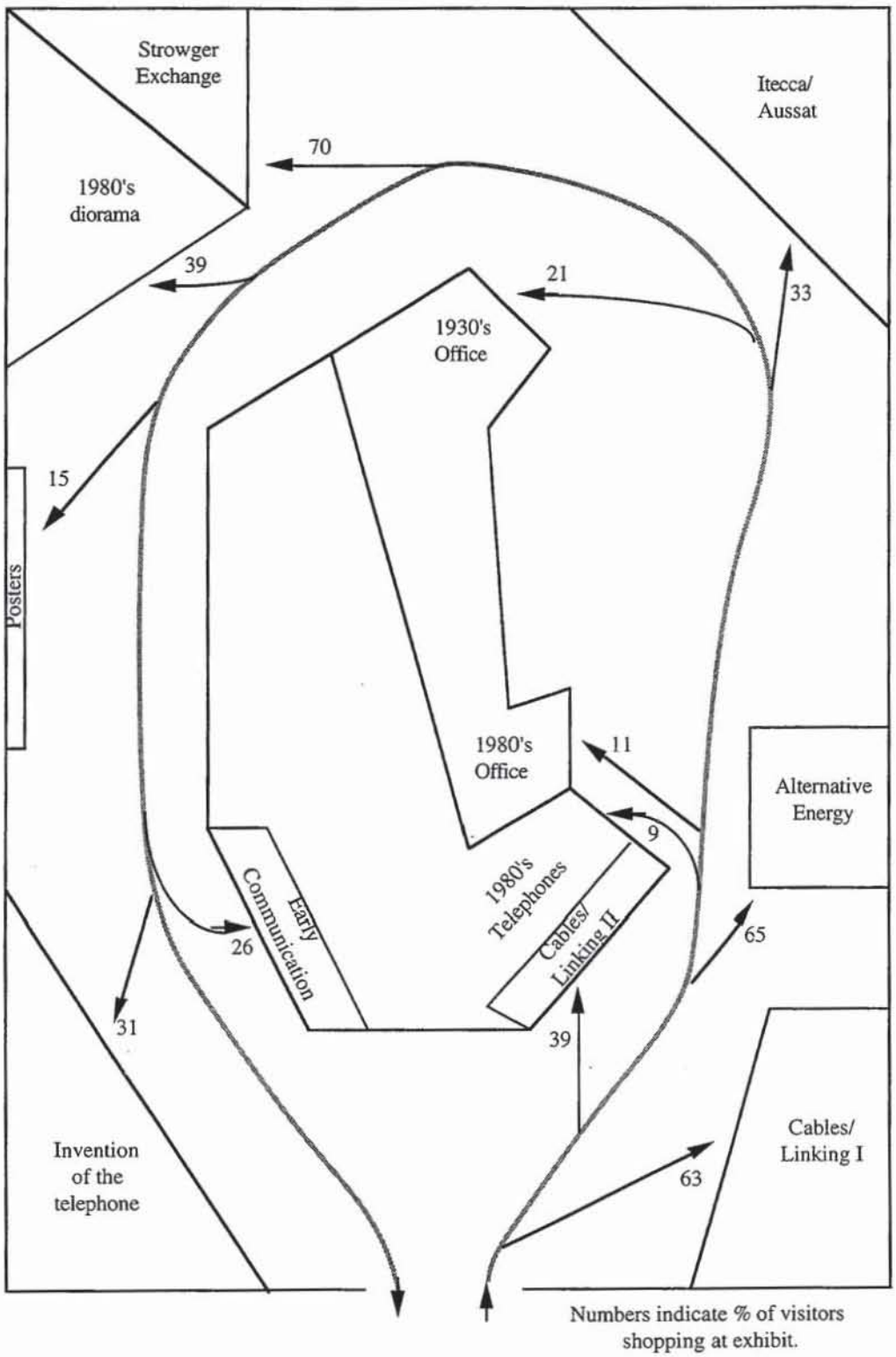

Figure 4.3. The right turning visitors and their attention patterns: Semaphore to Satellite Exhibition.

The mean total number of exhibits stopped at by the observed visitors was 3 (Standard Deviation = 2.9). Table 4.7 contains the frequency distribution for the total number of exhibits stopped for the total sample and for left and right turning visitors. nearly one fifth of the sample did not stop at any exhibits. Inspection of this table confirms that right turning visitors are more likely to stop at a greater number of exhibits than left turning visitors. Two Mann-Whitney U-tests indicated that visitors turning right upon entry to the exhibition were more likely to stay longer in the exhibition (Z corrected for ties = -2.4, $p<0.05$) and to stop at more exhibits (Z corrected for ties = -1.99, $p < 0.05$). Right turning visitors spent a mean time of 199 seconds in the exhibition (Standard Deviation = 128.2 seconds) and stopped at a mean of 3.9 exhibits (Standard Deviation = 2.4), while left turning visitors spent a mean time of 161 seconds (Standard Deviation = 139.5 seconds) in the exhibition and stopped at a mean of 3.1 exhibits (Standard Deviation = 2.8).

Table 4.7

Frequency distribution of total number of exhibits stopped at for total sample and for left and right turning visitors

Number of Exhibits	Total Sample		Left turners		Right Turners	
Stopped at	n	%	n	%	n	%
0	30	19.7	27	25.5	4	8.7
1	13	8.6	10	9.4	3	6.5
2	16	10.5	14	13.2	9	19.6
3	19	12.5	14	13.2	6	13.0
4	17	11.2	10	9.4	5	10.9
5	13	8.6	10	9.4	6	13.0
6	14	9.2	6	5.7	5	10.9
7 to 12	30	19.7	15	14.0	13	17.4
Total	152		106		46	

The next step in the analysis was to investigate visitor behaviour at the exhibits. To do this an index called Degree of Involvement was created by summing the number of times the observed visitors touched an exhibit or interacted with an exhibit. Half of the sample did not touch or interact with an exhibit. Of those visitors who did touch or interact with an exhibit, 67 percent had some involvement with one exhibit, 22.4 percent with two exhibits and 10.6 percent with three exhibits. It was also found that visitors turning right upon entry were more likely to have some involvement with the exhibits than those turning left - 65 percent compared to 41 percent. A Chi-Square analysis indicated that this was a significant difference, Chi-Square = 6.2, df = 3, $p < 0.05$. Degree of involvement was also found to be positively related to the total time spent in the exhibition (Spearman's Rho = 0.64, $p < 0.05$).

A series of nonparametric tests for group differences failed to find any significant differences between males and females, the different age categories or the different group sizes for the total time spent in the exhibition, the number of exhibits stopped at, or the degree of involvement with the exhibits.

4.4.2 Exhibit targetted observations

This method allowed for a second measure of the attracting power of exhibits to be calculated. Table 4.8 shows the attracting powers of the exhibits using this method. In this instance the highest attracting powers were obtained for the Invention of the Telephone, the Strowger Exchange, the 1880's Exchange Diorama and the Alternative Energies exhibit. The two different methods for calculating attracting power provided consistent results (Spearman's Rho= 0.63, $p < 0.05$).

Table 4.8

Attracting Power of Exhibits: Second Measure

Exhibit	Attracting Power % Stopping	n Passing	n Stopping
Invention of the telephone	18.3	306	56
Early Communication	61.2	147	90
Advertising Posters	12.1	331	40
1880's Exchange Diorama	51.6	161	83
Strowger Exchange	57.1	168	96
1930's Office	20.8	356	74
1980's Office	15.4	234	36
Aussat/Iterra	25.9	316	82
1980's Telephones	16.8	382	64
Alternative Energies	39.1	197	77
Cables/Linking	28.1	224	63
Cables/Optical Fibres	26.3	266	70

Table 4.9 contains information on the time spent at each exhibit. The mean time spent is usually used to measure the holding power of exhibits. Falk (1984) has noted that as time spent at an exhibit is often positively skewed and/or bimodal, the mean may not be an appropriate statistics to use in analyses of holding power. As the analyses in the present study were most concerned with the rank order of the exhibits, a seies of Spearman Rank Order correlations were computed between the mean and the other descriptive statistics of the median, mode and range and all were found to be significantly

positively correlated. Thus, in analyses concerned with the rank order of the exhibits the mean is representative of the distributions of time spent at exhibits. See Appendix C, Tables 1 and 2 for more details on this issue. As can be seen, the most successful exhibits in terms of holding power are the Strowger Exchange, Aussat/Iterra, the Invention of the Telephone and the Alternative Energies exhibit.

Table 4.9

Time spent at exhibits (in seconds).

Exhibit	Mean	SD	Median	Mode	Range
Early Communication	20.8	31.7	11.0	7	3-171
Invention of the Telephone	32.2	39.0	18.5	4	3-180
Advertising Posters	24.5	35.2	8.0	4	3-154
1880s Exchange Diorama	13.8	18.9	6.5	6	3-96
Strowger Exchange	57.6	58.4	32.5	17	5-206
Aussat/Iterra	33.3	40.4	13.5	10	4-170
1930s Office	13.4	14.7	7.3	5	3-87
1980s Office	8.6	13.4	7.7	3	2-34
1980s Telephones	8.1	9.0	5.3	5	2-59
Alternative Energies	29.3	22.5	24.0	10	2-104
Cables/Linking	23.9	26.3	15.7	7	3-146
Cables/Optical Fibres	26.9	26.7	20.6	21	2-141

The percentages of observed visitors making comments about the exhibits are given in Table 4.10. The exhibits which generated most comments were the Invention of the Telephone, Alternative Energies and the

Strowger Exchange. Visitors were observed touching the Strowger Exchange (20% touched, 36% touched and interacted), the 1930s Office (4% touched), the 1980s Office (12% touched), Alternative Energies (70% touched and interacted), Cables/Linking (2% touched and 49% touched and interacted), and Cables and Optical Fibres (14% touched). It is likely that the percentages reported for the Strowger Exchange underestimates the population percentage as there were several school groups visiting the exhibition and using this exhibit during the period of observation. For 24 percent of the sample there were school children around the exhibit preventing the visitors from interacting. This was not the case for the other two interactive exhibits. Commenting about an exhibit was found to be positively related to both touching and interacting with an exhibit. That is, visitors who touched or interacted with an exhibit were more likely to make comments about the exhibit. This relationship can be seen in the crosstabulation tables given in Table 4.11.

A series of crosstabulations and nonparametric tests for group differences were conducted in order to determine if visitor demographic characteristics were related to the exhibits' holding powers or to the second measure of attracting power. There were no significant differences between the exhibits in terms of the types of visitors that they attracted. That is, no exhibit seemed to be more popular for any particular age group, sex or size of visiting party. Further, there were no significant differences in the mean time spent at exhibits for age or size of visiting party. There was however, a significant difference between the sexes with males spending longer at exhibits overall (mean = 32.7 seconds, SD = 65.2) than females (mean = 21.1 seconds, SD = 28.2), as indicated by a Mann=Whitney U-test (Z

corrected for ties = -2.81, $p < 0.05$). There was, however, no significant difference between the sexes in terms of their likelihood of touching or interacting with an exhibit or making comments about exhibits.

Table 4.10

Percentage of Visitors Making Comments About Exhibits

Exhibits	**Percent Making Comment/s**
Early Communication	14.0
Invention of the Telephone	58.0
Advertising Posters	2.5
1880s Exchange Diorama	40.0
Strowger Exchange	48.0
Aussat/Iterra	39.0
1930s Office	42.0
1980s Office	15.0
1980s Telephones	22.0
Alternative Energies	51.0
Cables/Linking	22.0
Cables/Optical Fibres	38.0

Table 4.11

Crosstabulations of commenting on exhibits with touching and interacting with exhibits

A. Interacted with exhibits

Commented on exhibits	n Row % Column %	NO	YES	Total
	NO	58 63.7 79.5	33 36.3 41.8	91
	YES	15 24.6 20.5	46 75.4 58.2	61
	TOTAL	73	79	152

B. Touched exhibits

Commented on exhibits	n Row % Column %	NO	YES	Total
	NO	50 54.9 80.6	41 45.1 45.5	91
	YES	12 19.7 19.4	49 80.3 54.4	61
	TOTAL	62	90	152

STATISTICAL NOTE. For both tables a Chi-square was computed and in both cases was significant. For Table A, Chi-square = 18.8, $p < 0.05$; for Table B, Chi-square = 22.6, $p < 0.05$.

4.4.3 Exhibit features

Table 4.12 describes the 12 exhibits using the three variables from the Washburne and Wagar (1972) study, as well as providing the two measures of attracting power and the holding power for each exhibit and the percentages of visitors making comments about each exhibit. The first question to be analysed in this section is that of the relationships between the three exhibit variables, media, topic, and strategy of communication. As noted in the review of studies in this area it is possible that certain topics lend themselves more easily to display using particular media or strategies of communication. Examination of Table 4.12 indicates that there does appear to be a relationship between these three variables with all of the exhibits concerned with scientific investigation using the communication strategy of cause and effect and all being interactive exhibits. The three dioramas were all concerned with aspects of human activity and history and all used the communication strategy of telling a story. (Crosstabulations of these three variables may be found in Appendix C, Tables 3 to 5).

How then do these variables relate to the measures of visitor behaviour? A series of Kruskal-Wallis tests for group differences were conducted with holding power as the dependent variable and the three exhibit variables as independent variables. In all three cases there were significant differences between the different types of exhibits in terms of their holding power. The results of the tests and the mean holding powers for the groups are given in Table 4.13. In the case of the media used in the exhibits the largest mean is for the interactive exhibits followed by the audio-visual exhibits. As would be expected the largest mean holding powers were found for those exhibits

Table 4.12

Exhibit Features and Measures of Visitor Behaviour

Exhibit	Media	Communication strategy	Topic	Attracting power 1	Attracting power 2	Holding power	% of visitors
1. Early communication	Static text & objects	Parts making a story	Human history	23.7	33	20.8	14.0
2. Invention of the telephone	Video	Parts making a story	Human history	26.3	61	32.2	58.0
3. Advertising posters	Static flatwork	Facts and identification	Human history	12.5	12	24.5	2.5
4. 1880's diorama	Static diorama	Parts making a story	Human history	35.5	52	13.8	40.0
5. Strowger Exchange	Interactive	Cause and effect	Scientific investigation	61.2	57	57.6	48.0
6. Aussat/Iterra	Video	Parts making a story	Technology	17.1	26	33.3	39.0
7. 1930's office	Static diorama	Parts making a story	Human history	13.2	21	13.4	42.0
8. 1980's office	Static diorama	Parts making a story	Human activity	30.9	15	8.6	15.0
9. 1980's telephones	Static objects	Facts and identification	Technology	11.8	17	8.1	22.0
10. Alternative energies	Interactive	Cause-and-effect relationships	Scientific investigation	48.0	39	29.3	51.0
11. Cables/linking	Interactive	Cause-and-effect relationships	Scientific investigation	50.0	28	23.9	22.0
12. Cables/optical fibres	Static text and objects	Facts and identification	Technology	35.5	27	26.9	38.0

Table 4.13

Results of Kruskal-Wallis Tests for Exhibit Variable Group Differences in Holding Power

A. Media Groups

Group	n	Mean	SD
Static Flatwork	191	19.9	27.9
Static Diorama	133	17.9	42.7
AudioVisual	102	32.8	39.5
Interactive	151	36.9	41.6

Chi-square corrected for ties = 76.7, $p < 0.05$

B. Topic Groups

Group	n	Mean	SD
Human History	273	22.1	39.3
Scientific Invest.	151	36.9	41.6
Technology	153	22.9	38.3

Chi-square corrected for ties = 49.3, $p < 0.05$

C. Strategy of Communication

Group	n	Mean	SD
Telling a story	285	23.8	40.3
Cause & Effect	151	36.9	41.6
Facts & Identificat.	141	19.6	26.5

Chi-square corrected for ties = 49.2, $P < 0.05$

dealing with scientific investigation and using a cause and effect communication strategy. This pattern was also found in crosstabulation analyses between the three exhibit variables and whether or not visitors made comments about the exhibits(see Table 4.14) Table 4.15 summarises the means for the two measures of attracting power for the different exhibit variable groups. The pattern of results is consistent with that described for holding power. Further analyses were not conducted on these variables as the sample size in these analyses is only 12. It therefore not possible to determine the relative influence of the three exhibit variables on visitor behaviour.

4.5 Observation of Visitors at the Semaphore to Satellite Exhibition: Discussion

The measures of attracting and holding power can be seen as indicators of mindfulness. In particular, exhibits which score highly on both attracting and holding power are those which are most likely to be encouraging mindfulness in visitors. In the Semaphore to Satellite Exhibition the exhibits with both high attracting and holding power were the Strowger Exchange, the Cables/Linking exhibit and the Alternative Energies exhibits. All three of these exhibits offered an interactive experience for visitors. They were also all concerned with scientific investigation and used a cause and effect strategy of communication. Other successful exhibits were the Invention of the Telephone, the Aussatt/Iterra exhibit and the Cables and Optical Fibres exhibit. The first two of these exhibits were audiovisual exhibits and the third was adjacent to the Cables and Linking exhibit. Location near a successful exhibit also seems a likely explanation for the results obtained for the 1880s

Table 4.14

Crosstabulations of Exhibit Variables with Whether or Not Visitors Made Comments about Exhibits

A. Media

		Media					
	n Row % Column %	Static	Diorama	Audio-visual	Inter-active	Total	
Made comments	NO	153 39.9 80.1	87 22.7 65.4	52 13.6 51.0	91 23.8 60.3	383	Chi-square = 29.5 df = 3 p < 0.05
	YES	38 19.6 19.9	46 23.7 34.6	50 25.8 49.0	60 30.9 39.7	194	
	TOTAL	191	133	102	151	577	

B. Topic

		Topic				
	n Row % Column %	Human history	Scientific investigation	Tech-nology	Total	
Made comments	NO	189 49.3 69.2	91 23.8 60.3	103 26.9 67.3	383	Chi-square = 3.6 df = 2 p > 0.05
	YES	84 43.3 30.8	60 30.9 39.7	50 25.8 32.7	194	
	TOTAL	273	151	153	577	

C. Strategy of communication

		Strategy			
	n Row % Column %	Story	Cause & effect	Facts & identifi-cation	Total
Made comments	NO	182 47.5 63.9	91 23.8 60.3	110 28.7 78.0	383
	YES	103 53.1 36.1	60 30.9 39.7	31 16.0 22.0	194
	TOTAL	285	151	141	577

Chi-square = 11.9
df = 2
p < 0.05

Exchange Diorama. Success at attracting and holding visitor attention was reflected in the number of visitors making comments about exhibits.

The pattern of results obtained in this study was consistent with the predictions of the Mindfulness Model that interactive and multi-sensory exhibits are more likely than static exhibits to induce mindfulness. Further evidence supporting the Mindfulness Model exists in the differences found in the behaviours of visitors turning right upon entry to the exhibition. These visitors were immediately confronted by two of the interactive exhibits and it would seem that these exhibits were capable of inducing a mindful state for

Table 4.15

Mean Attracting Powers for the Exhibit Variables Groups

Group	Attracting Power 1 Mean(SD)	Attracting Power 2 Mean(SD)
A. MEDIA		
Static Flatwork	20.9(10.8)	22.3(9.5)
Static Flatwork	26.5(11.7)	29.3(19.9)
Audiovisual	21.7(6.4)	43.5(24.7)
Interactive	53.1(7.0)	41.3(14.6)
B. TOPIC		
History	23.7(9.1)	32.3(20.3)
Scientific Invest.	53.1(7.0)	41.3(14.6)
Technology	21.5(12.1)	23.3(5.5)
C. STRATEGY OF COMMUNICATION		
Story	24.3(8.3)	34.7(18.4)
Cause & Effect	53.1(7.0)	41.3(14.6)
Facts & Identification	20.0(13.0)	18.7(7.6)

visitors which was reflected in their subsequent behaviour in the exhibition of stopping at more exhibits, staying longer at exhibits and having more involvement with exhibits.

Other studies have attempted to investigate the impact of interactive exhibits on the attention paid by visitors to other exhibits in the same area. These studies usually compare a setting with an interactive exhibit to the same setting without the interactive. Thus the actual number of exhibits in the setting varies between the two conditions. Worts (1990), for example, reported an observation study of visitors to an art exhibition in which visitor behaviour in a traditional exhibition was compared to visitor behaviour in the same exhibition with eighteen additional interactive sections. While Worts reported a major increase in the mean time spent in the exhibition as a whole, from 5.4 to 16.3 minutes, with the additional exhibits, it is not clear that any of the additional time was spent at the traditional exhibits. In a similar study, Hilke, Hennings and Springuel (1988) compared visitors in an exhibition with an interactive computer exhibit to visitors in the same exhibition with the computer exhibit turned off. These authors concluded that the computer did not result in any decreased attention to the other exhibits. They did not, however, investigate the possibility of increased attention to other exhibits when the computer was in operation, but did suggest that visitors appeared to be more involved with all exhibits when the computer was available. The present study did not involve any change in the nature of the exhibition but was able to demonstrate that interactive exhibits can induce a mindful state in visitors which carries through to other exhibits. In this study those visitors who turned right upon entry to the exhibition experienced two interactive exhibits at the beginning of their visit and there is clear evidence that this

resulted in greater attention to, and involvement with, other exhibits in the setting, as would be predicted by the Mindfulness Model.

4.6 Observation of Visitors in the Gallipoli and Sinai and Palestine Galleries of The Australian War Memorial: Introduction

The Australian War Memorial is a unique institution in Australia in that it combines a museum with a shrine of remembrance. As noted in Chapter 1, it thus provides an opportunity to study the relationship between the affective tone of an exhibition and visitor behaviour. Two galleries were chosen for study, the Gallipoli and the Sinai and Palestine Galleries. These galleries were both concerned with military campaigns fought in the Middle East in World War 1 and were similar in size and style of exhibition. The major difference between the two galleries was the level of familiarity visitors were likely to have with the campaigns and their affective responses to the galleries. The Gallipoli campaign receives much greater media and public attention than the Sinai and Palestine campaign. The former is the focus of ANZAC Day, a major public holiday dedicated to Australia's war veterans but specifically to commemorate the landing at Gallipoli, and has been the subject of several popular television series aand motion pictures. It was argued that this level and type of publicity would result in visitors having a greater familiarity with the campaign and a greater affective response to the campaign.

This was supported by the results of a pilot study using a sample of 59 first year students in the Faculty of Commerce and Economics at James Cook University. These students were asked to rank order six military campaigns

in which Australian Defence Forces were involved in terms of how much they knew about the campaigns and how important they thought the campaigns were in Australian history (See Appendix A for a copy of this pilot questionnaire). Table 4.16 contains a summary of the results of this pilot study and inspection of these results shows that Gallipoli was ranked as both the most important campaign in Australian history and the campaign about which the students knew most. The Sinai and Palestine campaign was ranked fifth for the amoun that the students knew about it and for its importance in Australian history. Two Wilcoxon Matched Pairs Sign Ranks Tests were conducted and these indicated that the Gallipoli campaign was ranked significantly higher than the Sinai and palestine campaign for both the amount that students knew about the campaigns (Z corrected for ties = -6.02, p , 0.05) and the importance of the campaigns in Australian history (Z corrected for ties = -6.14, $p < 0.05$). These results supported the author's belief that visitors to the Australian War Memorial were likely to be more familiar with and to have stronger affective responses to the Gallipoli Gallery than the Sinai and Palestine Gallery.

In addition to examining the impact on visitor behaviour of the differences between the two galleries in terms of familiarity and affective responses, this study also offered opportunities to examine the effect on visitor behaviour of repetitive exhibits. Both galleries were larger the Semaphore to Satellite exhibition and had less variety in exhibit content and media. In the Semaphore to Satellite exhibition it also seemd that location of

Table 4.16

Results of Pilot Study of Familiarity with Gallipoli and Sinai and Palestine Campaigns

1. Mean and modal ranks for amount subjects felt they knew about six military campaigns. (Ranked from 1-know most about to 6-know least about.)

Campaign	**Mean rank**	**SD**	**Modal rank**
Tobruk/North Africa	3.77	1.4	4
New Guinea	2.84	1.2	2
Sinai & Palestine	4.63	1.3	6
France/Western Front	3.74	1.5	3
Gallipoli	1.59	1.4	1
Crete	4.98	1.2	6

2. Mean and modal ranks for importance of six campaigns in Australian history. (Ranked from 1-most important to 6-least important.)

Campaign	**Mean rank**	**SD**	**Modal rank**
Tobruk/North Africa	3.75	1.5	3
New Guinea	2.79	1.4	2
Sinai & Palestine	4.61	1.2	4
France/Western Front	3.59	1.4	3
Gallipoli	1.58	1.2	1
Crete	4.89	1.3	6

exhibits might be an important factor influencing visitor behaviour and it was hoped that this variable could be further investigated in this study.

4.7 Observation of Visitors in the Gallipoli and Sinai and Palestine Galleries: Method

4.7.1 Observation strategies

As in the previous study of the Sempahore to Satellite Exhibition, two observation strategies were employed, Exhibit Targetted and Tracking, and these were basically as described in Section 4.3.1. The two observers were also the same. The only change to the method was that no data was collected on visitor comments or involvement with exhibits. This reflects the larger size of these two galleries as compared to the Semaphore to Satellite Exhibition and the presence of security staff and systems to prevent visitors touching the exhibits. In the Exhibit Targetted strategy data was collected for 40 visitors at 11 exhibits in the Gallipoli Gallery (see Figure 4.4 for the breakdown of the Gallery into exhibits) and 17 exhibits in the Sinai and Palestine Gallery (see Figure 4.5 for the breakdown of this Gallery into exhibits). Examples of the data collection sheets for this study can be found in Appendix A.

It should be noted that in both galleries there were several possible entry/exit popints. In the Tracking stratgey observers began recording data for the first visitor to enter the gallery from any possible entrance. When a visitor left the gallery the observer began recording data for the next visitor to enter the gallery from any entrance. It was believed that the sample resulting from this stratgey would more accurately reflect the behaviour of all visitors to the galleries than if observations were restricted to one entry only.

4.7.2 Exhibit features

Table 4.17 contains brief descriptions of the exhibits in the two galleries. As previously noted the exhibits in these two galleries were restricted in terms of the topics covered and the strategy of communication used. Thus for the present study only the exhibit media variable was used in analyses.

4.7.3 Samples

The two observational strategies conducted in the two galleries collected data from four independent samples of visitors. Four hundred and fifty-eight visitors were observed at individual exhibits in the Gallipoli Gallery and 120 were followed through the Gallipoli Gallery, while Exhibit Targetted data was collected for 690 visitors in the Sinai and Palestine Gallery and Tracking data was collected for 192 visitors in the Sinai and Palestine Gallery. These samples are described in the following three tables. Table 4.18 contains the distributions for age for the four samples. Overall the samples were comparable. The only difference was that the the Exhibit Targetted sample for Sinai and Palestine had a greater proportion of visitors in the 16 to 20 years category. Table 4.19 contains information on the numbers of people who were with the observed visitors for the four samples. Again the samples were similar in their distributions with one exceptions, the Individual Exhibits sample in Gallipoli had a larger proportion of visitors on their own. It is possible that this was a result of the design of the gallery with many exhibits being in close proximity to each other. It is possible that other members of the visiting party may have been only one exhibit away from the observed visitor. Finally Table 4.20 contains information on the sex of the observed

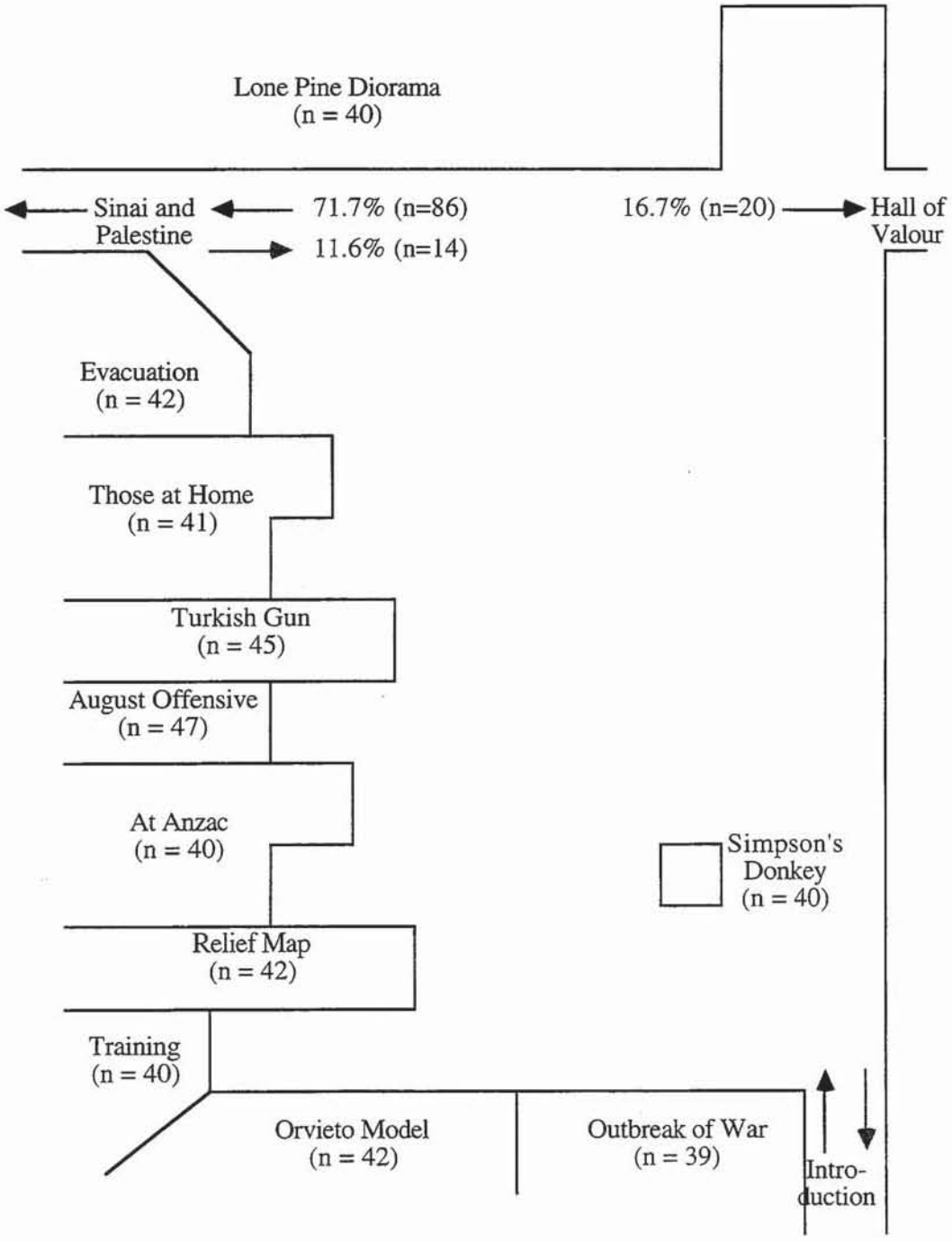

Figure 4.4. Exhibit breakdown for Gallipoli Gallery (with sample sizes for Exhibit Targetted observations).

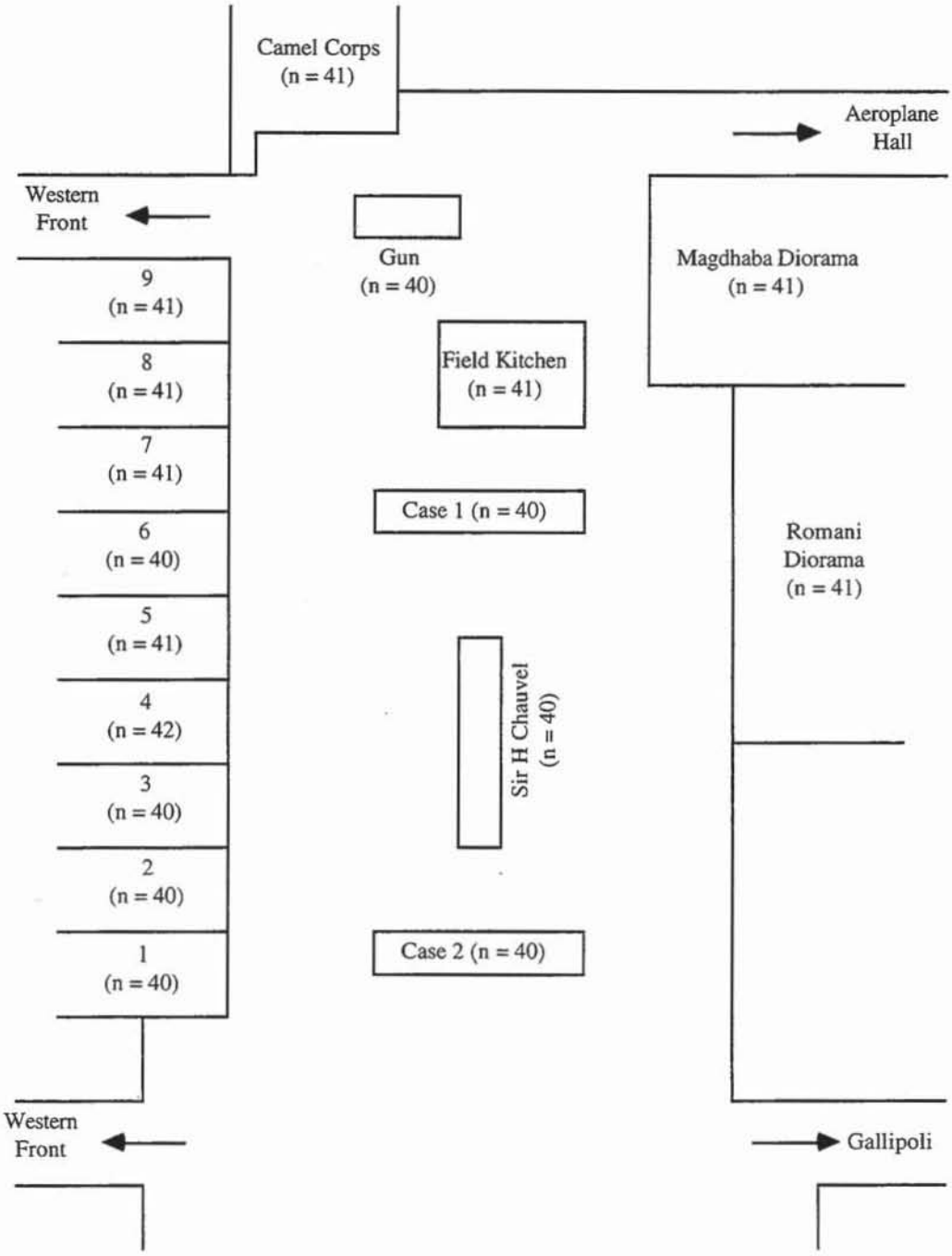

Figure 4.5. Exhibit breakdown for Sinai and Palestine Gallery (with sample sizes for Exhibit Targetted observations).

Table 4.17

Brief Description of Exhibits in the Gallipoli and Sinai and Palestine Galleries*

A. Exhibit	Description
Outbreak of war	Static display of objects with text and black and white photographs describing the outbreak of World War I and the drive to enlist soldiers.
Orvieto model	Static display of a model of the troop carrier *Orvieto* with objects (letters from soldiers to families) and text describing the first convoy of soldiers to the Middle East.
Training	Static display of objects (letters, uniforms, equipment) black and white photographs and text describing training in Egypt and the Dardanelles Plan.
Relief map	Relief model of the Dardanelles with two models of ANZAC soldiers.
At Anzac	Static display of objects (weapons, supplies, shrapnel and diaries), black and white photographs and text describing life on Anzac. Included a small diorama of the front line.
Turkish gun	Static display of Kropp Field Gun with a model of a Turkish soldier, objects (Turkish equipment) and text.
August offensive	Static display of objects (uniform, ammunition), black and white photographs and text describing an attempt to push forward into Turkish territory.
Those at home	Static display with objects (gun, table and chairs, posters and cards), black and white photographs and text describing life for Australian families at that time. Stereoscope for viewing postcards.
Evacuation	Static display of objects, black and white photographs and text describing the evacuation of troops from Gallipoli.
Lone Pine diorama	Large (approximately 4 metres high and 7 metres long) diorama of the trenches at Lone Pine. Also display of objects, black and white photographs and text describing the conditions.
Simpson's donkey	Sculpture with text describing the story of Simpson and his donkey.

cont.

Table 4.17 (cont.)

B. Sinai and Palestine Gallery	
Small dioramas	Nine small dioramas (approximately 1m high and 2m wide) along the left wall of the gallery with a label of text above each. In order they were labelled: Landing Supplies, At the Railhead, Ship of the Desert, After Darkness Comes the Dawn, The Dump at Beersheba, And So The Lifeline Trickling from Sea Reaches the Regiment, Within Sound of the Guns, The Squadron Receives its Supplies, and So the Long Trek Ends.
Camel Corps	Static display of two lifesize models of soldiers on a camel and a horse against a large black and white photograph of soldiers in the desert, with text.
Gun	Light Turkish Gun on stand (approximately 1m high, 1m wide and 3m long) with short label.
Field kitchen	German field kitchen (approximately 2.5m high) with short label.
Magdhaba diorama	Large diorama of battle (approximately 5m long, 2m high, 8m long) with text and a panel of backlit black and white transparencies in front of the diorama.
Romani diorama	As above with documents in a case.
Cases 1 and 2	Large glass cases containing objects and explanatory text. Objects include weapons, uniforms, badges and documents.
Sir H Chauvel	Static display of objects (uniforms, saddle, brief case), black and white photographs and text describing the role and contribution of Sir H Chauvel.

* Photographs of a selection of these exhibits are in Appendix B.

Table 4.18

Distribution of Age in the Four Samples

Age	GALLIPOLI Exhibit Targetted	GALLIPOLI Tracking	SINAI & PALESTINE Exhibit Targetted	SINAI & PALESTINE Tracking	Total
<20	10 (2.2%)	11 (9.2%)	127 (18.4%)	19 (9.9%)	167 (11.4%)
21-30	154 (33.6%)	36 (30.0%)	163 (23.6%)	64 (33.3%)	417 (28.5%)
31-40	81 (17.7%)	25 (20.8%)	130 (18.8%)	41 (21.4%)	277 (18.9%)
41-50	87 (19.0%)	16 (13.3%)	98 (14.2%)	24 (12.5%)	225 (15.4%)
51-60	64 (14.0%)	14 (11.7%)	76 (11.0%)	25 (13.0%)	179 (12.2%)
61-70	53 (11.6%)	16 (13.3%)	70 (10.1%)	17 (8.9%)	156 (10.6%)
>70	9 (2.0%)	2 (1.7%)	26 (3.8%)	2 (1.0%)	39 (2.7%)
TOTALS	458	120	690	192	1460

Table 4.19

Distribution of Number of Visitors in the Accompanying Group

Number	GALLIPOLI Exhibit Targetted	GALLIPOLI Tracking	SINAI Exhibit Targetted	SINAI Tracking	Total
Alone	193 (42.1%)	25 (20.8%)	163 (23.6%)	56 (29.2%)	257 (17.6%)
1	192 (41.9%)	58 (48.3%)	347 (50.3%)	84 (43.8%)	681 (46.6%)
2	49 (10.7%)	18 (15.0%)	107 (15.5%)	35 (18.2%)1	209 (14.3%)
3	18 (3.9%)	16 (13.3%)	60 (8.7%)	12 (6.3%)	106 (7.2%)
4	4 (0.9%)	3 (2.5%)	13 (1.9%)	4 (2.1%)	24 (1.6%)
5	2 (0.4%)	—	—	—	2 (0.1%)
7	—	—	—	1 (0.5%)	1 (0.05%)
TOTALS	458	120	690	192	1460

Table 4.20

Distribution of Sex in Four Samples

Sex	GALLIPOLI Exhibit Targetted	GALLIPOLI Tracking	SINAI Exhibit Targetted	SINAI Tracking	Total
Men	254 (55.5%)	65 (54.2%)	391 (56.7%)	106 (54.9%)	816 (55.8%)
Women	204 (44.5%)	55 (45.8%)	299 (43.2%)	86 (45.1%)	644 (44.1%)
TOTALS	458	120	690	192	1460

visitors and in this instance there was little difference between the four samples. In summary, the samples were comparable indicating no major biases existed in the sampling strategies.

4.8 Observation of Visitors in the Gallipoli and Sinai and Palestine Galleries: Results

4.8.1 Tracking Observations

The mean total time spent in the Gallipoli Gallery was 426.3 seconds, or just over seven minutes (SD = 306.8 seconds). Total time spent in the Gallipoli Gallery ranged from 26 seconds to 1792 seconds, or almost 30 minutes, with 50 percent of visitors spending longer than six minutes. The percentage of exhibits stopped stopped at by the observed visitors was also calculated and it was found that the mean percentage of exhibits stopped at was 56 percent (SD = 25.4%). Table 4.21 contains the distribution for the percentage of exhibits stopped at by the observed visitors. Inspection of this table indicates that more than half of the sample stopped at more than 50 percent of the exhibits.

Table 4.21

Percentage of Exhibits Stopped at by Observed Visitors in the Gallipoli Gallery

% of Exhibits Stopped At	n	% of Sample
0	2	1.7
1-10	7	5.8
11-20	4	3.3
21-30	11	9.2
31-40	12	10.0
41-50	9	7.5
51-60	17	14.2
61-70	16	13.3
71-80	14	11.7
81-90	13	10.8
91-99	11	9.2
100	4	3.3
TOTAL	120	

Table 4.22 shows the attracting powers, or the number of visitors stopping at each exhibit. The most successful exhibits in terms of this measure of attracting power are the At Anzac exhibit and the Lone Pine Diorama.

The mean total time spent in the Sinai and Palestine Gallery was 167.4 seconds, or approximately two minutes forty seven seconds (SD = 171.7 seconds). The total time spent in the gallery ranged from 4 to 1109 seconds with half of the sample spending 115 seconds or more. The mean percentage of exhibits stopped at by the sample was 26.2 (SD = 21.7%) and the distribution of percentage of exhibits stopped at by the observed visitors is

Table 4.22

Attracting Power (Measure 1) of Exhibits in the Gallipoli Gallery

Exhibits	n of Visitors Stopping	% of Visitors Stopping
Outbreak of War	55	45.8
Orvieto Model	74	61.7
Training	81	67.5
Relief Map	78	65.0
At Anzac	94	78.3
Turkish Gun	76	63.3
August Offensive	52	43.3
Those at Home	73	60.8
Evacuation	55	45.8
Lone Pine Diorama	86	71.7
Simpson's Donkey	14	11.7

given in Table 4.23. Slightly more than half of the visitors stopped at less than 20 percent of the exhibits.

Table 4.23

Percentage of Exhibits Stopped at by Observed Visitors in the Sinai and Palestine Gallery

% of Exhibits Stopped At	n	% of Sample
0	15	7.8
1-10	33	17.1
11-20	50	25.9
21-30	37	19.1
31-40	7	3.6
41-50	20	10.4
51-60	12	6.2
61-70	7	3.6
71-80	9	4.7
81-90	2	1.0
91-94	1	0.5
TOTAL	193	

The following table, 4.24, has the attracting powers (first measure) for the exhibits in the Sinai and Palestine Gallery. The most successful exhibits in this instance were the Magdhaba and Romani Dioramas and the first of the Small Dioramas.

Table 4.24

Attracting Powers (First Measure) of Exhibits in the Sinai and Palestine Gallery

Exhibits	n of Visitors Stopping	% of Visitors Stopping
Small Diorama 1	85	44.0
Small Diorama 2	66	34.2
Small Diorama 3	51	26.4
Small Diorama 4	47	24.4
Small Diorama 5	37	19.2
Small Diorama 6	32	16.6
Small Diorama 7	29	15.0
Small Diorama 8	29	15.0
Small Diorama 9	47	24.4
Camel Corps	74	38.3
Gun	27	14.0
Field Kitchen	36	18.7
Magdhaba Diorama	100	51.8
Romani Diorama	86	44.6
Case 1	35	18.1
Sir H. Chauvel	49	25.4
Case 2	30	15.5

A series of nonparametric tests for mean differences were conducted to investigate the relationships between the total time spent in the galleries or percentage of exhibits stopped at by visitors, and age, sex and number of accompanying visitors. No significant differences were revealed. Two Mann-Whitney U-tests, however, revealed significant differences between the two galleries in terms of total time spent and percentage of exhibits stopped at by visitors. In both cases Gallipoli was significantly more successful at attracting (Z corrected for ties = -9.14, $p<0.05$) and holding visitor attention (Z corrected for ties = -9.11, $p<0.05$).

The data was also examined to determine whether or not visitors followed major pathways or patterns through these galleries and if so, if these pathways influenced the time spent in the galleries or the percentage of exhibits stopped at. Figures 4.6 and 4.7 map the indices of visitor behaviour and information on pathways onto the floor plans for the two galleries. In the Gallipoli Gallery most of the exhibits are arranged along the left side of the gallery and the majority of visitors passed along this side and exited to the Sinai and Palestine Gallery (n = 86, 71.7%), with a small group exiting to the Hall of Valour (n = 20, 16.7%). The remaining visitors entered from the Sinai and Palestine Gallery and moved through the area in the reverse direction.

Visitor pathways through the Sinai and Palestine Gallery were numerous largely as the result of the Gallery having four exit/entry points. Table 4.25 is a breakdown of the major patterns of movement through this gallery.

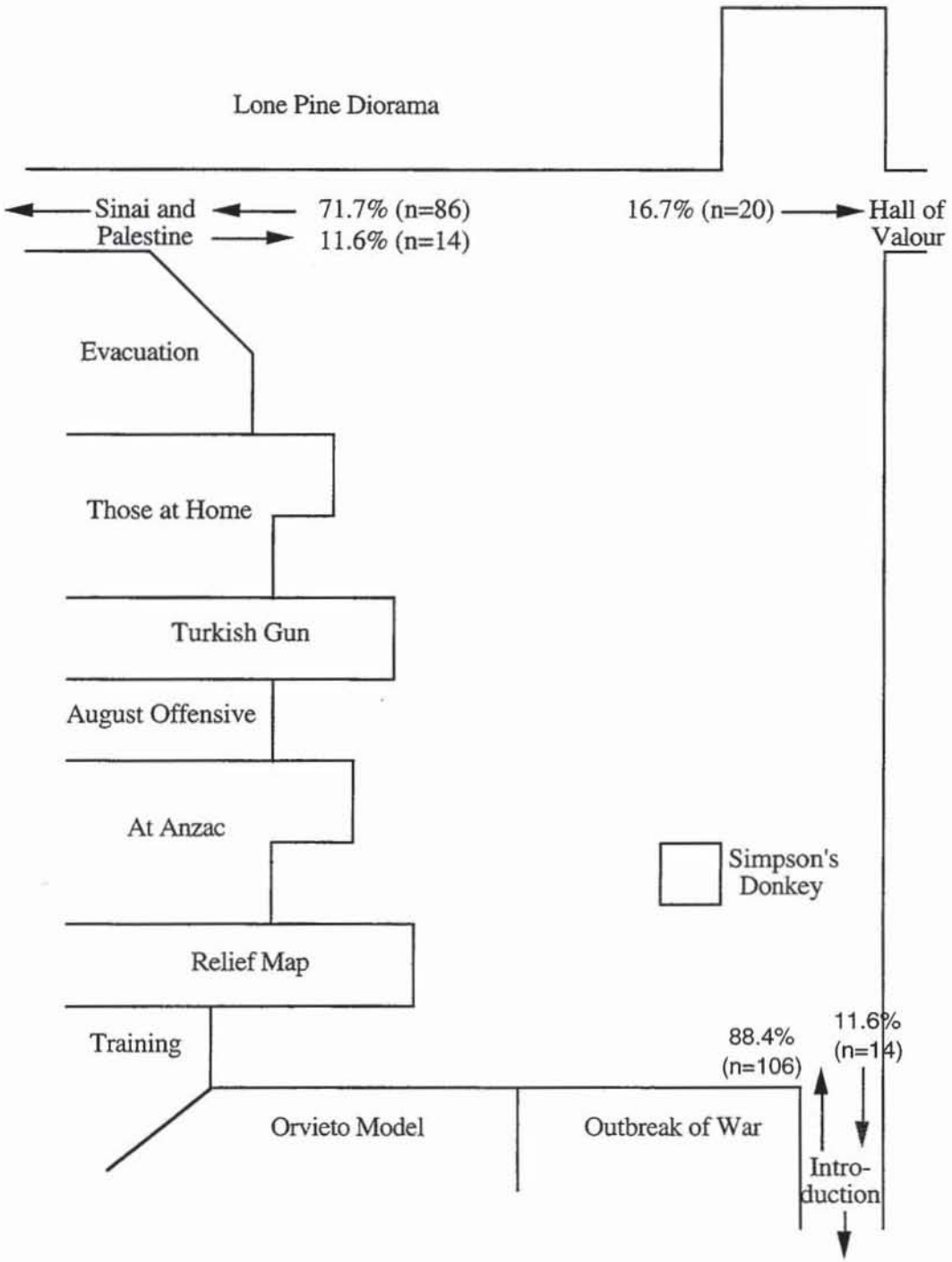

Figure 4.6. Patterns of visitor use of entrances and exits in the Gallipoli Gallery.

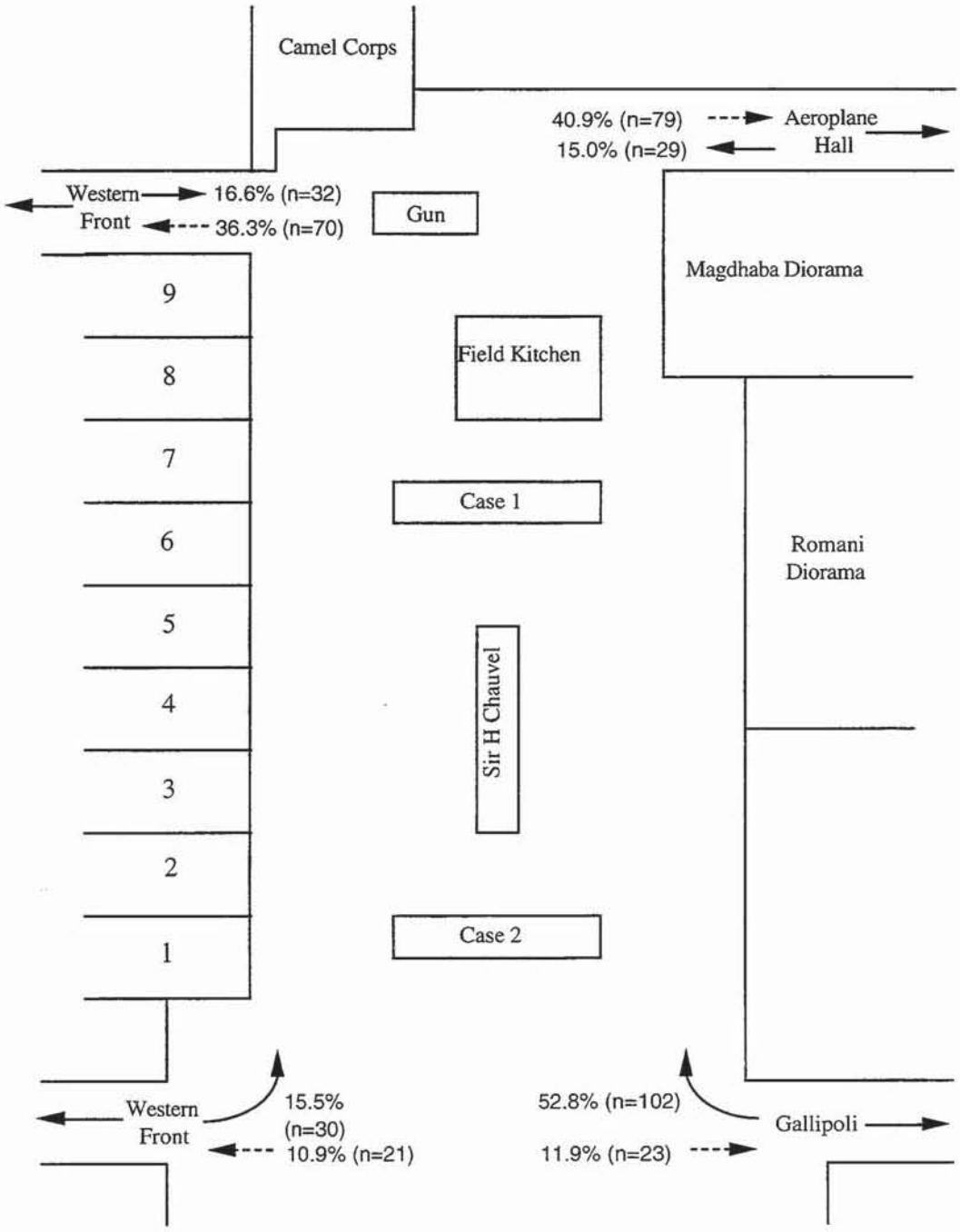

Figure 4.7. Patterns of visitor use of entrances and exits in the Sinai and Palestine Gallery.

Table 4.25

Breakdown of the Major Patterns of Movement Through the Sinai and Palestine Gallery

Pattern of Movement	**n**	**% of Sample**
Moved around all sides	48	24.9
Moved around all sides & centre	37	19.2
Moved mainly down left side	37	19.2
Moved mainly down right side	34	17.7
Moved across top only	17	8.8
Moved near cases only	13	6.7

Just over half the visitors (52.8%) entered the Sinai and Palestine gallery immideiately after having left the Gallipoli gallery. The rest of the sample entered after having visited other galleries. It is reasonable to assume, based on a knowledge of the overall layout of the Australian War Memorial (see Figure 4.8) that most visitors of these visitors had already passed by the Sinai and Palestine gallery and chosen not to enter it. Thus the sample was comprised of two groups of visitors, one which enters the Sinai and Palestine gallery immediately after Gallipoli and one which enters after having been to other galleries. This latter group was therefore more likely to be fatigued and to have experienced more exhibits, many of which were similar to those in the Sinai and Palestine gallery. It would be expected that the visitors in this latter group would be more likely to be mindless and that they should spend less time in the gallery and stop at fewer exhibits.

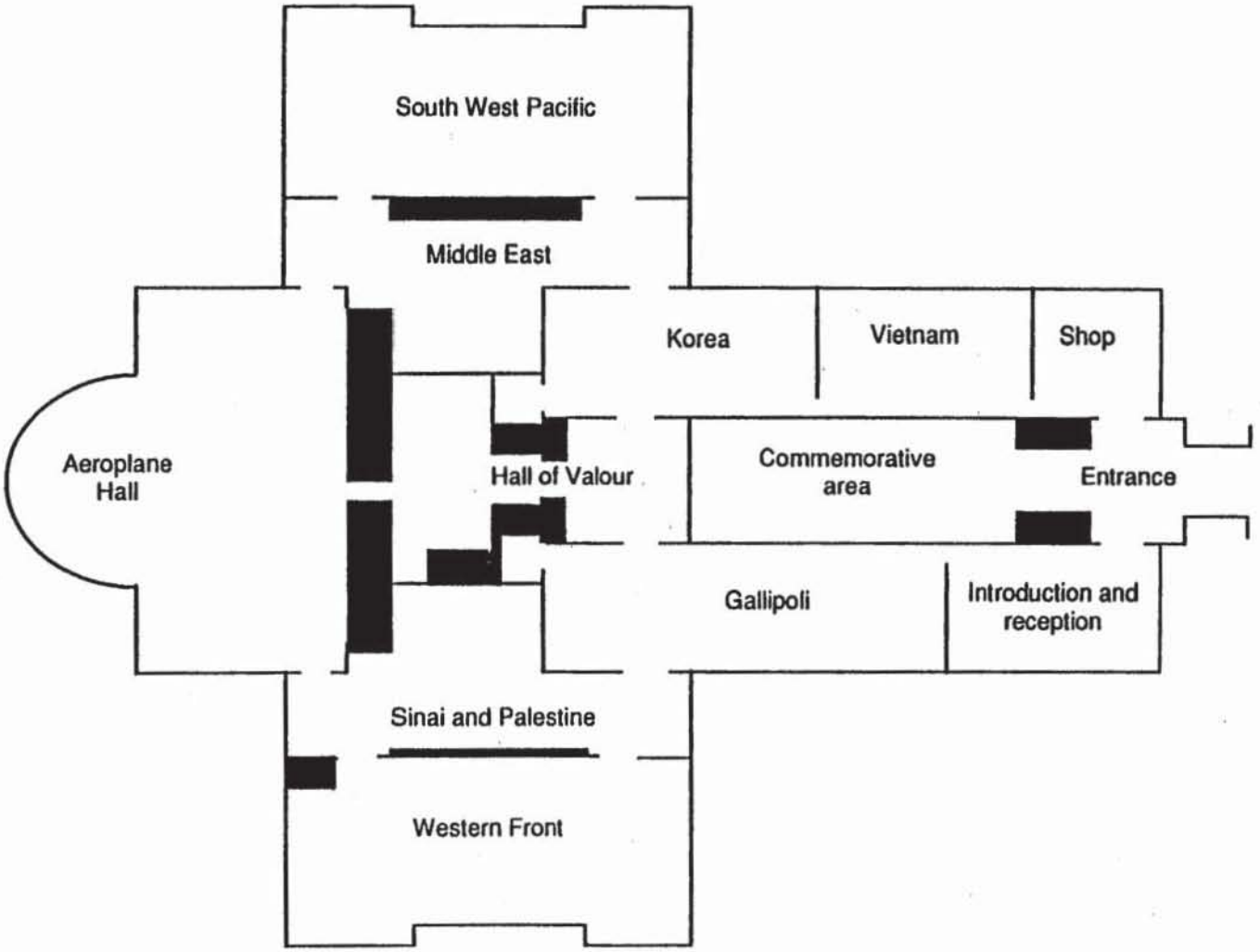

Figure 4.8. Floor plan of main galleries at the Australian War Memorial.

A series of analyses were conducted to investigate possible differences in the behaviour of visitors in these two groups which were labelled Gallipoli Entry and Other Entry. Table 4.26 contains the attracting powers (first measure) of the exhibits in the Sinai and Palestine gallery for these two groups of visitors. Overall, the Other Entry group appears less likely to stop at exhibits in the gallery. The exceptions to this pattern were the Camel Corps exhibit, the Gun and the Field Kitchen, which were all at the top end of the gallery and thus in the path of visitors as they came into the gallery. This pattern of Other Entry visitors stopping less at exhibits then Gallipoli Entry visitors was supported by the differences between the two groups in the mean percentage of exhibits stopped at and total time spent in the gallery. The mean percentage of exhibits stopped at by the Gallipoli Entry visitors was 28.55 (SD=21.2%) and was 23.59 (SD=22.0%) for the Other entry visitors. A Mann-Whitney U-test indicated that this was a significant difference (Z corrected for ties=-2.1, $p < 0.05$). In the case of the total time spent in the gallery the difference between the groups was not significant but was in the expected direction with a mean total time for the Gallipoli Entry visitors of 176.9 seconds (SD=156.3 seconds) compared to a mean time of 156.8 seconds (SD=187.8 seconds) for the Other Entry visitors.

Table 4.26

Attracting Powers (First Measure) of Exhibits in Sinai and Palestine Gallery for Gallipoli and Other Entry Visitors

Exhibit	**Gallipoli Entry n (%)**	**Other Entry n (%)**
Small Diorama 1	54 (52.9)	31 (34.1)
Small Diorama 2	40 (39.2)	26 (28.6)
Small Diorama 3	30 (29.4)	21 (23.1)
Small Diorama 4	28 (27.5)	19 (20.9)
Small Diorama 5	25 (24.5)	12 (13.2)
Small Diorama 6	19 (18.6)	13 (14.3)
Small Diorama 7	16 (15.7)	13 (14.3)
Small Diorama 8	18 (17.6)	11 (12.1)
Small Diorama 9	30 (29.4)	17 (18.7)
Camel Corps	12 (11.8)	15 (16.5)
Gun	19 (18.6)	17 (18.7)
Field Kitchen	17 (16.7)	18 (19.8)
Magdhaba Diorama	27 (26.5)	22 (24.2)
Romani Diorama	17 (16.7)	13 (14.3)
Case 1	56 (54.9)	44 (48.4)
Sir H Chauvel	47 (46.1)	39 (42.9)
Case 2	40 (39.2)	34 (37.4)
	(n = 102)	(n = 91)

4.8.2 Exhibit targetted observations

Table 4.27 shows the attracting powers (second measure) of exhibits in the Gallipoli Gallery. This index represents the percentage of visitors who stop at an exhibit out the total number of visitors who were observed passing each exhibit. As can be seen in the table the most successful exhibits were At Anzac, the Turkish Gun, the Lone Pine Diorama and Training. This measure of attracting power provided results consistent with those presented in Table 4.22 (Spearman's Rho=0.85, $P < 0.05$).

Table 4.27

Attracting Power (Measure 2) of Exhibits in the Gallipoli Gallery

Exhibits	n of Visitors Stopping	n of Visitors Passing	% of Visitors Stopping
Outbreak of War	49	139	35.2
Orvieto Model	45	97	46.4
Training	64	102	62.7
Relief Map	80	135	59.3
At Anzac	74	84	88.1
Turkish Gun	92	123	74.8
August Offensive	91	165	55.2
Those at Home	106	188	56.4
Evacuation	57	110	51.8
Lone Pine Diorama	123	182	67.6
Simpson's Donkey	42	166	25.3

The abilities of the exhibits in the Gallipoli Gallery to hold visitor attention are described in Table 4.28. The most successful exhibits in terms of the mean time spent at an exhibit were the Lone Pine Diorama, At Anzac and Training.

Table 4.28

Visitor Attention to Exhibits in the Gallipoli Gallery(in Seconds)

Exhibits	**Mean**	**SD**	**Median**	**Mode**	**Range**
Outbreak of War	21.5	20.6	14.7	1	1-89
Orvieto Model	21.1	25.1	11.2	5	1-107
Training	55.9	50.3	48.0	6	1-191
Relief Map	50.7	51.4	40.5	5	1-280
At Anzac	108.0	74.4	82.5	68	5-304
Turkish Gun	42.9	28.1	40.1	40	3-118
August Offensive	38.1	34.5	25.2	11	5-170
Those at Home	54.0	26.4	51.0	60	8-120
Evacuation	51.6	12.5	31.5	30	1-228

Lone Pine Diorama	298.1	298.9	179.8	100	14-950
Simpson's Donkey	8.9	12.5	3.5	1	1-52

Tables 4.29 and 4.30 contain the attracting powers (second measure) and holding powers for the individual exhibits in the Sinai and Palestine Gallery. The Spearman's Rho correlation between the two attracting power measures in this gallery (0.31, $p > 0.05$) was much lower than for the Gallipoli gallery or the Semaphore to Satellite exhibition. This reflects the much greater variety of pathways through this gallery. In the other two settings the visitors observed for the second measure of attracting power were likely to have followed the same pathways and to have seen a similar number of the same exhibits before they reached the target exhibit. In the case of Sinai and Palestine, however, the visitors could have come from any of several directions and to have experienced different numbers of exhibits before reaching the target exhibit. The most successful exhibits in terms of this measure of attracting power were the Romani Diorama and the first of the Small Dioramas, while the most successful in terms of holding power or mean time spent at an exhibit, were the Romani and Magdhaba Dioramas and Case 2.

Table 4.29

Attracting Powers (Second Measure) of Exhibits in the Sinai and Palestine Gallery

Exhibits	**n of Visitors Stopping**	**n of Visitors Passing**	**% of Visitors Stopping**
Small Diorama 1	69	87	79.3
Small Diorama 2	69	116	59.5
Small Diorama 3	57	110	51.8
Small Diorama 4	57	123	46.3
Small Diorama 5	60	125	48.0
Small Diorama 6	62	88	70.4
Small Diorama 7	57	88	64.8
Small Diorama 8	53	114	46.5
Small Diorama 9	48	101	47.5
Camel Corps	43	87	49.4
Gun	53	364	14.6
Field Kitchen	57	175	32.6
Magdhaba Diorama	46	137	33.6
Romani Diorama	47	52	90.4
Case 1	45	124	36.3
Sir H. Chauvel	46	149	30.1
Case 2	54	116	46.6

Table 4.30

Visitor Attention to Exhibits in the Sinai and Palestine Gallery

Exhibits	**Mean**	**SD**	**Median**	**Mode**	**Range**
Small Diorama 1	14.7	15.8	9.5	1	1-66
Small Diorama 2	7.7	10.3	4.2	1	1-49
Small Diorama 3	9.7	11.6	3.9	1	1-54
Small Diorama 4	7.5	10.6	3.3	1	1-53
Small Diorama 5	7.1	11.6	3.8	1	1-62
Small Diorama 6	7.0	9.6	3.5	1	1-56
Small Diorama 7	9.1	10.6	6.3	10	1-48
Small Diorama 8	4.7	4.5	2.4	2	1-22
Small Diorama 9	10.1	12.1	4.9	1	1-43
Camel Corps	27.3	25.0	27.0	27	1-119
Gun	7.6	8.5	2.5	1	1-32
Field Kitchen	5.5	6.3	2.2	1	1-26
Magdhaba Diorama	46.1	49.5	37.0	32	1-216
Romani Diorama	42.0	38.4	26.0	1	1-130
Case 1	21.9	23.4	13.5	1	1-74
Sir H. Chauvel	49.6	54.4	40.5	1	1-283
Case 2	30.8	42.1	12.5	2	1-167

A series of crosstabulation analyses were conducted to determine the influence of visitor demographics on their choice of exhibits. For the Gallipoli gallery these analyses indicated that on the whole the sample of visitors observed attending to each exhibit were similar in terms of sex and the size of their accompanying group. Age, however, did appear to be related to choice of exhibits (Chi-square = 69.4, df=20, $p < 0.05$), with the Orvieto Model and Training attracting mostly visitors aged more than 50 years (52.4%). The August Offensive, Those at Home and the Evacuation exhibits attracted mostly visitors under 30 years of age (68.9%, 53.7% and 47.5%).

The crosstabulation analyses conducted on the data collected in the Sinai and Palestine gallery indicated that sex, age and the size of the accompanying group were related to choice of exhibits. The Romani Diorama and the Sir H. Chauvel exhibit attracted more males than other exhibits with males making up 80.5 percent and 72.5 percent of the visitors observed at these two exhibits (Chi-square = 31.8, df=16, $p < 0.05$). The Gun, Field Kitchen and Magdhaba Diorama were most popular with visitors over 50 years of age (42.5%, 58.5% and 51.2%), while visitors under 31 years of age were the most likely to stop at the last two Small Dioramas and the Romani Diorama (63.4%, 58.5% and 56.1%, Chi-square = 101.3, df=32,$p < 0.05$). Finally the size of the accompanying group was also significantly related to choice of exhibits (Chi-square = 49.7, df=32, $p < 0.05$). In this instance single visitors were most attracted to the Gun (35.0%), Romani Diorama (36.6%) and Case 1 (35.0%), and visitors in a pair were most attracted to Case 1 (62.5%), Case 2 (60.0%) and the Camel Corps exhibit (61.0%). (The full

crosstabulation tables for these analyses are given in Appendix C, Tables 6 to 9.)

Nonparametric tests for group differences were also conducted with sex, age and the size of the accompanying group as independent variables and time spent at exhibits as the dependent variable (data for all exhibits in both galleries was combined for these analyses). No significant differences were found for sex or age. A Kruskal-Wallis Oneway Analysis of Variance indicated a significant result for the size of the accompanying group (Chi-aquare corrected for ties= 5.99, $p < 0.05$), with visitors alone spending the most time at exhibits (mean = 33.3 seconds, SD = 40.5 seconds), while visitors in a pair spent a mean time of 29.2 seconds at exhibits (SD = 43.1 seconds) and visitors in a groups of three or more people spent a mean time of 27.2 seconds in front of exhibits (SD=37.1 seconds). Finally, the two galleries were compared on time spent at exhibits using a Mann-Whitney U-test for group differences. This test revealed a significant difference (Z corrected for ties= -15.57, $p < 0.05$), with the a mean time of 47.7 seconds (SD = 49.1 seconds) for the Gallipoli gallery and 18.1 seconds (SD = 29.2 seconds for the Sinai and Palestine gallery.

4.8.3 Exhibit Variables

The exhibits in both galleries were categorised using the exhibit media variable previously discussed and the resulting codes are given in Table 4.31. Also in Table 4.31 are the key visitor behaviour indices for the exhibits. With the exception of the stereoscopes, all exhibits in both galleries were static and in both galleries there was repetition of exhibit formats. Table 4.32 contains the mean attracting and holding powers for each of the media categories and it can be seen that the large dioramas, the exhibit with the stereoscope and the

relief map are the most successful exhibits for all three visitor behaviour indicators. Figure 4.9 is a plot of the exhibits in both galleries on the first measure of attracting power and holding power. The exhibits have been

FIGURE 4.9

plotted using a semi-log graph following a procedure used by Abrahamson, Gennaro and Heller (1983). As these authors noted, the distributions of time spent at exhibits are highly positively skewed and the use of the semi-log graph is a way of transforming the information itno a more normal distribution. The first measure of attracting power was used as it was judged to be more representative of visitor behaviour. The division of the space into four quadrants results in four groups of exhibits which can be examined in fruther detail for common features. The dividing points reflect breaks in the distributions.

Examination of the plot reveals several features. Firstly there is little overlap between the the exhibits from the two galleries with all except one of the Gallipoli exhibits falling into the high holding, high attracting power quadrant. Secondly, the set of Small Dioramas in the Sinai and Palestine galleries are all within the low holding power quadrants and all except the first of these are in the low holding, low attracting power quadrant. The first Small Diorama is likely to have a higher attracting power because it is in the direct line of vision of visitors entering from the Gallipoli gallery. The other exhibits in the low attracting, low holding power quadrant are Simpson's Donkey, which was behind most visitors as they moved through the Gallipoli gallery, and the Gun and Field Kitchen in the Sinai and Palestine gallery, both of which were static and represent traditional military history exhibits. The three exhibits in the low attracting, high holding power quadrant were all traditional, static museum exhibits. It seems likely that only visitors with some interest in the contents of these exhibits were attracted to them and this interest sustained a higher level of attention. All of the large dioramas are

Table 4.31

Exhibit Variable and Visitor Behaviour Information for Exhibits in the Gallipoli and Sinai and Palestine Galleries

Exhibit	Media	Attracting Power 1	Attracting Power 2	Holding Power (seconds)
1. Gallipoli				
Outbreak of War	Flatwork, objects	45.8	35.2	21.5
Orvieto Model	Flatwork, objects model	61.7	46.4	21.1
Training	Flatwork, objects	67.5	62.7	55.9
Relief Map	Large relief map, flatwork, objects, model	65.0	59.3	50.7
At Anzac	Flatwork, objects	78.3	88.1	108.0
Turkish Gun	Flatwork, objects	63.3	74.8	42.9
August Offensive	Flatwork, objects	43.3	55.2	38.1
Those at Home	Flatwork, objects, interactive	60.8	56.4	54.0
Evacuation	Flatwork, objects	45.8	51.8	51.6
Lone Pine Diorama	Diorama (large) flatwork, objects	71.7	67.6	298.1
Simpson's Donkey	Object	11.7	25.3	8.9

cont.

cont.

Exhibit	Media	Attracting Power 1	Attracting Power 2	Holding Power (seconds)
2. Sinai & Palestine				
Small Diorama 1	Small Dioramas	44.0	79.3	14.7
Small Diorama 2		34.2	59.5	7.7
Small Diorama 3		26.4	51.8	9.7
Small Diorama 4		24.4	46.3	7.5
Small Diorama 5		19.2	48.0	7.1
Small Diorama 6		16.6	70.4	7.0
Small Diorama 7		15.0	64.8	9.1
Small Diorama 8		15.0	46.5	4.7
Small Diorama 9		24.4	47.5	10.1
Camel Corps	Large Diorama	38.3	49.4	27.3
Gun	Object	14.0	14.6	7.6
Field Kitchen	Object	18.7	32.6	5.5
Magdhaba Diorama	Large Diorama, flatwork	51.8	33.6	46.1
Romani Diorama	Large Diorama, flatwork	44.6	90.4	42.0
Case 1	Flatwork, objects	18.1	36.3	21.9
Sir H Chauvel	Flatwork, objects	25.4	30.1	49.6
Case 2	Flatwork, objects	15.5	46.6	30.8

Table 4.32

Mean Attracting and Holding Powers for Exhibit Media Categories

Media Categories	Attracting Power 1	Attracting Power 2	Holding Power[1]
Flatwork/objects and/or models	52.7 (18.3)	46.5 (21.6)	44.1 (25.9)
Flatwork/objects and interactive	56.4 (-)	60.8 (-)	54.0 (-)
Objects	60.2 (24.4)	51.6 (14.5)	103.4 (130.1)
Small Diorama	24.2 (9.1)	14.8 (3.6)	7.3 (1.7)
Large Diorama	57.1 (12.1)	24.4 (9.7)	8.6 (2.8)
Relief Map and Flatwork	59.3 (-)	65.0 (-)	50.7 (-)

Notes.
1. In seconds.
2. Standard Deviations are in brackets, blanks indicate n = 1.

within the high holding, high attracting power quadrant and the largest, Lone Pine, is one of the most successful exhibits in the plot. Within this high attracting, high holding power quadrant several exhibits can be identified as being different in some way form the exhibits around them. The Lone Pine Diorama is the only diorama in the Gallipoli Gallery, is much larger than the other exhibits and occupies a wall alone. The Relief Map is the only exhibit of its type in the gallery and Those at Home includes the only interactive feature in either gallery. The most traditional exhibits in the Gallipoli gallery, the Outbreak of War and the Orvieto Model are at the bottom of this quadrant.

4.9 Observation of Visitors in the Gallipoli and Sinai and Palestine Galleries: Discussion

The present study had the broad aim of examining patterns of visitor behaviour in a museum for evidence to support the Mindfulness Model and the specific goals of investigating the impact of the familiarity and affective tone of exhibits on visitor behaviour. Further, the results of the Semaphore to Satellite exhibition study suggested that location of exhibits was a variable which warranted further investigation and this was examined in the present study.

The patterns of visitor behaviour which were observed were consistent with the predictions of the Mindfulness Model. For example, the series of small dioramas in the Sinai and Palestine Gallery declined in both attracting and holding power as visitors moved past them. This pattern of declining visitor attention to repetitive exhibits is as would be expected from the Mindfulness Model. The repetition of a format would appear to induce mindlessness. This prediction is also supported on a larger scale by the results indicating that visitors who entered the Sinai and Palestine Galleries after having been through other galleries, thus having seen more exhibits, paid less attention to the exhibits in the Sinai and Palestine Gallery than those visitors who entered directly upon leaving the Gallipoli Gallery.

Analyses of the indicators of visitor attention also supported the Mindfulness Model's prediction that exhibits which differ in some way from those around them will be more likely to induce mindfulness in visitors. In the Gallipoli Gallery, the most successful exhibit was the one large Diorama. The only relief map and the only exhibit with an interactive component, Those

at Home, were also very successful at capturing visitor attention. In the Sinai and Palestine Gallery the observed visitors paid most attention to the large dioramas which again were different from the other exhibits in the gallery.

It was argued in the introduction to this study that these two galleries differed in terms of the familiarity of their subject material and thus in the affective response this subject material might involve in visitors. This argument was supported with evidence from a pilot study. It is important to note that, while it is argued in the Mindfulness Model that familiar situations or settings should induce mindlessness, the model proposes that affectively charged situations should be linked to mindfulness. It was argued the high profile or familiarity of the Gallipoli campaign would result in a greater affective response from visitors and thus induce visitors to be mindful. The results from the observations of visitors in the two galleries supported this prediction with visitors observed in the Gallipoli Gallery stopping at more exhibits and spending longer at exhibits than those in the Sinai and Palestine galleries. Evidence was also found indicating that the location of an exhibit influenced visitor behaviour. Thus, Simpson's Donkey which was behind visitors as they moved through the Gallipoli Gallery, had low attracting and holding powers. The Camel Corps exhibit, Gun and Field Kitchen, however, had better attracting powers for those visitors whose entry into the Sinai and Palestine Gallery was such that these exhibits were directly in front of them than for visitors using other entries.

In addition to information on Exhibit/Setting Factors and their influence on visitor behaviour the data from this study also provided some insight into relationships between Visitor Factors and visitor behaviour at exhibits. The Visitor Factors used in the analyses were sex, age and size of the

accompanying group. In summary, males were more attracted to the Romani Diorama and Sir H. Chauvel exhibit, older visitors (over 50 years) were most attracted to the Orvieto Model, Training exhibit, Gun, Field Kitchen and Magdhaba Diorama, younger visitors were attracted to the August Offensive, Those at Home, Evacuation exhibit, Small Dioramas 8 and 9 and the Romani Diorama. Visitors alone were most attracted to the Gun, Romani Diorama and Case 1 and visitors in a pair were most attracted to Cases 1 and 2 and the Camel Corps exhibit. There were no differences found between these demographic groups for total time spent or for the percentage of exhibits stopped at in either gallery. Time spent at exhibits was not found to be significantly related to the sex or age of visitors but was significantly related to the size of the accompanying group with visitors spending less time at exhibits as the number of people with them increased.

The relationships between demographic and choise of exhibits summarised above do not appear to reflect any consistent patterns of behaviour. That is, there are no particular exhibit features or topics which appeared to attract any particular group of visitors. The finding that visitors spent less time at exhibits as the number of visitors with them increased is consistent with McManus (1987, 1988) findings. McManus found that large groups had the lowest levels of attention to exhibits and that adults alone read the most comprehensively which would result in longer times spent at exhibits. These longer times, however, did not result in the present study in a longer overall time spent in the galleries. This might suggest that visitors alone are more selective in their choice of exhibits. Such selection of exhibits could imply a mindful cognitive state and is likely to be driven by personal

interests. Overall then, the data suggests that individual interests and motives could be important factors in exhibit choice.

4.10 A Comparison of Exhibits in the Semaphore to Satellite Exhibition and in the Gallipoli and Sinai and Palestine Galleries

None of the studies reviewed in the introduction to this chapter have compared visitor behaviour across different settings. The present study offers an opportunity for such a comparison. Figure 4.10 plots all the exhibits observed in the present study onto a semilog graph for holding power and the first measure of attracting power. As the procedures used in both settings to collect data on holding and attracting power were the same it is possible to make comparisons between the exhibits.

The plot of the exhibits in Figure 4.11 contains several features worth noting. Firstly, of the three interactive exhibits in the Semaphore to Satellite exhibition, only the Strowger Exchange is within the high attracting, high holding power quadrant. While several other Semaphore to Satellite exhibits are in the high holding power quadrants, on the whole these exhibits were not as successful at attracting and holding visitor attention as the Gallipoli Gallery exhibits. That is, several interactive and audiovisual exhibits were less successful than static flatwork or diorama exhibits. There are two sets of factors which could be contributing to these results. Firstly, the Mindfulness Model predicts that it is change or variety in exhibits within a setting that will induce mindfulness in visitors rather than simply having interactive or audiovisual features. Thus, if there is in a gallery with many similar exhibits

FIGURE 4.10

a single exhibit which differs in some way, it should induce mindfulness in visitors even if it is not interactive or audiovisual. Without this mindfulness perspective it might have been predicted that the interactive and audiovisual exhibits of the Semaphore and Satellite exhibition would have had the highest holding and attracting powers.

The Mindfulness Model also proposes, however, that variety in a setting should induce mindfulness in visitors. Thus it could have been predicted that as the Semaphore to Satellite exhibition had a broader range of exhibit media than either of the two Australian War Memorial Galleries, that its exhibits should have scored higher on the visitor behaviour indices than the War Memorial Galleries. Another prediction derived from the Mindfulness Model is that affectively charged settings should result in more mindful visitors.

It would seem that a combination of all these factors can be used to explain the pattern of results in Figure 4.11. The most successful exhibits, that is, those in the high holding, high attracting power quadrant, are those which were either different in some way from their companion exhibits or which had content which was effectively charged. Further, the overall distribution of the exhibits suggests that Gallipoli Gallery was the most successful gallery in terms of visitor attention followed by the Semaphore to Satellite Exhibition with the bulk of the Sinai and Palestine exhibits falling in the low attracting, low holding power quadrant. It would seem that the content of the Gallipoli exhibits was successful in inducing mindfulness in visitors even though the exhibits were static and very similar. In the case of the other two settings, which could be proved lacked the affective element of the Gallipoli Gallery, the variety and interactive components of the

Semaphore to Satellite exhibits were more successful overall than the static repetitive exhibits of the Sinai and Palestine exhibits.

4.11 Observation of Visitors in Two Australian Museums: Summary

The studies reported in this chapter were designed to investigate visitor behaviour in different museums and to seek evidence which would be consistent with the Mindfulness Model as set out in previous chapters. They were also aimed at exploring further relationships between variables which were not fully articulated in the Mindfulness Model such as potential relationships between visitor demographics and exhibit factors. The study conducted at the Australian War Memorial also had the goal of investigating the relationship between affectively charged exhibit contents and visitor behaviour. Two major indicators of mindfulness in visitors were used, the ability of exhibits to attract visitor attention and to hold visitor attention and data on visitor behaviour was collected using both Exhibit Targetted and Tracking observation strategies in each of the three settings examined.

The analyses of exhibit factors and visitor behaviour did produce results consistent with the Mindfulness Model. The prediction that variety or change in exhibits would produce greater levels of visitor attention and, conversely, that repetition in exhibits would result in lesser levels of visitor attention were supported by the results. Further, in the study of the Semaphore to Satellite exhibition exhibits which offered opportunities for interaction and/or multi-sensory exhibits were more successful than the static exhibits in that setting. The comparison of exhibits from all three settings, however, suggested that it was change or variety in exhibits within a setting that was more important in

producing mindful behaviour than simply opportunities for interaction. The comparison of exhibits in all three settings also suggested that affect is related to mindfulness. The Gallipoli Gallery exhibits were, on the whole, more successful at inducing mindful behaviours than the other exhibits studied and it was proposed that the major difference between the Gallipoli exhibits and other exhibits was that of the affective tone of the exhibit contents.

In addition to providing evidence to support the Mindfulness model the analyses also revealed that location of exhibits played a role in their impact or influence on visitor behaviour. This finding was made possible by the use of multiple methods of observation. Further, a preliminary analysis of the interrelationships between exhibit variables indicated that these variables were not independent of each other. That is, it seemed that particular topics and strategies of communication were likely to occur in exhibits with certain media. This suggests that greater attention may need to be given to the content/topics of exhibits and the strategies of communication than has previously been the case.

Several results pointed to the potential role of visitor interest in, and familiarity with, the content of the exhibits. These included differences between the demographic groups in their choice of exhibits and the differences in visitor behaviour between the Gallipoli and Sinai and Palestine galleries. While in the latter instance, a pilot study supported the proposal that the Gallipoli gallery topic was likely to produce greater affective response from visitors, observation studies alone cannot provide a complete picture of visitor responses to exhibits. Thus the obvious next step in this research program is to survey or interview visitors in the settings to further explore their responses to exhibits.

CHAPTER 5

Survey Studies in Australian Museums: Developing a Picture of Visitor Cognition

> *It is necessary to recognise that picture-analysis alone does not yield a total picture of the visitor. ... Supplementing the picture record with sound recording would provide still more complete information concerning visitor reactions. But such questions as what factors prompted the visitor to come, what was his emotional set or state of fatigue at the time of his visit, and so forth, require other techniques for their answer.*
>
> (Nielsen, 1946, p. 110)

5.0 Introduction

According to McManus (1989) the idea that visitors do not read labels of text "is almost a part of museum folklore" (p. 174). She points out that this conclusion is based almost exclusively on the results of observation studies of museum visitors and goes on to to argue that "reading is difficult to observe visually" (p. 186). Carlisle (1985) also recognises the limitations of observation studies in his conclusions from an observation study of children when he says that "what each individual child gained from the experience is unknown" (p. 32). To paint a complete picture of visitor experiences in museums we need both to watch visitors in museums and to ask visitors about museums (Screven, 1990a). This chapter reports on two survey studies of visitors in Australian museums conducted at the Semaphore to Satellite exhibition and the Gallipoli and Sinai and Palestine Galleries of the Australian War Memorial.

5.1 Previous Survey Studies of Museum Visitors

While Chapter 2 provided a review of museum visitor studies it is appropriate to briefly reconsider what previous surveys of museum visitors can tell us about their experiences. Chapter 2 was specifically aimed at examining the value of the proposed Mindfulness/Mindlessness Model of Museum Visitor Behaviour and Cognition for integrating and interpreting the results of previous research on museum visitors, and this was done by reviewing the research in two sections, studies concerned with Exhibit/Setting Factors and studies concerned with Visitor Factors. With respect to the section concerned with Exhibit/Setting Factors it was found that the Mindfulness Model's predictions were supported by the reported results. That is, any change away from a traditional format did result in greater learning from, and attention to, exhibits and greater opportunities for interaction were positively related to learning and enjoyment. These studies, however, focussed almost exclusively on physical attributes of exhibits which were manipulated or categorised by the researchers with little research examining visitor perceptions of the attributes of exhibits.

Table 1 in Appendix D contains a summary of those studies reviewed in Table 2.5 which involved interviews or surveys of visitors. Examination of this table shows that these studies are characterised by attention to a narrow range of exhibit features categorised from an etic perspective, a limited range of dependent measures and limited analyses of visitor characteristics. The most common dependent measures used were multiple choice quiz tests to assess knowledge of exhibit contents, with a few studies using true-false questions and/or open-ended questions to assess knowledge. Two studies also included tests of motor skills appropriate to the exhibits under

investigation (Birney, 1988; Sneider, Eason & Friedman, 1979). Other measures employed were rating scales measuring enjoyment of experiences or exhibits and measures of preference for exhibits. Only three studies (Derwin & Piper, 1988; Landay & Bridge, 1982; Worts, 1989, 1990) asked visitors to rate exhibits on scales other than liking or enjoyment and only one of these (Landay & Bridge, 1982) gave full details for these scales. Further, even Landay and Bridge (1982) did not discuss why they included the five semantic differential scales that were reported. In the case of visitor characteristics included in the analyses of these studies, less than half of the studies reported in Table 1, Appendix D, analysed any visitor characteristics in relation to their dependent measures and those that did were predominantly concerned with demographic variables.

Section 2.2 in Chapter 2 reviewed visitor studies which concentrated in more detail on visitor rather than on exhibit/setting characteristics. The major conclusions drawn from this review were that familiarity with settings, interest in a topic, reason for a visit and social composition of the visiting group were possible influences on learning and enjoyment in museum settings. In summary, there is a clear need for survey research with museum visitors which systematically examines in detail the relationships between visitor factors such as motivation, level of interest in a topic and familiarity with a setting, visitor perceptions of exhibits, visitors' cognitive state and their enjoyment of, and learning from a museum visit.

5.2 Aims of the Survey Research Programme

The major aim of the research programme reported in this chapter was to examine systematically and in detail visitor experiences in two Australian museum settings - the Semaphore to Satellite exhibition and the Gallipoli and Sinai and Palestine Galleries of the Australian War Memorial. As in the previous chapter the use of a range of settings was deemed desirable because it allows for a range of exhibit types and content areas to be examined. The studies were conducted in the order in which they are set out above, with the Semaphore to Satellite exhibition study aimed at developing measures of the key variables of mindfulness, learning, satisfaction, arousal, mood, familiarity and level of interest in a topic. The second study, conducted at the Australian War Memorial, was aimed at extending the analyses to include visitors' perceptions of the setting and in particular to investigate the relationship between arousal, mood and mindfulness. The importance of these galleries for investigating this relationship has been discussed in the previous chapter. It was also hoped that each study would further develop measures of mindfulness. The specific predictions derived from the Mindfulness Model to be investigated in these studies are summarised in Table 5.1.

5.3 Measuring Mindfulness

As measurement of mindfulness is of central concern to the studies reported in this chapter it is important that literature pertaining to this issue be discussed in detail. The obvious starting point is with the studies of mindfulness conducted by Langer and her colleagues. As noted by Salomon and Globerson (1987), however, most of Langer's research has involved an

Table 5.1

Summary of Predictions From the Mindfulness Model of the Museum Visit

1. Visitor Factors

Visitors who are interested in a particular topic or content area will be more likely to be mindful than other visitors.

Visitors' goals/reasons for their visit should be related to their cognitive state. Specifically visitors with an educational goal will be more likely to be mindful than visitors with other goals.

Familiarity with museums should be related to mindfulness/ mindlessness with regular museum visitors more likely to be mindful because they are more likely to have an educational goal/motive for their visits.

Visitors with high levels of fatigue should be less likely than other visitors to be mindful.

Arousal should be related to mindfulness/mindlessness with moderate to high levels of arousal resulting in mindfulness and low levels of arousal resulting in mindlessness.

The type of social group that the visitor is with should influence their cognitive state. Previous research suggests that visitors in family groups should be more likely to be mindful because family groups should be more likely to have an educational goal/motive for their visit.

2. Exhibit/Setting Factors

Exhibits and/or content which evokes an emotional response from visitors should induce mindfulness.

3. Visitor Perceptions of Exhibits/Settings

Visitors who perceive exhibits to be surprising, novel or different to their expectations will be more likely to be mindful than other visitors.

experimental manipulation designed to induce mindfulness or mindlessness and the success of the manipulation is then inferred from differences in post-test performances between the different experimental groups. The measures of performance that have been used are listed in Table 5.2. In all these studies improved performance is said to have resulted from mindful processing of the information available in the experimental setting. In this

Table 5.2

Performance Measures Used to Infer Mindfulness in Experimental Studies

Performance Measure	Study
Helping behaviour/compliance with requests.	Langer & Abelson, 1972 Langer, Blank & Chanowitz, 1978
Performance on perceptual tasks.	Chanowitz & Langer, 1981 Langer, Dillon, Kurtz & Katz, 1988
Use of labels/cues in person perception.	Langer & Newman, 1979 Langer & Imber, 1980 Langer, Bashner & Chanowitz, 1985
Creativity (in response to problems, uses of objects & poetry).	Langer & Piper, 1987 Alexander, Langer, Newman, Chandler & Davies, 1990 Langer, Hatem, Joss & Howell, 1989 Langer, Beck, Janoff-Bulman & Timko, 1984
Memory, detail of recall.	Langer & Imber, 1980 Alexander et al., 1990 Langer & Piper, 1988 Langer, Beck et al., 1984
Health.	Alexander et al., 1990 Langer & Rodin, 1976
Self-ratings of happiness, well-being and enjoyment of activities.	Alexander et al., 1990 Langer & Piper, 1988 Langer & Rodin, 1976

sense these studies provide a list of measures of outcomes of mindfulness rather than direct measures of mindfulness.

To develop more direct measures of mindfulness we need to look at Langer's definition of mindfulness. The most recent definition of mindfulness can be found in Brown and Langer (1990) . In this discussion of intelligence and mindfulness, mindfulness is defined

> *as a process in which one (1) views a situation form several perspectives, (2) sees information presented in this situation as novel, (3) attends to the context in which one is perceiving the information, and eventually (4) creates new categories through which this information may be understood* (p. 14).

This is consistent with previous definitions of mindfulness as a state of active mental processing of available information (Langer, 1989b). Salomon and Globerson (1987) have proposed that one way to operationalise mindfulness is to use self reports of mental activity. Although it has been argued that such self reports provide information on individual's theories of their cognitive activity rather than on their actual cognitive activity (Nisbett & Ross, 1980), Salomon and Globerson (1987) argue that this is most likely to be a problem for automatic processes and thus not applicable to mindfulness which involves "intentional, controlled processes" (p. 626). The use of self reports is consistent with Langer's (1978) description of mindfulness as the conscious use of information in a setting. Further, the issue of control is an important one for Langer and in several articles she notes that perceived control and competence are elements of mindfulness (Chanowitz & Langer, 1980; Langer, 1980).

It is important to note that one of the major obstacles to studying mindfulness in museum settings is determining what precedes, what indicates and what results from mindfulness. The variable, interest in a topic, is a good example of this problem. The model proposes that high levels of interest in a topic can be one path to mindful processing of information. Increased interest in a topic, however, may also be the result of mindful processing induced by some aspect of an exhibit in visitors who had no prior interest in a topic. It was noted in Chapter 2 that measuring interest after a visitor has experienced an exhibit does not allow for the researcher to distinguish between the two cases previously outlined. An obvious solution is to interview/survey the same visitors both prior to their experience and post their experience. This solution, however, suffers from major problems of reactivity. Asking visitors about their levels of interest in an exhibition or about other aspects of their approach to the exhibition is very likely to induce mindfulness and fundamentally alter the nature of the experience. One intention of the Australian War Memorial Study reported in this chapter was to use multiple survey points in an attempt to overcome this problem. For all studies the following distinctions were drawn. Mindfulness would be measured by self reports of mental activity and/or perceived control. It could also be assessed by behaviours such as seeking further information. Recall of information in a setting and satisfaction with an experience would be treated as outcomes of mindfulness and variables such as familiarity, arousal, mood, and interest in a topic would be treated as variables whose relationships with mindfulness were being explored.

5.4 Survey of Visitors to the Semaphore to Satellite Exhibition: Method

The study of visitors to the Semaphore to Satellite exhibition reported in this section was part of a larger evaluation research programme conducted for, and funded by Telecom Australia's Public Relations section. This programme included interviews conducted with 269 visitors before they entered the exhibition and a survey administered with an interactive computer exhibit to 275 visitors as they left the exhibition. The use of a pre-visit and post-visit surveys allowed for an evaluation of the exhibition's impact on visitors which was of primary interest to Telecom Australia. It is the computer survey, however, which is of principal interest in the present context as it was this survey which most fully examined the variables of mindfulness, interest in the exhibition topic, learning, satisfaction with the visit, visitor characteristics and visitor perceptions of the exhibition. The pre-visit survey did, however, provide data on visitors which can be used to assess possible sampling biases resulting from the use of a computer to administer the post-visit surveys.

A computer was used to administer the post-visit survey for two main reasons. Firstly it was a cost-effective method of collecting data over an extended period of time, and secondly, it was less intrusive into visitors' experiences as it acted as an exhibit in its own right. (With respect to its cost effectiveness the exhibit did collect survey data for approximately 1200 visitors over a two month period. Substantial damage incurred during the shipping of the disks resulted in a final sample of 275. There is no evidence to suggest that the damage occurred in any systematic fashion or that the final sample is not representative of the total sample.

Several studies have demonstrated the effectiveness of using computers as compared to traditional survey or interview methods in data collection

(Karriker, Miller, Springer & Soper, 1985; Sproull, 1986). Some of the available research suggests that computers may elicit more reliable data than self-report or interview techniques because they lack social desirability pressures which may be present in traditional survey techniques (Canoune & Leyke, 1985; Gallant, 1985). Newsted (1985), however, in a study comparing computers and interviews in a national park visitor centre, found an age difference in the use of computers with a younger sample using the computer. In addition to age differences there is some evidence that females are reluctant to use computerised systems (Bartram & Eastaugh, 1981). These gender differences, however, are not apparent in more recent studies (Hilke, Hennings & Springuel, 1988).

5.4.1 Sample.

Table 5.3 contains the demographic profile for the computer survey sample as well as for the pre-visit interview sample and the tracking sample from the observation studies (described in Chapter 4, section 4.3.2). This table thus provides both a description of the computer survey sample and an opportunity to compare this sample of visitors who chose to stop and complete the survey with samples chosen by interviewers or observers. The sampling procedure used for the pre-visit interviews involved the use of three interviewers stationed near to the entrance of the Semaphore to Satellite exhibition. These interviewers chose the first adult visitor not in a tour group

Table 5.3

Demographic Descriptions of the Computer Survey Sample, Interview sample and Tracking Observation Sample

	Computer Sample (n=275)		Interview Sample (n=269)		Tracking Sample (n=152)	
	n	%	n	%	n	%
A. Age						
< 20 years	162	59.1	43	16.0	12	8.0
21-30 years	55	20.1	106	39.2	70	46.0
31-40 years	25	9.1	36	13.4	30	20.0
41-50 years	14	5.1	27	10.1	20	13.0
51-60 years	7	2.4	34	12.7	13	9.0
> 60 years	11	4.0	23	8.5	7	5.0
B. Sex						
Male	157	57.1	151	56.1	79	52.0
Female	118	42.9	118	43.9	73	48.0

C. Type of Accompanying Group*	Computer Sample (n=275)		Interview Sample (n=269))	
Alone	67	24.4	89	33.0
With one other person	53	19.3	110	41.0
With friends	35	12.6	9	3.3
With family	53	19.3	49	18.2
With family and friends	15	5.5	12	4.5
With a school or tour group**	52	18.9	-	-
D. Place of Residence*				
Melbourne	169	61.4	144	53.5
Other Victoria	26	9.3	36	13.4
South Australia	3	1.2	6	2.2
New South Wales/ACT	39	14.2	37	13.8
Queensland/NT	7	2.4	10	3.7
Tasmania	10	3.7	5	1.9
Western Australia	4	1.6	4	1.5
Outside Australia	17	6.1	27	10.0

* These categories are applicable for the first two samples only.
** Interviewers were instructed not to approach visitors in tour groups.

to approach the exhibition entrance after the interviewers arrived. When this interview had been completed the interviewers approached the next adult not in a tour group in the area. A total of 410 visitors were approached giving a response rate of 65.8 percent. Examination of Table 5.3 indicates that the samples were comparable in terms of the distributions of gender. The distributions for type of visiting group differed with a greater proportion of visitors in couples in the interview group. The differences in this distribution may be due in part to the interview sampling strategy with the interviewers instructed not to approach visitors judged to be under 16 years of age and in a tour group. Refusals for this sample were reported by the interviewers to be mainly due to the target visitor not wanting to make children or others in their party wait and this may explain the larger proportions for the categories of alone and with one other person. The distributions for place of residence were comparable for the two samples for which this question was asked.

The major differences between the samples occurred in the distribution of age with the computer attracting a much greater percentage of visitors under the age of 20. When visitors under the age of 20 years are removed from the three samples, however, (shown in Table 5.4) the distributions become very similar. Thus it is not a case of the computer attracting fewer older people but of attracting more younger people. The other variable that can be compared for the two samples is that of membership of clubs or groups with a special interest in the area of communications. In this case the computer did appear to have attracted a group with more specialised interests as 23.0 percent of the computer sample said that they were members of such organisations as compared to 4.8 percent of the interview sample. Thus the use of a computer exhibit to collect data did produce a sample with more

young visitors and more visitors with a special interest. It was judged that these differences were not critical to the present study's concern with examining visitors' cognitive states and responses to their experience in the exhibition.

Table 5.4

Age Distributions for the Sample With Visitors Under 20 Years Removed from the Analysis

	Computer Sample		Interview Sample		Tracking Sample	
Age	**n**	*%*	**n**	*%*	**n**	*%*
21-30 years	55	49.1	106	46.9	70	50.0
31-40 years	25	22.3	36	15.9	30	21.4
41-50 years	14	12.5	27	11.9	20	14.3
51-60 years	7	6.3	34	15.0	13	9.3
> 60 years	11	9.3	23	10.2	7	5.0

5.4.2 Survey questionnaire.

The questions asked of visitors with the computer are given in Table 5.5. The questions are in the order in which they were presented to the visitors. The survey was designed to collect data on the following variables:-

(i) *Familiarity with museums*, measured by number of recent visits to this particular museum (question 2) and to museums in general (question 3).

Table 5.5

Questions Asked in Computer Survey

1. How long have you been at the museum today?
   1. Less than 30 minutes
   2. 30 minutes to 1 hour
   3. 1 hour to 2 hours
   4. 2 hours to 4 hours
   5. More than 5 hours

2. How many times have you visited the museum in the last 12 months?
   0. None
   1. Once
   2. Twice
   3. 3 to 5 times
   4. More than 5 times

3. How many other museums or displays have you visited in the last 12 months?
   0. None
   1. One
   2. Two
   3. 3 to 5
   4. More than 5

4. How strongly would you rate your interest in the topic - communications in Australia?
   1. Not at all interested
   2. Not particularly interested
   3. Neither interested nor disinterested
   4. Interested
   5. Very interested

5. Are you a member of a club, organisation or group interested in radio communications or communication technology in general?
   1. Yes
   2. I'm not a member but I have a special interest in these areas
   3. No

6. How different was your visit to the Semaphore to Satellite exhibition to what you expected?
   1. It was very different
   2. It was moderately different
   3. It was somewhat different
   4. It was not at all different

7. Please look at the following list of words carefully. Choose one word from the list that best fits how you felt as you went through the Semaphore to Satellite exhibition.
   1. Lively
   2. Nervous
   3. Quiet
   4. Tired
   5. Drowsy
   6. Leisurely
   7. Anxious
   8. Active

   Now look at the list again and choose a second word to describe how you felt.

8. How much do you think you have learnt from your visit to the Semaphore to Satellite exhibition?
   1. I've learnt a great deal of new information
   2. I've learnt a moderate amount of new information
   3. I've learnt some new information
   4. I've learnt nothing new at all

9. Please tell me who you are visiting the exhibition with today?
   1. No one
   2. One friend or partner
   3. A group of friends
   4. Your family
   5. Family and friends
   6. A school or tour group

10. I'd like to know how you enjoyed your visit to the Semaphore to Satellite exhibition today?
    1. I did not enjoy it at all
    2. I enjoyed it a little
    3. I enjoyed it moderately
    4. I enjoyed it a lot

11. Would you recommend a visit to your friends?
    1. I would definitely recommend it
    2. I would probably recommend it
    3. I am not sure
    4. I would not recommend it

12. Would you visit another exhibition about communications in Australia?
    1. I would not visit another exhibition
    2. I am not sure
    3. I would probably visit another exhibition
    4. I would definitely visit another exhibition

13. What would you say was the major reason for your visit to the museum today?
    1. To improve my knowledge of the world
    2. To relax
    3. To do something different
    4. To enjoy an activity with family or friends
    5. To see a specific exhibition
    6. To fill in time
    7. Because it was recommended by friends

Now I'm going to ask you a different sort of question. I'm going to show you 7 statements one at a time and I would like you to tell me how true each is for how you feel now.

My curiosity is aroused.
I feel like searching for answers.
I want to explore possibilities.
My interest has been captured.
I feel involved in what I am doing.
I want to enquire further.
I feel in control of what I am doing.

Rating scale
Not at all true
Somewhat true
Moderately true
Very true

14. Now I would like you to tell me how true you believe the following statements are about communications in Australia.

The type of communication system a society has influences its social structure.

Telecommunication services are important to everyday life.

The type of communication system a society has influences its economic system.

The telephone has had a large impact on social life.

In the last 50 years communication systems have changed greatly.

Changes in communication systems have changed many aspects of business and office work.

Solar energy is important for Australia's communication system.

Telecom provides important services to Australian society.

Satellites are a key element in Australia's communication system.

Australia's communication system is based on advanced technology.,

Rating scale
Absolutely true
Very true
Moderately true
Somewhat true
Not at all true

Please describe to me who you are . . .

15. Are you 1. Male 2. Female

16. How old are you? _____

17. Please type in the number for the place where you live . . .
1. Melbourne
2. Other Victoria
3. South Australia
4. New South Wales/ACT
5. Queensland/NT
6. Tasmania
7. Western Australia
8. Outside Australia

18. Now the questions are over and we can have some fun. Let's play Telecom Trivial Pursuit.

How did Flagstaff Hill get its name?
*_____ From the flagstaff on the top of it.
_____ It is shaped like the stern of a ship with a flagstaff on it.
_____ From Captain George Flagstaff, an important British officer.
_____ It is an English translation of an Aboriginal word.

What was the first message sent on the Geelong/Melbourne telegraph line?
_____ News of the winner of the Melbourne Cup.
*_____ News of the Eureka stockade.
_____ Prices of lamb and mutton from the Melbourne saleyards.
_____ A message from the Mayor of Melbourne to the Mayor of Geelong.

Where was the first telephone line in Victoria?
_____ From Melbourne to Geelong.
_____ From Melbourne to Queenscliff.
_____ From Geelong to Ballarat.
*_____ From Geelong to Queenscliff.

In what decade was Alexander Graham Bell's first telephone message?
_____ 1850s
_____ 1860s
*_____ 1870s
_____ 1880s

What was the first telephone message?
_____ Mr. Bell Can you hear me?
_____ Mr Watson can you hear me?
*_____ Mr. Watson come here please. I want you.
_____ Mr Bell come here please. I want you.

TABLE 5.5/3

How many years after Bell's first successful telephone message was the first exchange opened in Melbourne?

_____ 2 years
*_____ 4 years
_____ 6 years
_____ 8 years

Which of the following pieces of office equipment does the COMPUTERPHONE replace?

_____ Telephones, typewriters & intercoms.
_____ Telephones, typewriters & comptometers.
*_____ Telephones, typewriters, files, intercoms & comptometers.
_____ Telephones, typewriters, intercoms, comptometers & xeroxing machines.

How many telephone calls can a single optical fibre carry?

_____ 50 000
*_____ 35 000
_____ 15 000
_____ 1 000

How far above the earth are the satellites used in Australia's communication system?

_____ 36 kilometres
_____ 360 kilometres
_____ 3 600 kilometres
*_____ 36 000 kilometres

Which of the following can be transmitted by satellite?

*_____ Voice, video and data
_____ Voice and video only
_____ Voice only
_____ Voice and data only

* Correct answer.

(ii) *Level of interest in the topic of the exhibition,* measured by a rating of interest in the topic (question 4) and a question (5) asking about membership of a group with special interest in the exhibition topic. It was believed that this second measure of interest was one which could be reasonably considered as antecedent to the exhibition experience.

(iii) *Arousal and mood*, measured by question 7 which required visitors to choose two words from a list of eight to describe how they felt. The list of eight words was drawn from Russell's Circumplex Model of Affect (Russell, 1978, 1980; Ward & Russell, 1981) given in Figure 5.1. This model sees arousal and evaluation of arousal as two independent dimensions and thus allows for the examination of arousal and mood separately. It was decided that it would be unlikely that people engaging in a recreational activity would describe themselves as miserable, distressed or depressed, so the list of eight words was chosen to contain less extreme adjectives and contained two words to describe each of the four quadrants of the model as follows:-

A. *Lively* and *Active* to describe higher levels of arousal with a positive evaluation,

B. Quiet and *Leisurely* to describe lower levels of arousal with a positive evaluation,

C. *Anxious* and *Nervous* to describe higher arousal with a negative evaluation, and

D. *Tired* and *Drowsy* to describe lower arousal with a negative evaluation.

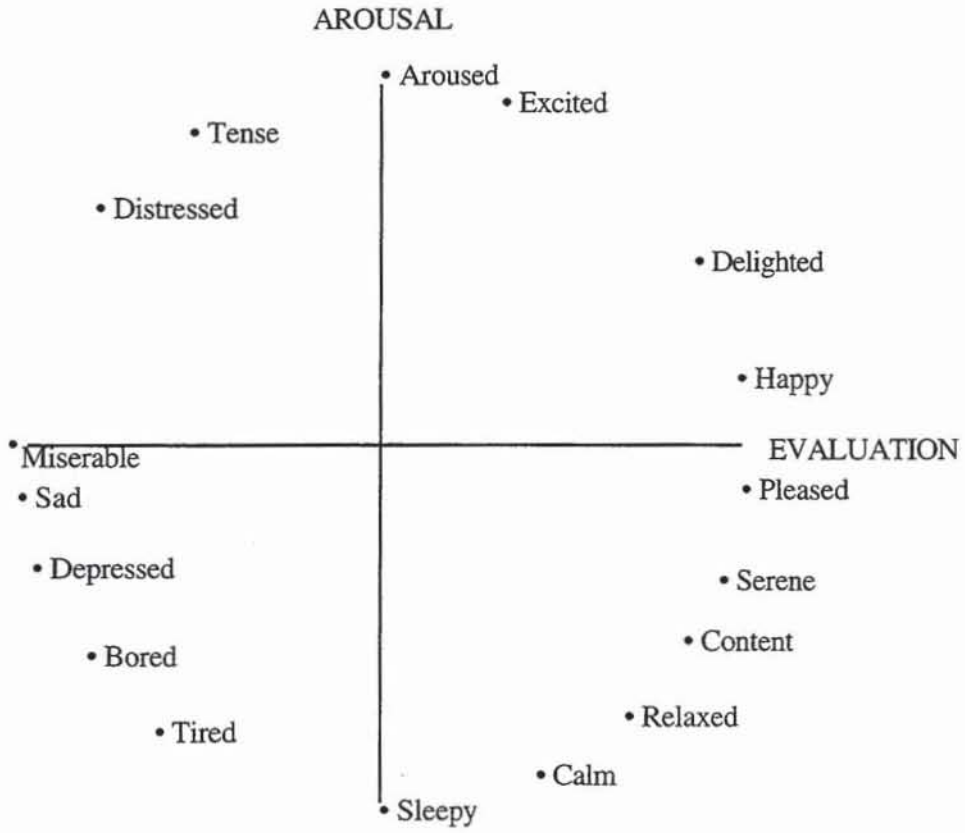

Figure 5.1: Placement of Affect Concepts According to the Circumplex Model of Affect
(Drawn from Russell, 1980, pp. 1164 & 1167).

The eight words were presented in random order and visitors were asked to choose two words so that the reliability of this measure could be assessed.

(iv) *Mindfulness*, measured by a rating of subjective learning (question 8) and seven statements describing mental activity and control which visitors were asked to use to describe their cognitive state (question 14). The seven statements were chosen to reflect elements of mindfulness discussed in the writings of Langer and her colleagues.

(v) *Visitor demographics*, including the social composition or nature of the visiting party (question 9), sex (question 16), age (question 17) and place of residence(question 18). The latter question was of interest to Telecom Australia.

(vi) *Visitor satisfaction with the experience in the exhibition,* measured by three questions (10,11 and 12) which asked for a global rating of enjoyment, a rating of intention to recommend the exhibition and a rating of intention to visit another similar exhibition. This method of measuring satisfaction with a leisure experience is based on approaches used extensively in tourism and leisure research (see Dorfman, 1979; Manning & Ciali, 1980; Vaske, Donnelly, Heberlein & Shelley, 1982; Vaske, Fedler & Graefe, 1986; Applegate & Clark, 1987, and Noe, 1987).

(vii) *Reason for the visiting the museum*, measured by question 13 which asked visitors to choose one of seven options to describe why they had come to the museum today. These seven options were chosen to reflect the reasons given in other museum studies (see Table 2.7 in Chapter 2 for a summary of these studies).

(viii) *Recall of the information contained in the exhibition*, measured by a set of ten multiple choice questions (question 19) based on factual information presented in the exhibition.

(ix) *Understanding of the information contained in the exhibition.* Lee and Uzzell (1980) have noted that factual quizes assess only one aspect of visitors' cognitive activities in museums settings, that of recall of specific elements. They argue that it is possible that more global changes can occur such as changes in beliefs and attitudes. In order to examine this possibility question 15 was included in the present survey. This question requested

visitors to rate ten statements on a five point scale according to how true they believed the statements to be. The ten statements were chosen from the themes of the exhibition.

Two further questions were included in the survey, questions 1 and 6, to measure variables which were thought might be related to mindfulness. The first asked visitors' to estimate the length of time they had spent in the museum. This was included because the Semaphore to Satellite Exhibition was one exhibition in a larger museum and visitors could arrive at this exhibition using several routes of varying length through the museum. It was believed that visitors having spent longer in the museum should feel more fatigued and that this might influence their experience in the Semaphore to Satellite Exhibition. While it has been noted that visitor estimates of time spent in museums may not be accurate (Bitgood & Richardson, 1986), it was not deemed a major problem for the present study which is not concerned with the accuracy of the estimates but with the estimates as an indicator of fatigue.

The second question (6) asked visitors to assess how different the exhibition was to what they expected. This was included as a measure to explore the prediction the mindfulness is more likely to result from unexpected situations. It was recognised that post hoc measures of expectations are difficult to validate and could be difficult for some visitors to answer accurately. It was, however, included for exploratory analyses.

5.5 Survey of Visitors to the Semaphore to Satellite Exhibition: Results and Discussion

5.5.1 Responses to survey questions.

The majority of the sample were not regular museum visitors with 34.5 percent not having visited this museum during the previous year, 30.3 percent not having been to any other museum in the previous year and 52.1 percent having been on 3 or less visits to museums in the previous year. Table 5.6 contains a crosstabulation of the responses to these two questions and showing that the two variables have a moderate positive correlation. The responses to these two questions were summed with the categories of '3 to 5 times' and 'more than 5 times' given scores of 3 and 4 respectively. The frequency distribution for this index, labelled familiarity with museums, is given in section B of Table 5.6. Although less than half of the sample have been to a museum more than 3 times in the past year the sample did include a substantial number who been more than 6 times (22.1%).

The majority of visitors (65.6%) reported that they were interested in the topic 'Communication in Australia' and nearly one quarter (23.0%) stated that they belonged to a group with a special interest in the topic. Table 5.7 is a crosstabulation of these two variables. This crosstabulation indicates that group members and those that state they are not members but have a special interest in area are more likely to express interest in the topic than those visitors who chose the 'No' response. Those visitors who said that they were not members of a group but had a special interest in the topic gave higher ratings of interest in the topic than those who said that they were club

Table 5.6

Crosstabulation of Number of Recent Visits to the Museum with Number of Recent Visits to Other Museums and Frequency Distribution of Familiarity with Museums Index

A. Crosstabulation

Count / Row % / Col %		Number of Visits to Museum					
		0	1	2	3-5	>5	Total
Number of visits to other museums	0	41 44.6% 50.6%	10 10.9% 28.6%	16 17.4% 34.8%	10 10.9% 21.3%	15 16.3% 25.9%	92 34.5%
	1	21 40.4% 25.9%	8 15.4% 22.9%	7 13.5% 15.2%	8 15.4% 17.0%	8 15.4% 13.8%	52 19.5%
	2	11 25.0% 13.6%	11 25.0% 31.4%	13 29.5% 28.3%	9 20.5% 19.1%	0 .0% .0%	44 16.5%
	3-5	4 13.3% 4.9%	2 6.7% 5.7%	6 20.0% 13.0%	9 30.0% 19.1%	9 30.0% 15.5%	30 11.2%
	>5	4 8.2% 4.9%	4 8.2% 11.4%	4 8.2% 8.7%	11 22.4% 23.4%	26 53.1% 44.8%	49 18.4%
	Total	81 30.3%	35 13.1%	46 17.2%	47 17.6%	58 21.7%	267 100.0%

Spearman Rank Order Correlation = 0.357 p <.05

B. Frequency Distribution of Familiarity Index

Value	n	%	
0	41	15.4	Mean = 3.5
1	31	11.6	Median = 3.0
2	35	13.1	Mode = 4.0
3	32	12.0	Std Dev = 2.5
4	42	15.7	
5	27	10.1	
6	13	4.9	
7	20	7.5	
8	26	9.7	

members. This might suggest that these personal interest visitors were actively seeking information that group members may already have access to through their club.

Table 5.7

Crosstabulation of Level of Interest in Topic "Communications in Australia" with Membership of a Group with a Special Interest in the Topic

Count / Row % / Column %		Group Membership? Yes	No but Interested	No	Total
Level of Interest	**Not at all**	11 27.5% 18.0%	5 12.5% 9.8%	24 60.0% 15.7%	40 15.1%
	Not particularly	6 23.1% 9.8%	3 11.5% 5.9%	17 65.4% 11.1%	26 9.8%
	Neither	9 28.1% 14.8%	3 9.4% 5.9%	20 62.5% 13.1%	32 12.1%
	Interested	12 13.6% 19.7%	19 21.6% 37.3%	57 64.8% 37.3%	88 33.2%
	Very interested	23 29.1% 37.7%	21 26.6% 41.2%	35 44.3% 22.9%	79 19.8%
	Total	61 23.0%	51 19.2%	153 57.7%	265 100.0%

Spearman Rank Order Correlation = 0.101, $p < 0.05$.

Table 5.8 is a crosstabulation of the first and second words chosen by the visitors to describe how they felt. Inspection of this table reveals that the most popular choices for both the first and second words were active, quiet, lively and leisurely. As expected, few visitors chose negative words to describe their mood. Inspection of the table also indicates that the visitors were generally consistent in choosing words. Nearly one quarter of the sample (24.9%) chose the same word twice and 30 percent chose as their second word the one from the same quadrant of the Circumplex Model. Also reported in the table is an A priori Proportional Reduction in Error (PRE) measure of association. This statistic is described in Reynolds (1977) and uses a similar logic to other PRE measures of association such as Goodman and Kruskal's Lambda and Tau and Cohen's Kappa. In this instance the researcher makes an a priori prediction and identifies those cells where the data should be found. All other cells are treated as error cells and used in the calculation of the statistic. A maximum value of 1 is achieved only when all observations are in the predicted cells. The statistic can be interpreted as the percentage improvement in predicting responses for one variable knowing responses on the other. Thus in the present case knowing the first word chosen reduces the error in predicting the choice of the second word by 37.3 percent. It was thus decided to use the first word chosen for further analyses. Based on the first word chosen 42.4 per cent of the visitors chose a word indicating higher levels of arousal, 66.5 per cent chose a word describing a positive mood, and 30.7 percent chose either active or lively thus indicating higher arousal and a positive mood.

Table 5.8

Crosstabulation of First and Second Choice of Words to Describe Affective State

First Word Chosen	Count / Row % / Column %	Second Word Chosen: Lively	Nervous	Quiet	Tired	Drowsy	Leisurely	Anxious	Active	Total
Lively		* 6 18.2% 18.8%	5 15.2% 26.3%	2 6.1% 4.3%	0 - -	2 6.1% 7.1%	4 12.1% 12.5%	0 - -	* 14 42.4% 24.6%	33 12.8%
Nervous		2 11.1% 6.3%	* 6 33.3% 31.6%	1 5.6% 2.1%	2 11.1% 6.7%	1 5.6% 3.6%	0 - -	* 1 5.6% 8.3%	5 27.8% 8.8%	18 7.0%
Quiet		2 4.8% 6.3%	0 - -	* 13 31.0% 27.7%	6 14.3% 20.0%	4 9.5% 14.3%	* 9 21.4% 28.1%	3 7.1% 25.0%	5 11.9% 8.8%	42 16.3%
Tired		5 26.3% 15.6%	0 - -	0 - -	* 3 15.8% 10.0%	* 5 26.3% 17.9%	2 10.5% 6.3%	1 5.3% 8.3%	3 15.8% 5.3%	19 7.4%
Drowsy		2 5.4% 6.3%	2 5.4% 10.5%	6 16.2% 12.8%	* 12 32.4% 40.0%	* 10 27.0% 35.7%	2 5.4% 6.3%	3 8.1% 25.0%	0 - -	37 14.4%
Leisurely		0 - -	0 - -	* 21 42.0% 44.7%	4 8.0% 13.3%	3 6.0% 10.7%	* 10 20.0% 31.3%	1 2.0% 8.3%	11 22.0% 19.3%	50 19.5%
Anxious		3 25.0% 9.4%	* 3 25.0% 15.8%	1 8.3% 2.1%	1 8.3% 3.3%	1 8.3% 3.6%	0 - -	* 0 - -	3 25.0% 5.3%	12 4.7%
Active		*12 26.1% 37.5%	3 6.5% 15.8%	3 6.5% 6.4%	2 4.3% 6.7%	2 4.3% 7.1%	5 10.9% 15.6%	3 6.5% 25.0%	*16 34.8% 28.1%	46 17.9%
Total		32 12.5%	19 7.4%	47 18.3%	30 11.7%	28 10.9%	32 12.5%	12 4.7%	57 22.2%	257 100.0%

* marks words which describe the same quadrant of the Circumplex Model.

Chi-Square = 158.9, df = 49, p>0.05.

A priori PRE (predicted cells marked *) = 0.373.

More than half of the visitors (66.2%) reported moderate or high enjoyment of the exhibition, with nearly one third (32.9%) reporting that they would definitely recommend a visit to the exhibition to others, and 28.1 percent stating that they would visit another similar exhibition in the future. Table 5.9 has the frequency distributions for responses to these three questions. Spearman rank order correlations were computed to investigate the relationships between each of these variables and these are also given in Table 5.9. These correlations indicated significant positive correlations existed between these three variables and so a single index of satisfaction with the experience was created by summing responses to the three questions. In this process, the responses were given scores from 1 which indicated a reply of 'Not at all', 'Not recommend', or 'Not visit in the future' through to 4 for the responses 'A lot', 'Definitely recommend', or 'Definitely visit'. The resulting index had a range from 3 to 12 and the actual frequency distribution is given in Table 5.10. The mean score was 8.1 (SD = 2.6) with a median and mode of 8.0.

The most common reason given for visiting the museum was an educational one, 'To improve my knowledge of the world' (26.9%), followed by 'To do something different' (18.2%) and 'To relax' (15.0%). Table 5.11 shows the distribution of all responses to the question on reason for visiting the museum. This pattern of responses is not dissimilar to those reported in other museum visitor surveys (See Table 2.7 for these results).

As it was suggested in the revision of the Mindfulness Model at the end of Chapter 2 that the reason given for visiting a museum was likely to be related to familiarity with museums and the social composition of the visiting

Table 5.9

Frequency Distributions of Responses to Three Questions Evaluating Satisfaction with the Semaphore to Satellite Exhibition

		n	%
A.	**Overall I enjoyed the exhibition:**		
	A lot	103	37.5
	Moderately	79	28.7
	A little	39	14.3
	Not at all	24	19.5
B.	**I would:**		
	Definitely recommend it	91	33.0
	Probably recommend it	60	21.7
	Not sure	57	20.9
	Not recommend it	67	24.5
C.	**I would:**		
	Definitely visit	77	28.1
	Probably visit	77	28.1
	Not sure	62	22.5
	Not visit	59	21.3

Spearman Rank Order Correlations

	Rho	p
Enjoyment with Recommendation	.458	<.05
Enjoyment with Intention to Visit	.315	<.05
Recommendation with Intention to Visit	.241	<.05

Table 5.10

Frequency Distribution of Satisfaction Index

Value	n	%
3	19	7.7
4	8	3.2
5	14	5.6
6	22	8.9
7	29	11.7
8	44	17.7
9	39	15.7
10	22	8.9
11	23	9.3
12	28	11.3

Mean = 8.1
Median = 8.0
Mode = 8.0
Std. Dev. = 2.6

Table 5.11

Reasons for Visiting the Museum

Reason	n	%
To improve knowledge	74	26.9
To relax	41	15.0
To do something different	50	18.2
To enjoy an activity with family/friends	27	9.9
To see a specific exhibition	31	11.1
To fill in time	29	10.7
Because it was recommended	23	8.3
TOTAL	**275**	

group, further analyses were conducted to investigate these relationships. Specifically it was proposed that regular visitors to museums and family groups should be more likely than other visitors to be interested in educational goals. A crosstabulation of group composition and reason for visiting (see Table 5.12) found some support for this prediction, Families and visitors on their own were the most likely to give improvement of knowledge as their reason for visiting, although families were fairly evenly distributed across all the reasons. Overall no clear pattern appeared. Familiarity with museums was significantly related to group composition in a oneway analysis of variance with familiarity as the dependent variable ($F= 2.79$, $df = 5, 248$, $p < 0.05$). The means for the six different types of group are also given in Table 5.12. The highest mean familiarity scores were for visitors alone and visitors with friends. A oneway analysis of variance with the reason for visiting as the independent variable was also conducted ($F = 1.64$, $df = 6, 246$, $p > 0.05$). Although the result was not significant the pattern of means for familiarity, reported in Table 5.12, was as predicted with the highest mean familiarity score for those who gave an educational reason for visiting the museum. Thus regular visitors were more likely to give an educational reason for visiting and more likely to be visitors alone or families. These relationships, however, were not strong.

The next question to be considered was that of visitors' recall of the information in the exhibition measured by responses to the ten multiple choice question in question 19. The visitors were given a score for the number of correct responses that they gave. The frequency distribution for the total score is given in Table 5.13. Overall the sample did not display a high level

Table 5.12

Results of Analyses Investigating Relationships Between Reason for Visit, Type of Visiting Party and Familiarity with Museums

A. Crosstabulation of Reason for Visit and Type of Visiting Party

Type of Visiting Party	Count / Row % / Column %	Reason for Visit: Improve Know	Relax	Something Diff.	Family/ Friends	Specific Exhibit	Fill in Time	Recom.	Total
Alone		22 36.1% 32.8%	8 13.1% 21.6%	11 18.0% 25.0%	3 4.9% 12.5%	8 13.1% 28.6%	6 9.8% 22.2%	3 4.9% 14.3%	61 24.6%
One other person		12 24.5% 17.9%	7 14.3% 18.9%	7 14.3% 15.9%	5 10.2% 20.8%	6 12.2% 21.4%	7 14.3% 25.9%	5 10.2% 23.8%	49 19.8%
Friends		5 15.6% 7.5%	8 25.0% 21.6%	6 18.8% 13.6%	6 18.8% 25.0%	1 3.1% 3.6%	3 9.4% 11.1%	3 9.4% 14.3%	32 12.9%
Family		15 31.3% 22.4%	5 10.4% 13.5%	8 16.7% 18.2%	6 12.5% 25.0%	6 12.5% 21.4%	5 10.4% 18.5%	3 6.3% 14.3%	48 19.4%
Family/ Friends		2 15.4% 3.0%	0 .0% .0%	5 38.5% 11.4%	1 7.7% 4.2%	4 30.8% 14.3%	0 .0% .0%	1 7.7% 4.8%	13 5.2%
Tour		11 24.4% 16.4%	9 20.0% 24.3%	7 15.6% 15.9%	3 6.7% 12.5%	3 6.7% 10.7%	6 13.3% 22.2%	6 13.3% 28.6%	45 18.1%
Total		67 27.0%	37 14.9%	44 17.7%	24 9.7%	28 11.3%	27 10.9%	21 8.5%	248 100.0%

B. Mean Familiarity with Museums Scores for Types of Visiting Party and Reason for Visit

Type of Visiting Party	x (SD)
Alone	4.26 (2.8)
One other person	2.80 (2.3)
Friends	3.72 (2.6)
Family	3.14 (1.9)
Family/Friends	2.50 (2.6)
Tour	3.19 (2.5)

Reason for Visit	x (SD)
Improve Knowledge	4.12 (2.7)
Relax.	3.16 (2.0)
Something different	2.90 (2.5)
Be with Family/Friends	3.76 (2.2)
See Specific Exhibition	3.50 (2.7)
Fill in time	3.33 (2.6)
Recommended	3.71 (2.5)

Table 5.13

Frequency Distribution of Total Score for Factual Questions

Score	n	%
0	5	1.8
1	20	7.2
2	43	15.7
3	64	23.2
4	46	16.9
5	33	12.0
6 to 10	64	23.2
TOTAL	**275**	

of recall of facts contained in the exhibition with a mean score of 4.14 (SD = 2.3), a median score of 4.0 and a mode of 3.0.

The responses of the visitors to the ten theme statements are given in Table 5.14. Overall there was a high level of agreement with all the statements. This lack of variation in responses might suggest that the statements were too general for visitors to make specific judgements about. It is also possible that visitors were responding in what they believed to be a socially acceptable fashion.

There was an even distribution of the visitor sample in terms of the times that they reported spending in the museum, as can be seen in Table 5.15. This variable was crosstabulated with the first word chosen to describe arousal and mood and this is given in Table 5.16. There is some support for the prediction that those who report having spent longer in the museum were most likely to describe themselves as feeling quiet and drowsy, while visitors

Table 5.14

Frequency Distributions of Responses to Ten Themes of the Semaphore to Satellite Exhibition

	x (SD)	1.Absolutely True n (%)	2.Very True n (%)	3.Moderately True n (%)	4.Somewhat True n (%)	5.Not at all True n (%)
1. The type of communication system a society has influences its social structure.	2.0 (1.2)	122 (48.6)	59 (23.5)	42 (16.7)	9 (3.6)	19 (7.6)
2. Telecommunication services are important to everyday life.	1.8 (1.2)	141 (56.2)	56 (22.3)	28 (11.2)	10 (4.0)	16 (6.4)
3. The type of communication system a society has influences its economic system.	1.9 (1.2)	130 (51.8)	59 (23.5)	34 (13.5)	14 (5.6)	14 (5.6)
4. The telephone has had a large impact on social life.	1.7 (1.1)	155 (61.7)	54 (21.5)	18 (7.2)	9 (3.6)	15 (6.0)
5. In the last 50 years communication systems have changed greatly.	1.8 (1.2)	149 (59.4)	46 (18.3)	29 (11.6)	11 (4.4)	16 (6.4)
6. Changes in communication systems have changed many aspects of business and office work.	1.7 (1.1)	157 (62.5)	51 (20.3)	19 (7.6)	11 (4.4)	13 (5.2)
7. Solar energy is important for Australia's communication system.	2.0 (1.3)	124 (49.4)	55 (21.9)	35 (13.9)	18 (7.2)	19 (7.6)
8. Telecom provides important services to Australian society.	2.0 (1.3)	128 (50.9)	60 (23.9)	30 (11.9)	12 (4.8)	21 (8.4)
9. Satellites are a key element in Australia's communication system.	2.0 (1.2)	125 (49.8)	56 (22.3)	35 (13.9)	18 (7.2)	17 (6.8)
10. Australia's communication system is based on advanced technology.	1.9 (1.2)	135 (53.8)	52 (20.7)	37 (14.7)	10 (3.9)	17 (6.8)

reporting having spent less time were more likely to describe themselves as feeling lively and active.

Table 5.15

Frequency Distribution of Reported Time Spent in the Museum

Reported Time Spent	**n**	**%**
<30 minutes	71	25.8
30-60 minutes	75	27.3
1 to 2 hours	64	23.2
2 to 4 hours	37	13.5
>4 hours	28	10.1
TOTAL	**275**	

More than half of the visitors surveyed described the Semaphore to Satellite Exhibition as moderately to very different to what they had expected. Table 5.17 contains the complete distribution of responses to this question. As can be seen in this table, the sample was fairly evenly distributed across the four response categories.

Finally, Table 5.18 contains the distribution of responses to the questions measuring mindfulness. There was a tendency for visitors to rate all the statements, with the exception of the subjective learning statement, positively, although there were substantial percentages in the category 'Not at all true' for all statements. Table 5.19 is the correlation matrix for these eight variables and shows high positive correlations between all the statements. The next step in the analysis was to create a single index for mindfulness by

Table 5.16

Crosstabulation of Reported Time Spent at the Museum with First Word Used to Describe Affective State

Count / Row % / Column %	Word								
	Lively	Nervous	Quiet	Tired	Drowsy	Leisurely	Anxious	Active	Total
<30 min	14 20.6% 42.4%	5 7.4% 27.8%	9 13.2% 21.4%	3 4.4% 15.8%	6 8.8% 16.2%	12 17.6% 24.0%	2 2.9% 16.7%	17 25.0% 37.0%	68 26.5%
30 min-1 hour	3 4.2% 9.1%	5 7.0% 27.8%	8 11.3% 19.0%	9 12.7% 47.4%	15 21.1% 40.5%	13 18.3% 26.0%	4 5.6% 33.3%	14 19.7% 30.4%	71 27.6%
TIME									
1-2 hours	7 12.1% 21.2%	3 5.2% 16.7%	13 22.4% 31.0%	5 8.6% 26.3%	4 6.9% 10.8%	16 27.6% 32.0%	3 5.2% 25.0%	7 12.1% 15.2%	58 22.6%
2-4 hours	4 12.1% 12.1%	1 3.0% 5.6%	5 15.2% 11.9%	2 6.1% 10.5%	8 24.2% 21.6%	8 24.2% 16.0%	1 3.0% 8.3%	4 12.1% 8.7%	33 12.8%
> 4 hours	5 18.5% 15.2%	4 14.8% 22.2%	7 25.9% 16.7%	0 .0% .0%	4 14.8% 10.8%	1 3.7% 2.0%	2 7.4% 16.7%	4 14.8% 8.7%	27 10.5%
Total	33 12.8%	18 7.0%	42 16.3%	19 7.4%	37 14.4%	50 19.5%	12 4.7%	46 17.9%	257 100.0%

Chi-Square = 44.4, df = 28, p>0.05.

Table 5.17

Frequency Distribution of Ratings of the Semaphore to Satellite Exhibition as Different to Expectations

The exhibition was	**n**	**%**
Very different to what I expected	102	37.3
Moderately different	40	14.4
Somewhat different	61	22.1
Not at all different	72	26.2
	TOTAL	**275**

summing the ratings of all eight statements. In this process scores of 1 were given for the responses 'Not at all true' and ' Learnt nothing' through to 4 for the responses 'Very true' and 'Learnt a great deal'. Table 5.20 shows the frequency distribution for this single index. In Langer's discussions of mindfulness she stresses that it is a state which is qualitatively different to that of mindlessness. That is, it is not that mindless people are simply less mindful, it is that they are not mindful at all. This would suggest that the most appropriate action for further analyses would be to choose two groups based on the two extremes of the distribution given in Table 5.20. This is supported by Salomon and Globerson (1987). Thus, for further analyses approximately the top third of the distribution was classified as mindful (a score of 27 or more), while the bottom third, from a score of 19 or less, were classified as mindless visitors. These cutoff points produced a mindful group who have scored four on at least three out of the eight statements with a score of three for the others, and a mindless group who have scored mainly ones

and twos. While it could be argued that the cutoff point for the mindless group could be lower, this would reduce the sample size and thus provide difficulties for further analyses and also assumes high accuracy in the measuring instrument which would be presumptuous at this stage of the research. Further, a higher cutoff errs in the direction of misclassifying mindful visitors as mindless visitors and this is a more conservative error than the reverse situation.

Table 5.18

Frequency Distributions of Responses to Mindfulness Questions

	Levels of Agreement			
Statement	**Very True** n (%)	**Moderately True** n (%)	**Somewhat True** n (%)	**Not at all True** n (%)
1. My curiosity is aroused	117 (42.7)	57 (20.9)	56 (20.2)	45 (16.2)
2. I feel like searching for answers	114 (41.3)	55 (19.8)	53 (19.5)	53 (19.5)
3. I want to explore possibilities	117 (42.7)	53 (19.5)	55 (19.8)	50 (18.0)
4. My interest has been captured	110 (39.8)	52 (19.1)	61 (22.0)	52 (19.1)
5. I feel involved in what I am doing	115 (41.8)	62 (22.7)	50 (18.0)	48 (17.3)
6. I want to enquire further	116 (42.0)	55 (19.8)	53 (19.5)	51 (18.4)
7. I feel in control of what I am doing	139 (50.7)	45 (16.2)	41 (15.1)	50 (18.0)
	Level of Learning			
	A great deal n (%)	**A moderate amount** n (%)	**Some new information** n (%)	**Nothing** n (%)
8. I feel I have learnt	76 (27.7)	39 (14.1)	89 (32.4)	71 (25.8)

Table 5.19

Spearman Rank Order Correlations Between Mindfulness Measures

Statement							
2	0.502						
3	0.480	0.773					
4	0.449	0.634	0.711				
5	0.456	0.583	0.701	0.747			
6	0.422	0.585	0.695	0.673	0.763		
7	0.339	0.528	0.541	0.547	0.605	0.615	
8	0.298	0.205	0.234	0.298	0.267	0.224	0.120
Statement	1	2	3	4	5	6	7

Note: All correlations were significant at the .05 level.

Table 5.20

Frequency Distribution of Mindfulness Index

	Value	n	%
	8	5	2.0
	9	4	1.6
	10	2	0.8
	11	7	2.9
	12	3	1.2
MINDLESS	13	3	1.2
VISITORS	14	7	2.9
	15	5	2.0
	16	14	5.7
	17	9	3.7
	18	11	4.5
	19	8	3.3
----->			
	20	7	2.9
	21	11	4.5
	22	14	5.7
	23	10	4.1
	24	12	4.9
	25	15	6.1
	26	15	6.1
----->			
	27	9	3.7
MINDFUL	28	14	5.7
VISITORS	29	14	5.7
	30	12	4.9
	31	13	5.3
	32	21	8.6

-----> Cut off points for further analyses.

5.5.2 Relationships Between Mindfulness/Mindlessness and Other Variables

This stage of the analysis involved investigating the relationships between mindfulness/mindlessness and the other variables measured with a series of bivariate statistical techniques. The first step was to crosstabulate mindful/mindless visitors with the demographic variables of age, sex and the nature of the visiting group and these crosstabulations are given in Table 5.21. These crosstabulations indicated that there were no differences between the mindful and mindless visitors in terms of age or the nature of the visiting group. It had been predicted, on the basis of previous survey research with museum visitors, that family groups should be more likely to be mindful than other groups because they would be more likely than other groups to have an educational motive for their museum visits. The analyses reported in the previous section, however, indicated that in the present sample those visiting with their family were evenly distributed in terms of the reasons that they gave for visiting the museum. These analyses indicated that visitors alone were the most likely to report an educational motive for their visit and in the present crosstabulation they were the most likely to be mindful. Thus this table supports the argument that reason for visiting mediates the relationship between the social composition of the group and mindfulness/mindlessness.

The crosstabulation in section A of Table 5.21 did indicate a significant difference between males and females with the latter less likely than males to be in the mindful group. Further investigations found that females were also less likely to report higher levels of interest in the topic 'Communication in Australia' and were less likely to give an educational reason for their visit (see

Table 5.21

Crosstabulation of Mindful/Mindless Visitors with Sex, Age and Type of Accompanying Group

A. Sex

Count / Row % / Column %	Sex: Male	Sex: Female	Total
Mindless Visitors	35 49.3% 39.8%	36 50.7% 57.1%	71 47.0%
Mindful Visitors	53 66.3% 60.2%	27 33.8% 42.9%	80 53.0%
Total	88 58.3%	63 41.7%	151 100.0%

Chi-Square = 4.45, df = 1, $p<0.05$.

B. Age

Count / Row % / Column %	Age: <20	21-30	31-40	41-50	51-60	61-70	>70	Total
Mindless Visitors	9 13.4% 40.9%	16 23.9% 48.5%	14 20.9% 58.3%	13 19.4% 43.3%	8 11.9% 50.0%	5 7.5% 50.0%	2 3.0% 66.7%	67 48.6%
Mindful Visitors	13 18.3% 59.1%	17 23.9% 51.5%	10 14.1% 41.7%	17 23.9% 56.7%	8 11.3% 50.0%	5 7.0% 50.0%	1 1.4% 33.3%	71 51.4%
Total	22 15.9%	33 23.9%	24 17.4%	30 21.7%	16 11.6%	10 7.2%	3 2.2%	138 100.0%

Chi-Square = 2.18, df = 6, $p>0.05$.

C. Type of Accompanying Group

Count / Row % / Column %	Age: Alone	One Other	Friends	Family	Family/Friends	Group	Total
Mindless Visitors	18 23.1% 45.0%	14 17.9% 46.7%	* 8 10.3% 47.1%	* 17 21.8% 50.0%	* 7 9.0% 70.0%	* 14 17.9% 48.3%	78 48.8%
Mindful Visitors	* 22 26.8% 55.0%	* 16 19.5% 53.3%	9 11.0% 52.9%	17 20.7% 50.0%	3 3.7% 30.0%	15 18.3% 51.7%	82 51.3%
Total	40 25.0%	30 18.8%	17 10.6%	34 21.3%	10 6.3%	29 18.1%	160 100.0%

Chi-Square = 2.13, df = 5, $p>0.05$.
A priori PRE (predicted cells marked *) = 0.05.

Table 2, Appendix D). Given these lower levels of interest and the reasons given for visiting the museum it would be expected that females would be less likely to be in the mindful group.

A crosstabulation of mindfulness/mindlessness with responses to the question regarding membership of a group with a special interest in communications indicated that a significant relationship existed between these two variables with the mindful group more likely to report membership of a group or a special interest in the exhibition topic. See Table 5.22 for this crosstabulation.

Table 5.22

Crosstabulation of Mindful/Mindless Visitors and Membership of a Group with a Special Interest in the Exhibition Topic

Count Row % Column %	Group Membership? Yes	Personal Interest	No	Total
Mindless Visitors	17 21.8% 41.5%	10 12.8% 28.6%	* 51 65.4% 60.0%	78 48.4%
Mindful Visitors	* 24 28.9% 58.5%	* 25 30.1% 71.4%	34 41.0% 40.0%	83 51.6%
Total	41 25.5%	35 21.7%	85 52.8%	161 100.0

Chi-Square = 10.88, df = 2, $p<0.05$.

A priori PRE (predicted cells marked *) = 0.24.

Table 5.23 is the crosstabulation of mindfulness/mindlessness with reasons given for visiting the museum. Again the crosstabulation indicated a significant relationship exists and this relationship was as predicted by the Mindfulness Model, That is, the mindful group was much more likely than the mindless group choose 'To improve my knowledge' as their reason for visiting the museum.

Figure 5.2 is the profiles of the mean ratings given for the ten theme statements for the mindful and mindless groups. As can be seen the mindless group were consistently less confident in their ratings with all their means lying between 'Very True' and 'Moderately True', while all the means for the mindful group were between the categories of 'Absolutely True' and 'Very True'. The mindful group also had consistently lower standard deviations indicating less group variance. From the previous discussions it might have been expected that mindful visitors should be more varied in their ratings of these statements than mindless visitors as mindful processing of the information should result in greater awareness of alternative perspectives and/or qualifications to the statements. Such information was not, however, available thus limiting these possibilities. Additionally, evidence from attitude research suggests that attitudes formed as the result of thoughtful, systematic or mindful consideration of information are more persistent, consistent and resistant to change and held with more confidence (Fazio & Zanna, 1981; Eagly & Chaiken, 1984; Mackie, 1987; Petty & Cacioppo, 1986).

The final crosstabulation analysis conducted was between mindfulness/ mindlessness and the first word given by visitors to describe how they felt and it is given in Table 5.24. The table also reports a priori PRE statistics

Table 5.23

Crosstabulation of Mindful/Mindless Visitors and Reason for Visiting the Museum

Count / Row % / Column %	Reason: Improve Know	Relax	Something Diff.	Family/ Friends	Specific Exhibit	Fill in Time	Recom.	Total
Mindless Visitors	10 12.8% 22.2%	* 10 12.8% 50.0%	* 15 19.2% 51.7%	* 8 10.3% 44.4%	* 13 16.7% 65.0%	* 15 19.2% 83.3%	* 7 9.0% 70.0%	78 48.8%
Mindful Visitors	* 35 42.7% 77.8%	10 12.2% 50.0%	14 17.1% 48.3%	10 12.2% 55.6%	7 8.5% 35.0%	3 3.7% 16.7%	3 3.7% 30.0%	82 51.3%
Total	45 28.1%	20 12.5%	29 18.1%	18 11.3%	20 12.5%	18 11.3%	10 6.3%	160 100.0%

Chi-Square = 25.46, df = 6, $p<0.05$.
A priori PRE (predicted cells marked *) = 0.29.

using three different prediction rules. The first looks at arousal level only with the prediction being that higher levels of arousal should be associated with mindfulness and this is supported by the data with a 30.8 percent improvement in predictive power. The second rule looks only at the positive and negative mood evaluations with the prediction that positive mood should be related to mindfulness. In this instance the pattern of results is consistent with the prediction but does not indicate as strong a relationship as for arousal. Finally the prediction that a positive mood and high arousal should be most related to mindfulness is also supported, but again not as strongly as arousal alone.

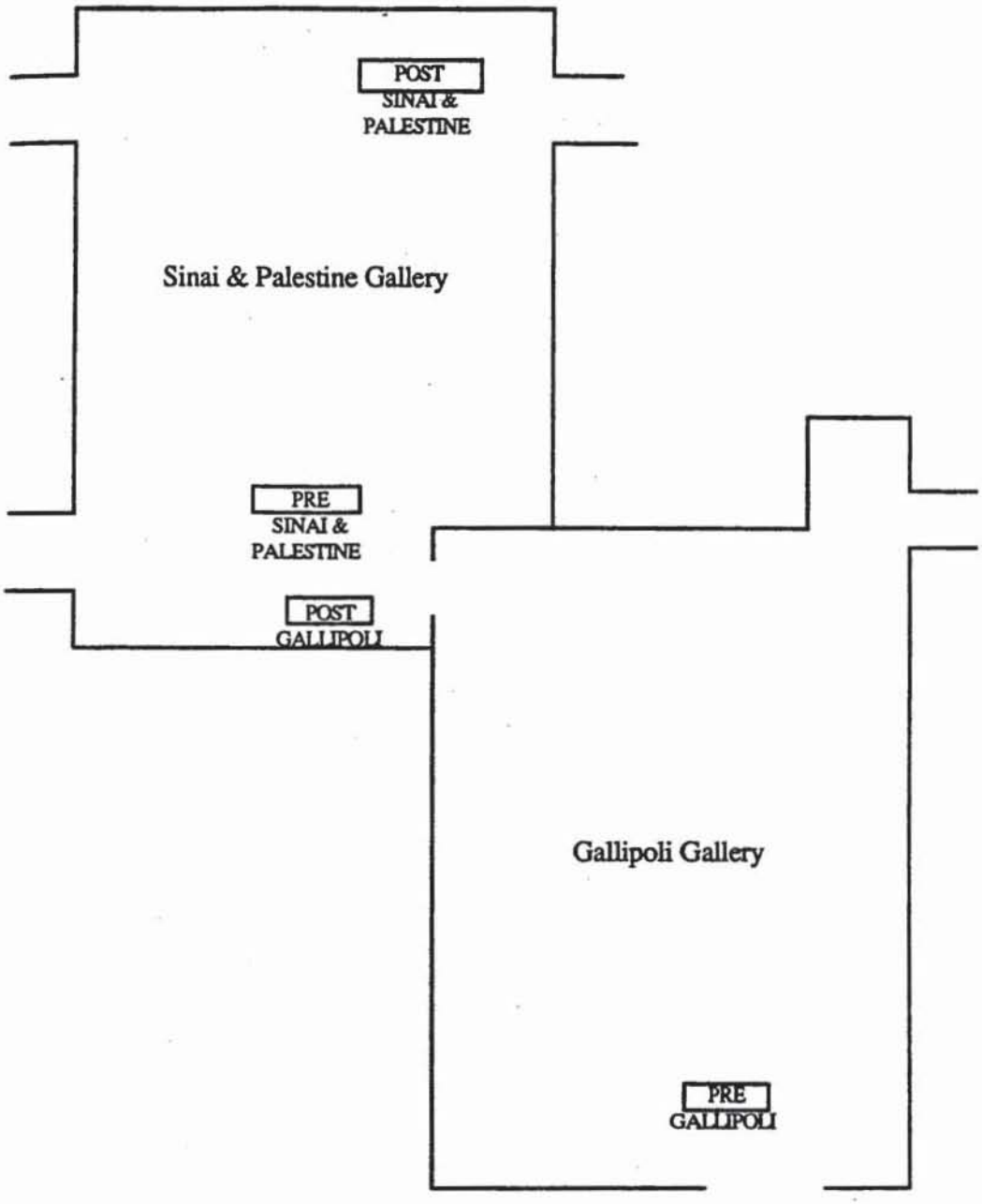

Figure 5.3. Location of tables with survey books

Table 5.24

Crosstabulation of Mindful/Mindless Visitors and First Word Chosen to Describe Current State

Count Row % Column %	First Word Chosen								
	Lively	Nervous	Quiet	Tired	Drowsy	Leisurely	Anxious	Active	Total
Mindless Visitors	9 11.5% 42.9%	#$ 6 7.7% 46.2%	*$ 11 14.1% 44.0%	*#$ 6 7.7% 54.5%	*#$ 19 24.4% 73.1%	*$ 19 24.4% 65.5%	#$ 2 2.6% 33.3%	6 7.7% 20.0%	78 48.4%
Mindful Visitors	*#$12 14.5% 57.1%	* 7 8.4% 53.8%	# 14 16.9% 56.0%	5 6.0% 45.5%	7 8.4% 26.9%	# 10 12.0% 34.5%	* 4 4.8% 66.7%	*#$24 28.9% 80.0%	73 51.6%
Total	21 13.0%	13 8.1%	25 15.5%	11 6.8%	26 16.1%	29 18.0%	6 3.7%	30 18.6%	161 100.0%

Chi-Square = 20.62, df = 7, $p<0.05$.

A priori PRE using Arousal (predicted cells marked *) = 0.308.
A priori PRE using Evaluation (predicted cells marked #) = 0.147.
A priori PRE using Arousal and Evaluation (predicted cells marked $) = 0.220.

The final step in these bivariate analyses involved the investigation of mean differences between the mindful and mindless groups for the variables reported time spent in the museum, level of interest in the exhibition topic, ratings of how different the exhibition was to expectations, and the indices of familiarity with museums, satisfaction with the experience and level of recall of exhibit contents. As the first three of these variables were measured with ordinal level scales, a nonparametric test, a Mann-Whitney U-test, was used to investigate group differences. The results of these analyses are given in Table 5.25. These tests and the group means (also given in Table 5.25) indicated that a significant difference existed between the mindful and mindless groups only for the level of interest in the exhibition topic with the mindful group having a higher mean level of interest. Although not a

significant difference, the mindful group also had a higher mean for how different the exhibition was to expectations.

Table 5.25

Mann-Whitney U-Tests for Differences Between Mindless and Mindful Visitors for Reported Time Spent at the Museum and Ratings of Level of Interest in Exhibition Topic and of How Different Exhibition Was to Expectations

Variable	z (corrected for ties)	p	Mean (SD) Mindless Visitors	Mindful Visitors
Reported Time Spent	-0.13	>0.05	2.6 (1.3)	2.6 (1.4)
Different to Expectations (1 not at all ---> 4-very)	-1.60	>0.05	2.5 (1.2)	2.8 (1.2)
Interest in Topic (1 not at all ---> 4-very)	-3.52	<0.05	3.2 (1.5)	3.9 (1.3)

Table 5.26 reports the results of t-tests for group differences for the indices familiarity with museums, satisfaction with exhibition and recall of the exhibition content. As predicted the mindful group were more familiar with museums, more satisfied with their experiences and had better recall of the exhibition contents, although significant relationships were reported only for the first two of these variables.

To summarise thus far, the analyses consistently support the predictions of the Mindfulness Model. Interest in a topic, measured by membership of a

Table 5.26

T-Tests for Differences Between Mindless and Mindful Visitors for Familiarity with Museums, Satisfaction with Experience and Knowledge of the Exhibition Content Indices

Variable	T	df	p	Mean (SD) Mindless Visitors	Mindful Visitors
Familiarity	-3.24	159	<0.05	2.8 (2.5)	4.1 (2.6)
Satisfaction	-5.18	159	<0.05	7.1 (2.7)	9.2 (2.5)
Knowledge	-1.20	145	>0.05	3.9 (2.0)	4.4 (2.5)

special group, does result in a greater chance of the visitor being mindful, as does familiarity with museums, higher levels of arousal, positive mood and giving educational reasons for visiting a museum. Further mindful visitors have better recall of exhibit contents and report higher levels of interest in, and satisfaction with the exhibition. The predictions with regard to the social composition of the visiting group were not specifically supported but the analyses indicated that, as predicted, group composition is linked to mindfulness through the reasons given for visiting a museum.

While the previous analyses have provided information on the relationships between mindfulness/mindlessness and several variables, these analyses were all bivariate and thus not able to answer the question of the relative importance of these various relationships. To answer this question a discriminant analysis was conducted using familiarity with museums, satisfaction with the exhibition, interest in the exhibition topic, reported time

spent in the museum, recall of exhibition contents and ratings of how different the exhibition was to expectations as the discriminating variables. Klecka (1980) defines discriminant analysis as 'a technique for examining differences between 2 or more groups ... with respect to several variables simultaneously" (p. 7). The discriminant analysis can tell us the relative contribution of the discriminating variables in discriminating between mindful and mindless visitors. The basic requirements for this statistical technique are that the discriminating variables be of interval level and normally distributed and not highly intercorrelated. With respect to the latter requirement the correlations between the discriminating variables are given in Table Appendix and no correlation was higher than 0.37. With respect to the first requirement three of the variables did not meet these conditions having an ordinal level of measurement. Several authors, however, have suggested that this violation of assumptions may not be critical in descriptive discriminant analysis, which is the current case (see Klecka, 1980; Huberty, 1984; and Mardia, 1971, for further discussions of this issue). The results of this discriminant analysis are given in Table 5.27. A canonical correlation of 0.44 was achieved, suggesting that the six variables in a single discriminating function were significantly related to mindfulness/mindlessness. Further this function correctly classified 72.8 per cent of the cases. More importantly the results suggested that the three most important variables in the function were satisfaction with the experience, familiarity with museums and level of interest in the exhibition topic.

Table 5.27

Results of Discriminant Analysis

A. Discriminant Function

Eigen value	Canonical Correlation	Wilk's Lambda	Chi-Square	p
0.24	0.44	0.81	30.27	<.05

B. Classification Table

Actual Group		Predicted Group	
		1.	2.
1.	Mindless Visitors	71.8%	28.2%
2.	Mindful Visitors	26.3%	73.7%

Percent of cases correctly classified: 72.8%.

C. Discriminating Items

Variable	Wilks Lambda	F	p	Standard Coefficient
Satisfaction	0.86	23.4	<0.05	0.74
Familiarity	0.94	8.9	<0.05	0.39
Interest	0.94	9.5	<0.05	0.26
Reported Time	0.99	0.4	>0.05	0.23
Knowledge	0.99	1.4	>0.05	0.13
Different Rating	0.99	1.1	>0.05	0.04

5.6 Survey of Visitors to the Semaphore to Satellite Exhibition: Conclusions

Overall, the results of the present survey supported the predictions derived from the Mindfulness Model. The variables of interest in the topic displayed, familiarity with museums and satisfaction with an exhibition were found to be significantly related to mindfulness. The use of two indicators of interest in the exhibition topic provided some support for the proposal that visitors with an interest in a topic before they arrive at an exhibition will be more likely to be mindful in the exhibition. Specifically those who report membership of a group with a special interest in communications, a condition which should reflect previsit interest, were more likely than other visitors to be mindful.

The proposal that links between familiarity with museums and mindfulness are based on, or mediated by reason for visit was also supported. This mediating role of reason for visit also explained the relationships revealed between type of accompanying group, and in combination with interest in the topic displayed, explained the relationship found between sex and mindfulness. This suggests that visitor motivation in general is a powerful influence on their cognitive state.

The pattern of results obtained from the analyses using the words chosen from the Circumplex Model suggested that arousal rather then evaluation or mood had the strongest connections to mindfulness. This is consistent with the discussions of mindfulness and arousal in chapter one, although the findings for mood are not clear as it seems that most visitors are in a positive mood and so the results are limited.

Finally the study provided some support for the proposal that visitors who find an exhibition as different to their expectations, or unexpected, are more likely to be mindful. The relationship was not, however, significant and further exploration of visitor perceptions of exhibitions is necessary.

5.7 Survey of Visitors to the Gallipoli and Sinai and Palestine Galleries of the Australian War Memorial: Method

Three aims were identified for this study:- to measure mindfulness and the other variables set out in the Mindfulness Model at a series of points to investigate relationships between mindfulness and visitors' existing levels of interest in a topic, to investigate in detail the relationships between mood, arousal and mindfulness and to examine visitors' perceptions of the settings and the influence of these perceptions on visitors' cognitive states.. As noted previously, it is not possible to accurately measure mindfulness in the same individuals before and after their experience of a gallery or exhibition, so the present study involved surveying independent samples of visitors at four points - as they entered the Gallipoli Gallery, as they left the Gallipoli Gallery, as they entered the Sinai and Palestine Gallery and as they left the Sinai and Palestine Gallery. The questionnaires were bound in a large book and left on a table with a sign requesting visitors to participate in the study, There were two chairs at the table and pencils available. Additionally, as security staff moved through the galleries on their regular rounds they requested visitors who were in the galleries to participate in the study and pointed out the location of the tables. Figure 5.3 shows the locations of the tables and questionnaire books.

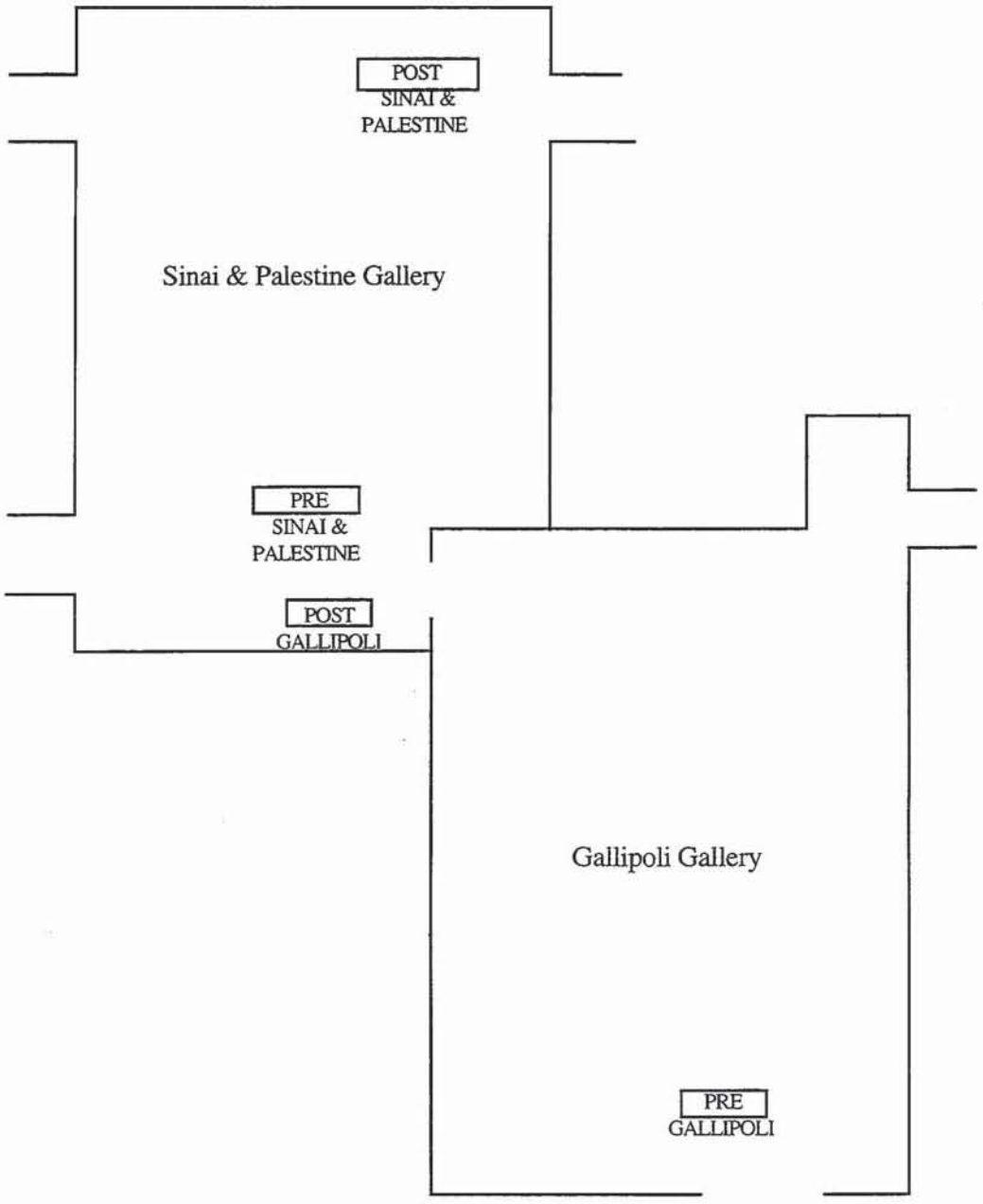

Figure 5.3. Location of Tables with Survey Books

5.7.1 Sample.

A total of 360 visitors completed questionnaires with 107 completing the Pre-Gallipoli survey, 109 completing the Post-Gallipoli survey, 85 completing the the Pre-Sinai and Palestine survey and 59 completing the Post-Sinai and Palestine survey. The lower numbers for the Sinai and Palestine gallery reflect a lower level of visitation which was noted in the observational studies. Table 5.28 contains the demographic profiles for these four samples with information on sex, age and type of accompanying group provided. The chi-squares at the bottom of the table indicated that no significant differences were found between the four groups in terms of sex, age or type of accompanying group. Further a question to assess visitors' reasons for visiting the Australian War Memorial was included in the two pre surveys and the responses for these two sample are also given in Table 5.28. Again, no significant differences were found.

5.7.2 Survey questionnaires.

Table 5.29 contains the questions used in the four surveys. All four surveys included measures to collect data on the following variables:-

(i) *Familiarity with museums*, measured in the same way as in the Semaphore to Satellite study with number of recent visits to this museum (question 1) and to museums in general (question 2).

(ii) *Level of interest in the topics of the galleries*, measured by a 0 (not at all interested) to 5 (very interested) rating scale of interest in the topics (question 8) and a questions about personal connections to the campaigns displayed in the galleries (question 6).

Table 5.28

Demographic Description of Survey Samples for Australian War Memorial Study

	Gallipoli		Sinai & Palestine	
	Pre (n=107)	Post (n=109)	Pre (n=85)	Post (n=59)
A. Sex:				
Male	48 (46.6%)	62 (62.0%)	41 (52.6%)	26 (48.1%)
Female	55 (53.4%)	38 (38.0%)	37 (47.4%)	28 (51.9%)
B. Age:				
<20 years	34 (33.3%)	25 (24.3%)	12 (15.4%)	12 (22.2%)
21-30 years	22 (21.6%)	29 (28.2%)	19 (24.4%)	10 (18.5%)
31-40 years	23 (22.5%)	28 (27.2%)	25 (32.1%)	12 (22.2%)
41-50 years	8 (7.8%)	8 (7.8%)	16 (20.5%)	6 (11.1%)
51-60 years	4 (3.9%)	5 (4.9%)	2 (2.6%)	6 (11.1%)
61-70 years	8 (7.8%)	6 (5.8%)	3 (3.8%)	5 (9.3%)
>70 years	3 (2.9%)	2 (1.9%)	1 (1.3%)	3 (5.6%))
C. Accompanying Group				
Alone	8 (7.8%)	11 (11.0%)	3 (3.9%)	9 (17.0%)
1 other person	25 (24.5%)	27 (27.0%)	16 (21.1%)	13 (24.5%)
Family	17 (16.7%)	16 (16.0%)	26 (34.2%)	11 (20.8%)
Friends	12 (11.8%)	20 (20.0%)	9 (11.8%)	4 (7.5%)
Family & Friends	4 (3.9%)	3 (3.0%)	2 (2.6%)	1 (1.9%)
Large Group	36 (35.3%)	23 (23.0%)	20 (26.3%)	15 (28.3%)
D. Reason for Visit				
To do something different	7 (6.7%)		10 (13.0%)	
Education	19 (18.1%)		11 (14.3%)	
Family Activity	5 (4.8%)		4 (5.2%)	
Tourist Activity	23 (21.9%)		21 (27.3%)	
Fill in Time	2 (1.9%)		3 (3.9%)	
Recommended	32 (30.5%)		15 (19.5%)	
Memorial	15 (14.3%)		9 (11.7%)	
See specific exhibition	2 (1.9%)		4 (5.2%)	

Chi-Squares: Sex = 5.45, df = 3, p>0.05.
Age = 27.12, df = 18, p>0.05.
Accompanying Group = 23.44, df = 15, p>0.05.
Reason for Visit = 7.24, df = 7, p>0.05.

Table 5.29

Survey Questions Used in Australian War Memorial Study

1. Is this your first visit to the Memorial?
   - ☐ Yes
   - ☐ No, I have been ___ times before.

2. Have you visited any other museums or exhibitions in the last 12 months?
   - ☐ No
   - ☐ Yes, I have visited ___ other museums.

3. Where else have you been in the Memorial today?

   _____
   _____
   _____

4. What is the major reason for your visit to the War Memorial today?

   _____
   _____
   _____

5. Could you choose from this list of words the 2 words that best describe how you feel now? Please tick 2.
   - ☐ Lively
   - ☐ Quiet
   - ☐ Drowsy
   - ☐ Anxious
   - ☐ Nervous
   - ☐ Tired
   - ☐ Leisurely
   - ☐ Active

6. Do you have any personal connection with the Gallipoli (Sinai & Palestine) campaign?
   - ☐ No
   - ☐ Yes, could you briefly explain this please?

   _____
   _____
   _____

7. The following is a list of words describing people's feelings about the Gallipoli/Sinai & Palestine Campaigns. Please tick the place on the lines that best describes how you feel about the Gallipoli/Sinai & Palestine Campaigns.

	NOT AT ALL					VERY
AFRAID	0	1	2	3	4	5	6
GRATEFUL	0	1	2	3	4	5	6
THOUGHTFUL	0	1	2	3	4	5	6
REGRETFUL	0	1	2	3	4	5	6
HONOURED	0	1	2	3	4	5	6
TROUBLED	0	1	2	3	4	5	6
RESPECTFUL	0	1	2	3	4	5	6
ANGRY	0	1	2	3	4	5	6
DESPAIRING	0	1	2	3	4	5	6
WORRIED	0	1	2	3	4	5	6
SYMPATHETIC	0	1	2	3	4	5	6
SAD	0	1	2	3	4	5	6

8. How strongly would you rate your interest in the Gallipoli/Sinai & Palestine Galleries?

   Please tick the place on the line that is most appropriate

   NOT AT ALL INTERESTED ——— VERY INTERESTED

   0-----1-----2-----3-----4-----5

9. The following statements have been given to us by other visitors who were asked to describe how they felt in a museum. We would like you to tell us how true they are for you right now?

	NOT AT ALL TRUE	SOME-WHAT TRUE	MODE-RATELY TRUE	VERY TRUE
My curiosity is aroused	____	____	____	____
I'm searching for information	____	____	____	____
My interest has been captured	____	____	____	____
I want to enquire further	____	____	____	____
I feel involved in this visit	____	____	____	____

10. Where do you normally live?

    _____

    Are you _____ male or _____ female?

12. Which of the following age categories is appropriate?
    - ☐ <20 years
    - ☐ 21 - 30
    - ☐ 31 - 40
    - ☐ 41-50
    - ☐ 51 - 60
    - ☐ 61 - 70
    - ☐ >71 years

13. Who are you visiting the Memorial with today?

    _____

14. Finally, a short quiz on the Gallipoli Campaign.

    How many Australian lives were lost at ANZAC?
    - ☐ 19,000
    - ☐ 1,915
    - ☐ 8,709
    - ☐ 10,000

    How many Australians were awarded the Victoria Cross for their actions in the Battle of Lone Pine?
    - ☐ 7
    - ☐ 5
    - ☐ 1
    - ☐ 3

    When did the last troops leave ANZAC?
    - ☐ January 1916
    - ☐ December 1915
    - ☐ May 1915

What was the staple of the ANZAC diet?

- ☐ Stale bread and cheese
- ☐ Tinned stew and biscuits
- ☐ Tinned stew and bread
- ☐ Bully beef and biscuits

When was the armistice to allow the Turks to bury their dead?

- ☐ January 1915
- ☐ March 1915
- ☐ May 1915
- ☐ July 1915

The answers to these questions may be found in the exhibits in the Gallipoli Gallery.

14. Finally, a short quiz on the Sinai and Palestine Campaign.

When did the Battle of Magdhaba begin?

- ☐ 22nd December 1915
- ☐ 1st October 1915
- ☐ 22nd December 1916
- ☐ 1st October 1916

How many regiments of the Australian Light Horse served in Palestine and Sinai between 1916 and 1918?

- ☐ 14
- ☐ 10
- ☐ 8
- ☐ 6

Who lead the First Light Horse across Sinai?

- ☐ Sir Philip Chetwoode
- ☐ Sir Harry Chauvel
- ☐ Sir L.W.C. Chayton
- ☐ C. Greenway

Who made a daring escape from a train taking P.O.W.'s to Constantinople?

- ☐ Sergeant S. Edwards
- ☐ Major E. Chayton
- ☐ Sergeant C. Greenway
- ☐ Captain T.W. White

When did the Camel Corps first see action?

- ☐ Battle of Romani
- ☐ Defence of Quinn's Post
- ☐ Battle of Magdhaba
- ☐ Defence of Gaba Tepe

The answers to these questions may be found in the exhibits in the Sinai and Palestine Gallery.

15. Could you write a few sentences briefly outlining what you know about the Gallipoli/Sinai&Palestine Campaigns?

_____

_____

_____

16. Now could you also briefly describe how you feel about the Gallipoli/Sinai & Palestine Campaigns?

_____

_____

_____

17. How satisfied were you with your visit in the gallery?

- ☐ Not at all satisfied
- ☐ A little satisfied
- ☐ Moderately satisfied
- ☐ Very satisfied

18. How different was the gallery to what you had expected?

- ☐ Very different
- ☐ Moderately different
- ☐ A little different
- ☐ Not at all different

19. How much do you think you have learnt from the gallery?

- ☐ I've learnt a great deal of new information.
- ☐ I've learnt a moderate amount of new information.
- ☐ I've learnt a little new information.
- ☐ I've learnt nothing.

20. Was there any information in the gallery that surprised you?

- ☐ No
- ☐ Yes, what was it?

_____

_____

21. Would you recommend a visit to your friends?

- ☐ I would definitely recommend it.
- ☐ I would probably recommend it.
- ☐ I am not sure.
- ☐ I would not recommend it.

22. How long have you spent in the Gallipoli/Sinai & Palestine Galleries?

_____

23. We would like you to think about the Gallipoli/Sinai & Palestine Galleries and rate them on the following six scales.

NOVEL	___ ___ ___ ___ ___	FAMILIAR
SIMPLE	___ ___ ___ ___ ___	COMPLEX
DENSE	___ ___ ___ ___ ___	SPARSE
SIMILAR	___ ___ ___ ___ ___	CONTRASTING
USUAL	___ ___ ___ ___ ___	SURPRISING
CROWDED	___ ___ ___ ___ ___	UNCROWDED

24. Could you briefly tell us what was the best aspect of the gallery?

_____

_____

25. Now, what was the worst aspect of the gallery?

_____

(iii) *Arousal and mood,* measured with two questions. The first question (question 5) was the same as that used in the Semaphore to Satellite survey drawn from the Circumplex model of affect. As a major aim of the present study was to further investigate the relationships between mood, arousal and mindfulness it was decided to include a further question measuring mood or emotional responses to the topics of the galleries. This question (7) consisted of 12 rating scales which visitors were asked to use to describe how they felt about the campaigns displayed. These 12 adjectives were chosen after conducting a pilot study with 20 third year psychology students. These students were given a list of 132 adjectives taken from the Multiple Affect Adjective Checklist (Zuckerman & Lubin, 1965) and asked to pick all those that they felt were appropriate to describe their emotional responses to military campaigns. The 12 most common adjectives chosen by these students were then chosen for use on the present study. See Appendix E for further details of this pilot. Question 16 was an open-ended question included as a check that these twelve adjectives were the most appropriate for the setting. In the previous survey for the Semaphore to Satellite exhibition a measure of perceived time spent in the museum was included in an attempt to measure fatigue. This was not a successful measure and in the present study another measure was used, that of where else the visitor had been in the Australian War Memorial before they reached the gallery being studied. This question (3) was a more direct measure and it was hoped might be useful in the analyses.

(iv) *Visitor demographics,* including the social composition of the visiting party (question 13), sex (question 11), age (question 13) and place of

residence (question 10). The latter question was of interest to the Australian War Memorial staff and was not included in any further analyses.

(v) *Levels of knowledge about the campaigns displayed.* All surveys included an open-ended question (question 15) to assess the levels of knowledge that visitors had about the campaigns. This was included as another measure of this variable not used in the Semaphore to Satellite study. Levels of knowledge were also measured by five quiz questions (question 14) based on the information contained in the exhibits in the two galleries.

Further the two previsit surveys included an open-ended question (4), asking for the visitors' reasons for visiting the Australian War Memorial. It had been planned to include this question in all four surveys but due to a typesetting error this question was not included in the post visit surveys. Thus it was only possible to use the responses to this question as a check on the comparability of the two pre visit samples.

The two post visit surveys also included questions to measure the following variables:-

(vi) *Mindfulness*, using the five of the scales employed in the Semaphore to Satellite exhibition (question 9) and a rating of subjective learning (question 19). The rating scales excluded from the present study were 'I want to explore possibilities' and 'I feel in control of what I am doing'. These were excluded because several visitors in the interview sample of the Semaphore to Satellite exhibition suggested that these were difficult scales to use to describe a museum visit.

(vii) *Visitor satisfaction with their experience,* measured by two questions, a rating of satisfaction (question 17) and a rating of intention to recommend a visit to the Australian War Memorial (question 21). The

question on intention to return used in the previous study was not used in this instance because it is confounded by visitors' opportunities to return. That is, high levels of non resident visitors will result in this question suggesting lower levels of satisfaction because people do not know if they will be able to return.

(viii) *Perceptions of the galleries*, measured by three questions (18, 20 and 23). The first two asked visitors to rate how different the gallery was to their expectations and if any of the information in the gallery was surprising. Both of these two features of settings have been suggested as related to mindfulness. Further question 23 involved six scales taken from Mehrabian and Russell's (1974) work on measuring the rate of information in a setting. The scales all included aspects of a setting which have been proposed as ways to induce mindfulness.

Finally three further questions were included for the purposes of exploratory research into mindfulness. Question 22 was included to investigate a proposal of Langer's (Langer, Chanowitz et al., 1988) that mindfulness might be related to a perception that time passes more quickly. Questions 24 and 25 asked visitors to state what were the best and worst aspects of the galleries and it was proposed that mindful visitors should be more detailed in their responses to these questions.

5.8 Survey of Visitors to the Gallipoli and Sinai and Palestine Galleries of the Australian War Memorial: Results and Discussion

5.8.1 Responses to survey questions, index creation and reliability checks.

A series of analyses were conducted in order to create indices for later analyses. The first of these was a Familiarity with museums index computed in the same way as for the Semaphore to Satellite study by summing responses to the questions on previous visits to the Australian War Memorial and other museums and exhibitions. This index ranged from 0 to 30 with a mean of 2.62 (SD=3.4), a median of 2.0 and a mode of 0.0. Nearly one-third of the surveyed visitors had never visited the Australian War Memorial before or any other museum in the last 12 months.

Two variables were used to create an index of knowledge about the topics on display in the galleries, the total score for the five quiz questions and responses to the open-ended question on knowledge of the campaigns. The latter question was coded in two ways, the number of pieces of information given and the types of information given. Distributions of these responses are given in Table 5.30. Overall there was a low level of knowledge about the two military campaigns with half the sample stating that they didn't know anything about the campaigns. The number of pieces of information given was significantly positively correlated to the total quiz scores (Spearman correlation = 0.18, $p < 0.05$). The resulting index of knowledge ranged from 0 to 8, with a mean of 3.14 (SD=1.9), a median of 3.0, and a mode of 2.0.

Table 5.30

Frequency Distribution for Quiz Scores and Responses to Open-ended Question on Knowledge of Gallery Contents

A. Quiz Score	**n**	**%**
0	30	14.6
1	39	18.9
2	62	30.1
3	36	17.5
4	31	15.0
5	8	3.9
B. Open-ended Knowledge: Pieces of Information Given		
0	182	50.5
1	89	24.7
2	60	16.7
3 or more	29	8.1
C. Open-ended Knowledge: Types of Information Given (First Answer only Coded).		
Nothing	182	50.5
Many Died	29	8.1
Weren't Successful	43	12.0
Specific Facts	16	4.6

The present study included six indicators of mindfulness, the five scales in question 9 and the measure of subjective learning. A series of correlations between these indicators were conducted and are reported in Table 5.31, section A. As can be seen these correlations were all positively correlated and, with the exception of two, these correlations were statistically significant. These indicators were summed to produce a single index of mindfulness. The frequency distribution for this index is given in section B of Table 5.31. The cutoff points to determine mindful and mindless visitors are also shown. These points are less severe than those used in the previous study because of a more compact scale and lower sample size.

An index of satisfaction with the experience was also created by summing ratings of overall satisfaction with the visit and intention to recommend a visit to others. The resulting index ranged from 2 to 8 with a mean of 7.42(SD=1.2), a median of 8.0 and a mode of 8.0. The majority of visitors were very positive about their visit with 71.1 per cent receiving the maximum score of 8.0.

Figure 5.4 is the profile of mean ratings for the 12 mood adjectives. A series of analyses (reported in Appendix D, Table 4) failed to show any differences in responses for the two different order of presentation of these scales. Further, the open-ended question which asked visitors to describe how they felt did not suggest any adjectives which should have been included in the rating scales. The most common adjectives given were sad (n=81, 22.5%), angry (n=81, 22.5%), and proud (n=21, 5.8%). A factor analysis was conducted in order to investigate any underlying structure for these scales and to guide the creation of indices for further analyses. The rotated factor

Table 5.31

Spearman Correlations Between Indicators of Mindfulness and Frequency Distribution of the Mindfulness Index

A. Spearman Correlations Between Indicators of Mindfulness Indicators

2.	Searching for Information	0.34*				
3.	Interest Captured	0.44*	0.29*			
4.	Enquire Further	0.39*	0.54*	0.45*		
5.	Feel Involved	0.39*	0.30*	0.40*	0.47*	
6.	Subjective Learning	0.21*	0.13	0.16*	0.09	0.24*
		1.	2.	3.	4.	5. 6.

(Curiosity aroused)

* $p<0.05$.

B. Frequency Distribution of Mindfulness Index

Index Score	n	%	
6-9	5	3.5	
10-12	18	12.6	
13-15	29	20.4	<---------- Mindless
16-17	23	16.2	
18-21	49	34.6	<---------- Mindful
22-24	18	12.6	

Mean = 16.8 (SD = 4.0). Median = 17.0. Mode = 17.0.

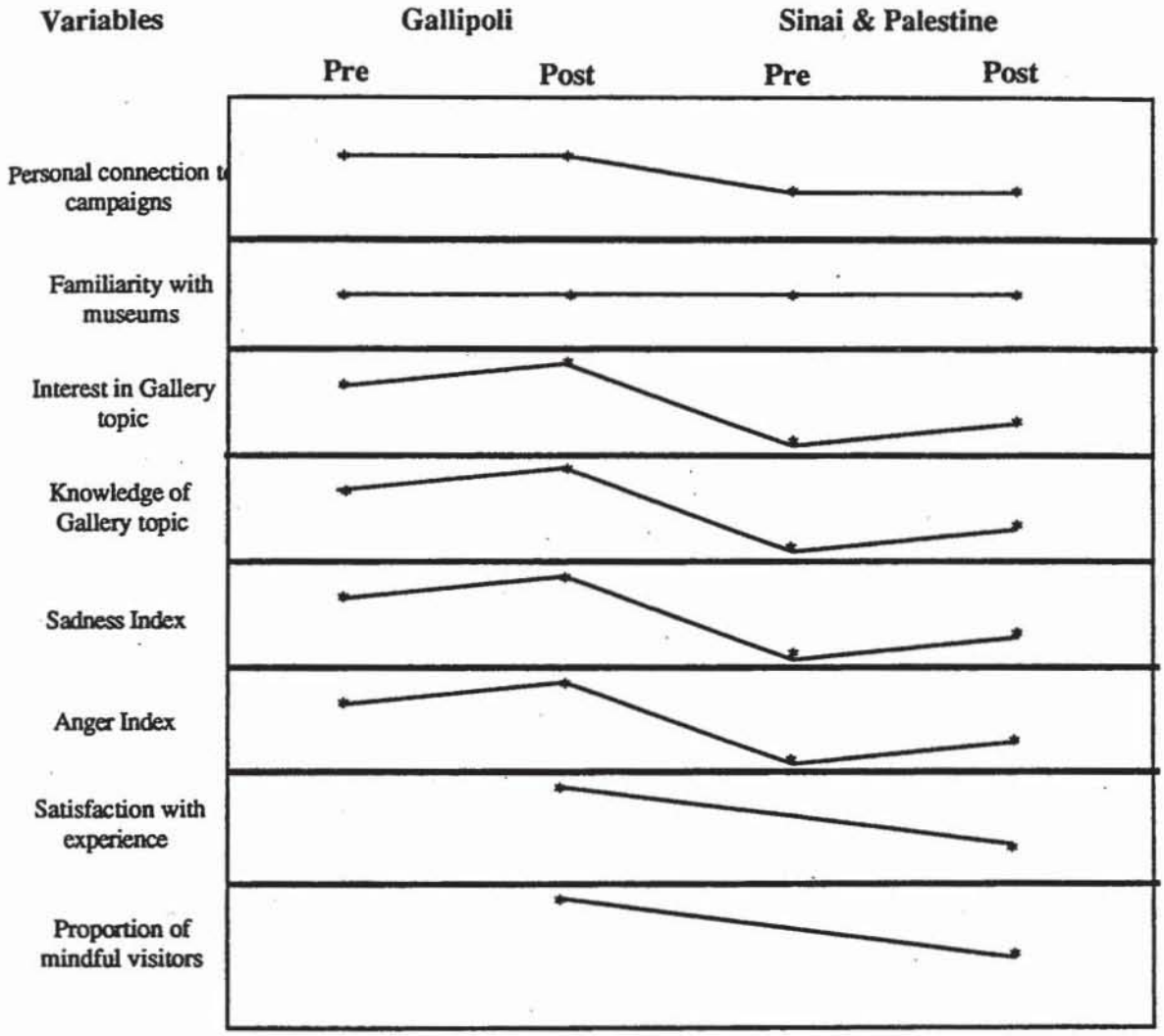

Figure 5.4. Predicted Patterns of Results for Gallery Differences.

solution resulted in two factors accounting for 52.5 percent of the common variance. The loading of the items on these two factors is given in Table 5.32. These results suggested the creation of two indices for further analyses - one labelled pensive and created by summing the ratings of sad, respectful, grateful, thoughtful and regretful, and one labelled distress, created by summing the ratings of angry, despairing, sympathetic and afraid. The distress index ranged from 0 to 24, with a mean of 13.7 (SD=6.5), a median of 15.0, and a mode of 24.0, while the pensive index ranged from 0 to 30 with a mean of 11.3 (SD=8.4), a median of 11.0, and a mode of 0.0.

Table 5.32

Loading of 12 Mood Adjectives on Rotated Two Factor Solution. (Varimax Rotation, Principal-Components Analysis)

Adjective	**Factor 1 (38.5%)***	**Factor 2 (14.0%)**
Respectful	.211	-.086
Angry	-.146	.385
Despairing	-.006	.241
Worried	.144	.051
Sympathetic	-.067	.311
Sad	.254	-.128
Afraid	-.099	.335
Grateful	.206	-.049
Thoughtful	.217	-.043
Regretful	.242	-.089
Honoured	.092	.125
Troubled	.092	.115

* Percent of variance accounted for.

Table 5.33 is the crosstabulation of the first and second word chosen by visitors to describe how they felt. As in the Semaphore to Satellite study visitors were consistent in their choice of words. Thus for further analyses the first word chosen was used. Further analyses were conducted to investigate the relationships between visitors' responses to this question and their scores on the pensive and distress indices and the results of these analyses are given in Table 5.34. There appeared to be no consistent relationships between these variables suggesting that visitors were able to distinguish between their responses to the content of the galleries and their responses to the experiences of the galleries.

A factor analysis was also carried out to investigate the relationships between the questions asking for visitor perceptions of the settings - the six bipolar rating scales, and the questions on how different the gallery was to expectations and was there any surprising information in the galleries. Initially it was planned to combine all of these into a single index of information rate. A series of correlations between these variables (given in Table 5, Appendix D), however, indicated that they were not all positively correlated so a factor analysis was conducted to explore the possibility of there being several underlying descriptive dimensions. The rotated factor solution suggested three factors accounting for 56.4 per cent of the common variance. Table 5.35, section A, contains the loadings of the scales on these three factors. As a result of this factor analysis it was decided to create three indices for dor describing the settings under study:-

1. A novelty index, computed by adding the ratings of the novel-familiar scale and the dense-sparse scale. The responses were coded from 5

Table 5.33

Crosstabulation of First and Second Word Chosen to Describe Current State

	Count Row % Column %	Second Word Chosen							
		Quiet	Drowsy	Anxious	Nervous	Tired	Leisurely	Active	Total
First Word Chosen	Lively	4 11.8% 66.7%	0 .0% .0%	3 8.8% 7.7%	1 2.9% 8.3%	2 5.9% 5.6%	8 23.5% 7.2%	* 16 47.1% 47.1%	34 13.6%
	Quiet	0 .0% .0%	8 5.1% 66.7%	32 20.5% 82.1%	8 5.1% 66.7%	19 12.2% 32.8%	* 81 51.9% 73.0%	8 5.1% 23.5%	156 62.4%
	Drowsy	0 .0% .0%	0 .0% .0%	0 .0% .0%	0 .0% .0%	* 12 70.0% 23.3%	5 29.4% 4.5%	0 .0% .0%	17 6.8%
	Anxious	0 .0% .0%	0 .0% .0%	0 .0% .0%	* 3 37.5% 25.0%	2 25.0% 5.6%	2 25.0% 1.8%	1 12.5% 2.9%	8 3.2%
	Nervous	2 33.3% 33.3%	0 .0% .0%	* 2 33.3% 5.1%	0 .0% .0%	1 16.7% 2.8%	1 16.7% .9%	0 .0% .0%	6 2.4%
	Tired	0 .0% .0%	* 4 20.0% 33.3%	1 5.0% 2.6%	0 .0% .0%	0 .0% .0%	13 65.0% 11.7%	2 10.0% 5.9%	20 8.0%
	Leisurely	* 0 .0% .0%	0 .0% .0%	1 11.1% 2.6%	0 .0% .0%	0 .0% .0%	1 11.1% .9%	7 77.8% 20.6%	9 3.6%
	Total	6 2.4%	12 4.8%	39 15.6%	12 4.8%	36 14.4%	111 44.4%	34 13.6%	250 100.0%

Chi-Square = 208.5, df = 36, $p<0.05$.
A priori PRE (predicted cells marked *) = 0.303.

Table 5.34

Mean Scores on Pensive and Distress Indices for Visitors Choosing Words from Different Sections of the Circumplex Model

	Sections of Circumplex Model	Pensive Mean	(SD)	Distress Mean	(SD)
A.	**Arousal and Evaluation Dimensions Combined**				
1.	High arousal, positive evaluation	10.8	(7.9)	13.9	(6.7)
2.	Low arousal, positive evaluation	11.9	(8.5)	13.9	(6.3)
3.	High arousal, negative evaluation	9.4	(7.2)	12.9	(6.3)
4.	Low arousal, positive evaluation	10.7	(9.3)	13.4	(8.3)
	Kruskal-Wallis 1 way Anova				
	Chi-Square = 3.35	(p>0.05)	1.13	(p>0.05)	
B.	**Arousal Dimension Only**				
1.	High arousal	10.8	(8.4)	13.7	(7.2)
2.	Low arousal	11.5	(8.3)	13.7	(6.3)
	Mann-Whitney U-test. z =	-0.66 (p>0.05)		-0.31 (p>0.05)	
C.	**Evaluation Dimension Only**				
1.	Positive Evaluation	11.8	(8.4)	13.9	(6.4)
2.	Negative Evaluation	9.9	(7.9)	13.1	(6.9)
	Mann-Whitney U-test z =	-1.63 (p>0.05)		-0.83 (p>0.05)	

to 1 moving from left to right on these scales. Thus a higher score indicates that the setting is seen as more novel and/or dense,

2. A complexity index, computed by adding the ratings of the simple-complex, similar-contrasting and usual-surprising scales. Again a higher score indicates that the setting is seen as more complex, contrasting and/or surprising, and

3. A surprising index, created by adding the ratings of crowded-uncrowded, how different the gallery was to expectations and answers to the question regarding surprising information. For this latter question, an answer of no was given a score of 0 and answers of yes were scored according to the number of pieces of information given. No one gave more than three pieces of information.

The descriptive statistics for these three variables are given in Table 5.35, section B.

Level of interest in the gallery topics was generally high as can be seen in the frequency distribution in Table 5.36, with nearly half of the surveyed visitors (n=136, 42.2%) rating their level of interest with a 5 or a 6. As might be expected level of interest in the gallery topics was significantly related to whether or not visitors had a personal connection with either of the two campaigns. The majority of visitors stated that they had no personal connections with the campaigns (n=306, 87.4%), four visitors (1.1%) stated that they had been involved directly in the campaigns and forty visitors (11.5%) reported that they had relatives or friends who had participated in the campaigns.

Table 5.35

Loading of Eight Setting Ratings on Rotated Three Factor Solution. (Varimax Rotation, Principal Components Analysis) and Descriptive Statistics for Three Setting Indices

A. Loadings on Factors

Scale	**Factor 1 (25.4%)**	**Factor 2 16.4%)**	**Factor 3 (14.6%)**
Novel - Familiar	.563	.217	-.120
Simple-Complex	-.213	.265	-.212
Dense - Sparse	.461	-.025	.039
Similar-Contrasting	.135	.525	-.082
Usual - Surprising	.091	.495	.213
Crowded - Uncrowded	.245	-.007	.455
Different to Expected	-.016	.166	.387
Surprising Information	-.115	-.097	.539

* Per cent of variance explained.

B. Descriptive Statistics for Three Setting Indices

Indices	**Mean (SD)**	**Median**	**Mode**	**Range**
Novelty	6.07 (2.2)	6.0	6.0	2.-10
Complexity	9.84 (2.7)	10.0	9.0	3-15
Surprising	6.66 (1.9)	7.0	5.0	3-11

Table 5.36

Frequency Distribution for Ratings of Level of Interest in the Gallery Topics

Rating		**n**	**%**
Not at all interested	0	5	1.6
	1	10	3.1
	2	31	9.6
	3	71	22.0
	4	69	21.4
	5	107	33.2
Very interested	6	29	9.0

Mean = 3.94 (SD = 1.4). Median = 4.0. Mode = 5.0

These latter two responses were collapsed so that visitors were divided into those who had no personal connections to the campaigns and those that did. The latter group was found to have a significantly higher mean level of interest in the gallery topics than visitors with no personal connections to the campaigns (Mann-Whitney U-Test, $z=-2.26$, $p < 0.05$). Those with a personal connection also had higher mean scores for knowledge about the campaigns, and on the pensive and distress indices. The results of these analyses are given in Table 5.37. Further, no relationships were found between personal connections to the campaigns and age (Chi-square = 10.97, df=6, $p>0.05$), accompanying group (Chi-square=3.67, df=5, $p >0.05$), or the first word chosen to describe the visitor's present state (Chi-square =10.89, df=7, $p > 0.05$).

Table 5.37

Mean Scores for Visitors With and Without Personal Connections With the Campaigns for Level of Interest in the Topic, Knowledge About the Gallery Contents, and Pensive and Distress Indices

Index	**Personal Connection**		**Mann-Whitney U-test**	
	No	**Yes**	**z**	**p**
Interest	3.81 (1.3)	4.25 (1.0)	-2.26	<0.05
Knowledge	3.15 (1.9)	3.29 (2.0)	-0.52	>0.05
Sadness	11.06 (8.3)	12.29 (8.6)	-0.97	>0.05
Anger	13.52 (6.5)	14.93 (6.6)	-1.62	>0.05

(Standard Deviations)

Responses to the question asking where visitors had been in the War Memorial before reaching the gallery under study were categorised as follows: - 'no where else' (n=55, 15.3%), 'the introductory area only' (n=66, 18.3%), the introductory area and one gallery, usually Gallipoli, (N=23, 6.4%) and the introductory area and two galleries, usually Gallipoli and the Western Front (n=17, 4.7%). A substantial proportion (n=199, 55.0%) did not answer this question suggesting that visitors were not well oriented in the setting. This large proportion of missing data also excluded this variables from further analyses.

Visitors in the two postvisit samples were also asked to estimate the time they had spent in the galleries and the frequency distribution for the responses of these two samples combined is Table 5.38. The distribution

ranged from 5 to 90 minutes with a mean of 36.5 minutes (SD=22.1) and a median and mode of 30 minutes.

Table 5.38

Frequency Distribution of Reported Time Spent in the Museum

Reported Time (Minutes)	**n**	**%**
5	3	2.1
10	18	12.7
15	10	7.0
20	18	12.7
30	35	24.6
31-45	17	11.9
46-60	31	21.8
75	3	2.1
90	7	4.9

Finally, Table 5.39 contains the responses to the questions asking visitors what were the best and worst features of the galleries. Overall, visitors were again positive about their experiences with nearly half the sample (46.3%) stating that everything was good and more than half the sample (64.2%) stating that nothing was bad about the galleries.

Table 5.39

Best and Worst Features of the Galleries

Best Feature	**n**	**%**
Everything	57	46.3
Models & dioramas	34	27.7
Art	10	8.1
Artefacts	11	8.9
Presenting people's lives	8	7.2
Authenticity	2	1.6
Variety	1	0.8
Worst Feature	**n**	**%**
Nothing	79	64.2
Not enough information	10	8.1
Weapons/death	21	17.1
Art	4	3.3
All the same	3	2.4

5.8.2 Differences between the four sampling points.

The next step in the analysis was to investigate differences between the four sampling points to test the hypotheses outlined in the introduction and presented graphically in Figure 5.4. The pilot study reported in Chapter 4 provided evidence that the Gallipoli campaign had a higher public profile than the Sinai and Palestine campaign with higher ratings for importance and knowledge. Given this higher profile it was predicted that visitors would

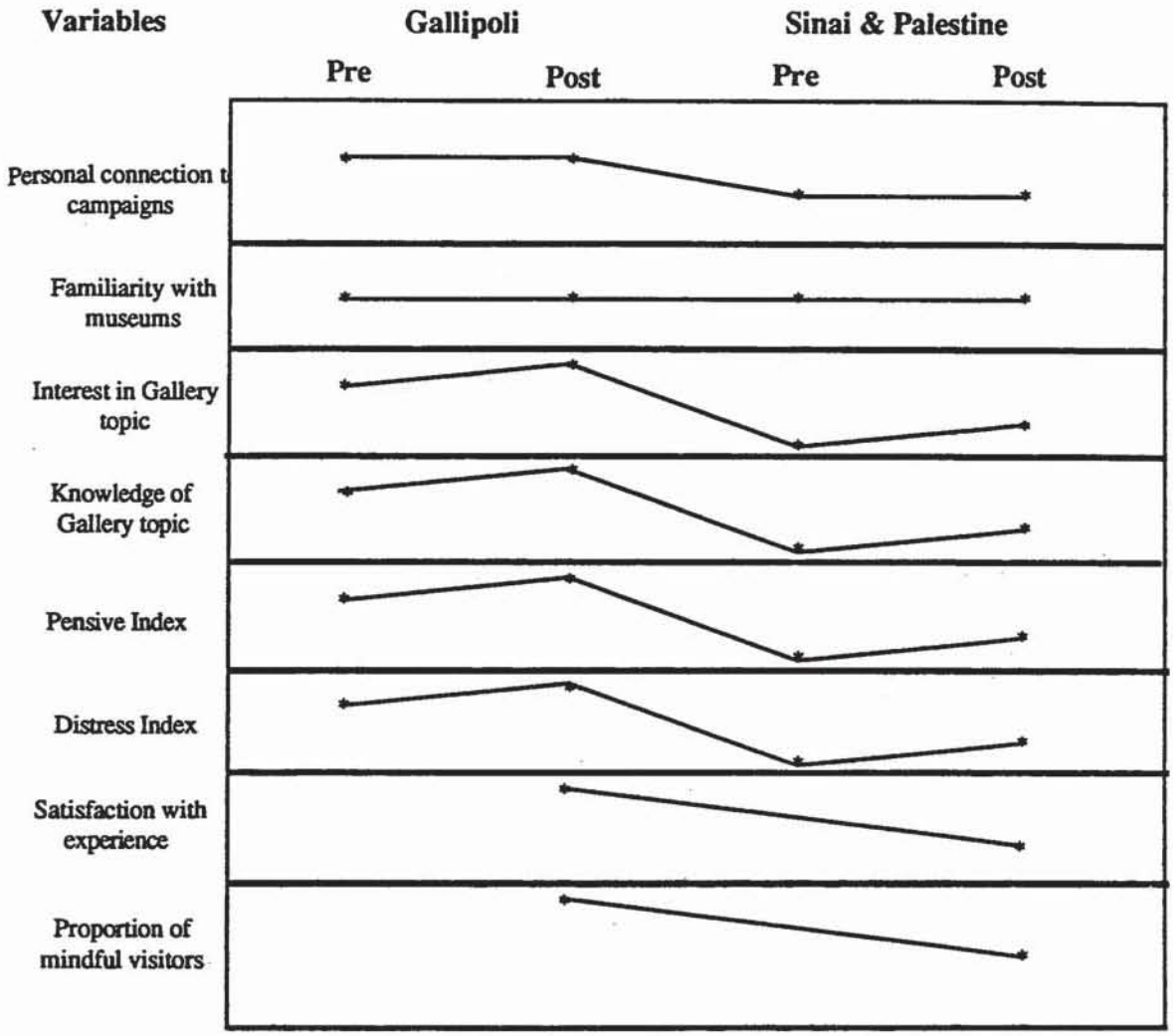

Figure 5.5. Predicted Patterns of Results for Gallery Differences.

have been more likely to explore family connections to the Gallipoli campaign and thus a greater proportion of visitors in the two Gallipoli samples should have reported personal connections to the campaign than in the two Sinai and Palestine samples. It was then predicted that this higher level of personal connection should be paralleled by higher levels of interest in, and knowledge about the gallery topics and higher scores on the pensive and distress indices for the two Gallipoli samples. Further, these higher levels of interest, greater personal connections, and higher levels of emotional response should result in a greater proportion of mindful visitors and in turn more mindful visitors should produce even higher levels of interest, knowledge and emotional response in the post Gallipoli sample. It was also predicted that more mindful visitors should result in higher levels of satisfaction with the experience in the post Gallipoli sample. Finally, the variable of familiarity with museums was included as it was identified as an important variable in relation to mindfulness in the Semaphore to Satellite study. It was predicted that all four samples should be comparable with respect to familiarity with museums and that any difference between them on this variable might influence the resulting proportions of mindful visitors.

In order to test these predictions the following analyses were conducted:-

1. Kruskal-Wallis Analyses of Variance were conducted to examine mean differences between the four samples for familiarity with museums (Chi-square=0.5, $p > 0.05$), interest in the gallery topics (Chi-square=54.2, $p<0.05$), knowledge of the gallery topics (Chi-square=38.2, $P <0.05$), and the pensive (Chi-square=2.8, $p>0.05$) and distress indices (Chi-square=4.2, $p>0.05$).

2. A Mann-Whitney U-test was conducted to examine mean differences between the two post visit samples for satisfaction with the experience ($z=-0.02$, $P>0.05$).

3. Chi-squares were computed to investigate group differences for personal connections to the campaigns (Chi-square=11.1, df=3, $P<0.05$) and the proportion of mindful and mindless visitors in the two postvisit samples (Chi-square=1.8, df=1,$p>0.05$).

The means and standard deviations and category percentages for the four samples for the variables listed above are given in Table 5.40 and presented graphically in Figure 5.6. A comparison of the pattern of results in Figures 5.5 and 5.6 indicates that the predicted patterns of results were obtained for interest in gallery topics and knowledge of gallery topics. Further, the patterns of means for the sadness and anger indices were consistent with the predictions made. The predictions for the levels of satisfaction with the experience and the proportion of mindful visitors, however, were not supported, with virtually no difference in mean satisfaction levels between the two post visit samples and a higher proportion of mindful visitors in the post Sinai and Palestine sample.

Further examination of Table 5.40 and Figure 5.6 suggests two possible explanations for these results. In the case of personal connections to the campaigns the two postvisit samples had similar proportions of visitors reporting a personal connection to the campaign and this may have contributed to the greater than predicted proportion of mindful visitors in the

Table 5.40

Summary of Results of Analyses of Gallery Differences

Variable	Gallipoli		Sinai & Palestine	
	Pre	Post	Pre	Post
* Personal Connection (Yes)	20.0%	12.8%	3.8%	10.7%
Familiarity with Museums(ˆx,SD)	2.61 (3.8)	2.40(2.8)	2.43 (2.8)	3.34 (4.4)
* Interest in Topic (ˆx,SD)	3.89 (1.0)	4.49(1.3)	2.97 (1.4)	4.30 (1.3)
* Knowledge of Topic (ˆx,SD)	3.31 (1.7)	3.84(2.0)	1.85 (1.4)	2.33 (1.8)
Sadness Index (ˆx,SD)	11.85 (8.5)	11.84(7.8)	10.31 (8.4)	10.34 (9.3)
Anger Index (ˆx,SD)	13.14 (6.5)	14.53(6.2)	12.66 (6.9)	14.32 (6.6)
Satisfaction with Experience (ˆx,SD)	-	7.39(1.2)	-	7.46 (1.1)
Mindful Visitors (%)	-	52.8%	-	66.7%
Mindless Visitors (%)	-	47.2%	-	33.3%

* Differences significant $p<0.05$ (see text for further details).

post-Sinai and Palestine group. This greater proportion of mindful visitors might also reflect the higher levels of familiarity with museums reported for the post-Sinai and Palestine sample. It would seem that the visitors who completed the survey in the post-Sinai and Palestine setting might not have been representative of the population of visitors to the gallery in terms of familiarity with museums and personal connections to the Sinai and Palestine campaign and thus were more likely to be mindful.

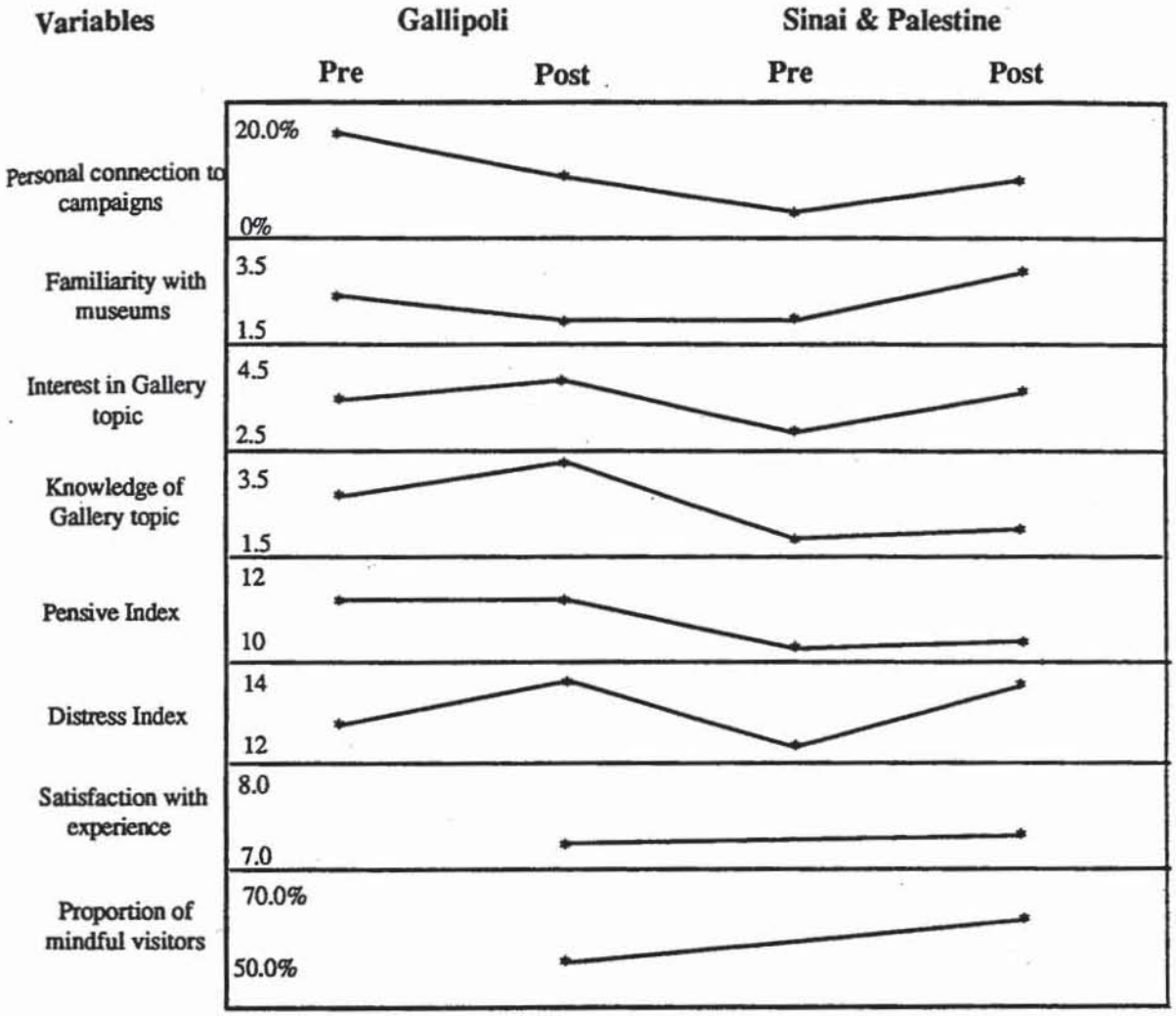

Figure 5.6. Actual Patterns of Results for Gallery Differences.

5.8.3 Relationships between mindfulness/mindlessness and other variables.

As in the Semaphore to Satellite study this stage in the analysis consisted of a series of bivariate analyses to examine differences between mindful and mindless visitors for a series of variables. In these analyses the two post-visit samples were combined. The first set of analyses investigated possible differences in demographic variables between the mindless and mindful visitors. No significant relationships were found for sex (Chi-square=0.50,df=1,p>0.05), age (Chi-square=3.86,df=6,p>0.05), or type of accompanying group (Chi-square=3.5,df=5,p>0.05). The relationship between mindfulness/mindlessness and personal connections to the campaigns was also found not to be significant using a chi-square analysis (see Table 5.41), although the pattern of results in a crosstabulation table was consistent with the prediction that people with a personal connection to the campaigns would be more likely to be mindful visitors.

Table 5.42 is the crosstabulation of mindful and mindless visitors with the first word chosen by visitors to describe how they felt. As in the Semaphore to Satellite study the arousal dimension had the strongest link to mindfulness, although in the present study there was not a strong relationship between these variables.

Crosstabulations were also constructed to investigate potential relationships between mindfulness and the best and worst features of the galleries. Table 5.43 has these two crosstabulations. In the case of best features the mindful group were more positive than the mindless which is consistent with the Mindfulness Model's predictions. The mindful visitors

Table 5.41

Crosstabulation of Mindful/Mindless Visitors with Personal Connections to the Campaigns

Count Row % Column %	Personal Connections No	 Yes	 Total
Mindless Visitors	46 88.5% 46.0%	6 11.5% 31.6%	52 43.7%
Mindful Visitors	54 80.6% 54.0%	13 19.4% 68.4%	67 56.3%
Total	100 84.0%	19 16.0%	119 100.0%

Chi-Square = 1.3, df = 1, p>0.05.

Table 5.42

Crosstabulation of Mindful/Mindless Visitors and First Word Chosen to Describe Current State

Count Row % Column %	First Word Chosen Lively	 Quiet	 Drowsy	 Anxious	 Nervous	 Tired	 Leisurely	 Total
Mindless Visitors	2 3.9% 16.7%	*$36 70.6% 47.4%	*#$3 5.9% 75.0%	#$ 1 2.0% 25.0%	#$ 1 2.0% 20.0%	*#$6 11.8% 54.5%	*$ 2 3.9% 40.0%	51 43.6%
Mindful Visitors	*#$10 15.1% 83.3%	# 40 60.6% 52.6%	1 1.5% 25.0%	* 3 4.5% 75.0%	* 4 6.0% 80.0%	5 7.5% 45.5%	# 3 4.5% 60.0%	66 56.4%
Total	12 10.2%	76 64.9%	4 3.4%	4 3.4%	5 4.3%	11 9.4%	5 4.3%	117 100.0%

Chi-Square = 8.6, df = 6, p>0.05.
A priori PRE using Arousal (predicted cells marked *) = 0.19.
A priori PRE using Evaluation (predicted cells marked #) = 0.02.
A priori PRE using Arousal and Evaluation (predicted cells marked $) = 0.11.

appeared to be less discriminating in their positive reactions which seems inconsistent with the concept of mindfulness. In the case of worst features, however, the mindful visitors were more likely to be critical than the mindless visitors. These findings reflect those found for the attitude statements in the Semaphore to Satellite exhibition. That is, in the positive case mindful visitors are more confident and less discriminating in their responses. When discussing negative aspects, however, they show more complex responses.

The second stage of the analysis involved conducting a series of Mann-Whitney U-tests to test for mean differences between mindful and mindless visitors for a range of variables identified as important for this study. Table 5.44 summarises the results of these tests. As can be seen from this table significant differences were found for only two variables, interest in the gallery topics and the distress index, with the mindful visitors having higher means scores for both these variables. Mindful visitors also had higher mean scores for knowledge of the gallery topics, the pensive index, satisfaction with the experience, familiarity with museums and the novelty index, as would be expected from the Mindfulness Model. The other results, however, were not as predicted. In the case of perceived time spent in the galleries, the results were consistent with the findings of the observation studies that visitors spend more time in the Gallipoli than the Sinai and Palestine gallery and this may be a stronger influence than that predicted.

As the analyses conducted with the three setting indices were not informative, it was decided to examine the eight setting descriptive variables individually. Table 5.45 contains the results of these analyses. For all eight

Table 5.43

Crosstabulation of Mindful/Mindless Visitors and Best and Worst Features of Galleries

A. Best Features

Count / Row % / Column %	Every-thing	Models	Art	Dioramas	Equip-ment	People's Lives	Nothing	Total
Mindless Visitors	17 32.7% 35.4%	3 5.8% 42.9%	6 11.5% 75.0%	10 19.2% 55.6%	3 5.8% 30.0%	5 9.6% 55.6%	8 15.4% 42.1%	52 43.7%
Mindful Visitors	31 46.3% 64.6%	4 6.0% 57.1%	2 3.0% 25.0%	8 11.9% 44.4%	7 10.4% 70.0%	4 6.0% 44.4%	11 16.4% 57.9%	67 56.3%
Total	48 40.3%	7 5.9%	8 6.7%	18 15.1%	10 8.4%	9 7.6%	19 16.0%	119 100.0%

B. Worst Features

Count / Row % / Column %	Insuf-ficient Nothing	Inform.	Weapons	Re-Art	petitive	Total
Mindless Visitors	37 81.2% 43.5%	3 5.8% 37.5%	7 13.5% 36.8%	3 5.3% 100.0%	2 3.3% 66.6%	52 44.1%
Mindlful Visitors	48 72.7% 56.5%	5 7.6% 62.5%	12 18.2% 63.2%	0 .0% .0%	1 1.5% 33.3%	66 55.9%
Total	85 72.0%	8 6.8%	19 16.1%	3 2.5%	3 2.5%	118 100.0%

Table 5.44

Results of Mann-Whitney U-Tests for Mean Differences Between Mindful and Mindless Visitors

Variable	z	SIG.	Mindless Visitors (`x,SD)	Mindful Visitors (`x,SD)
Knowledge of Topic	-1.79	0.07	3.29 (2.0)	4.04 (2.0)
Distress Index	-2.10	0.04	13.41 (6.5)	16.06 (5.9)
Pensive Index	-1.11	0.26	10.53 (8.0)	12.17 (8.4)
Satisfaction with Experience	-1.80	0.07	6.98 (1.7)	7.63 (0.8)
Interest in Topic	-4.69	0.0001	3.73 (1.4)	4.8 (0.5)
Familiarity with Museums	-0.41	0.68	2.37 (2.9)	2.54 (2.9)
Perceived Time Spent in Gallery	-1.31	0.19	33.85(20.1)	39.22(21.7)
Novelty Index	-0.64	0.52	5.96 (1.7)	6.16 (2.4)
Complexity Index	-0.15	0.88	9.86 (2.5)	9.54 (2.7)
Crowding Index	-1.19	0.22	6.76 (1.9)	6.39 (1.8)

scales the Mindfulness Model predicts that the mindful visitors should have higher mean scores than the mindless visitors. In the present study this was the case for all scales except similar-contrasting and different to expected. Several possible explanations for these results can be outlined. Firstly it is possible that there are problems with the accuracy of the scales. It may be that it is difficult to answer these questions, particularly the question concerned with different to expected. Visitors may not have had clear expectations. It is also possible that the mindful visitors were giving a more accurate description of the setting. That is, they were mindful not only with respect to the setting but with respect to completing the survey. It is also

possible that all these variables have a curvilinear relationship with mindfulness as discussed in Chapter One, such that mindfulness occurs at moderate to high levels of these variables with mindlessness for the low and very high levels of these variables. The tests conducted would not have indicated such relationships. Examination of the scatterplots for these variables (see Appendix D, Figures 1-8) did not, however, support this explanation.

The final stage in the analysis was to conduct a descriptive discriminant analysis with the indices of knowledge of the topic, satisfaction with the experience, interest in the gallery topics and distress, and the usual-surprising scale as discriminating variables. The first three variables were chosen because they were identified as key variables in the mindfulness model and the other variables were chosen because they had significant relationships with mindfulness/mindlessness in the bivariate analyses (See Stevens, 1986, for further discussion of this point). Table 6 in Appendix D has the correlations between the discriminating variables and no correlation was higher than 0.38 The results of this discriminant analysis are given in Table 5.46. A canonical correlation of 0.58 was achieved indicating that the five variables in a single function were significantly related to mindfulness/ mindlessness and this function correctly classified 72.3 per cent of the cases. Interest in the gallery topics, satisfaction with the experience, the distress index and the usual-surprising scale were all significant contributors to the function, although the most important of these variables was interest in the gallery topics.

Table 5.46

Summary of Discriminant Analysis

A. Discriminant Function

Eigen Value	Canonical Correlation	Wilk's Lambda	Chi-Square	p.
0.49	0.58	0.67	30.27	<0.05

B. Classification Table

Actual Group		Predicted Group	
		1.	2.
1.	Mindless Visitors	63.2%	36.8%
2.	Mindful Visitors	20.0%	80.0%

Percent of cases correctly classified: 72.3%.

C. Discriminating Items

Variable	Wilk's Lambda	F	p	Standard Coefficient
Interest	0.78	23.49	<0.05	0.92
Satisfaction	0.93	4.64	<0.05	0.27
Usual-Surprising	0.94	5.38	<0.05	0.30
Distress	0.95	4.64	<0.05	0.07
Knowledge	0.97	2.10	>0.05	0.08

5.9 Survey of visitors to the Gallipoli and Sinai and Palestine Galleries of the Australian War Memorial: Conclusions

This study had three major goals; to use multiple survey points to examine the relationships between mindfulness and other variables identified from the Mindfulness Model, to examine the relationships between mindfulness/mindlessness and arousal and affective responses to the galleries and their topics, and to examine in more detail visitor perceptions of the settings under study and their relationships with mindfulness/mindlessness. In the case of the relationships between arousal, affective responses and mindfulness/mindlessness it was also hoped that the comparisons between the two galleries would support the findings and interpretations of data in the observational studies conducted in these galleries and described in the previous chapter.

The analysis of the results had two major stages, the comparisons of the four survey points or two galleries and investigations of mindfulness/mindlessness in the two postvisit surveys only. In the case of the gallery comparisons the pattern of results was not consistent in all instances with the predictions made. In summary, the levels of interest in the gallery topics, knowledge of the gallery topics and levels of sadness and anger felt about the campaigns displayed were as predicted with higher levels reported for the Gallipoli than the Sinai and Palestine gallery. This supports the results of the observational studies which found patterns of greater attention in the Gallipoli than in the Sinai and Palestine galleries. These higher levels were not associated, however, with higher levels of satisfaction with the experience or greater proportions of mindful visitors. More detailed inspection of the results, however, revealed that the proportion of visitors

with a personal connection to the campaign displayed and the levels of familiarity with museums were higher in the post-Sinai and Palestine gallery than expected and that these are likely to have contributed to the higher than expected proportions of mindful visitors.

The second major stage of the analysis which examined the relationships between mindfulness/mindlessness and other variables in the two postvisit samples produced results consistent with the Mindfulness Model and with the results of the Semaphore to Satellite study. Overall this study found that mindfulness was connected to higher levels of interest in the topic, personal connections to the topic, greater knowledge of the material displayed, satisfaction with the experience, familiarity with museums, arousal and greater affective responses to the setting and the topics. With respect to the relationships between arousal and affective responses to the settings and topics this study found that responses to the settings were not related to responses to the topics on display. Further arousal had a stronger relationship than mood to mindfulness and mindlessness.

The other variables examined were visitors' perceptions of the galleries and these analyses indicated that mindful visitors described the galleries as more complex, surprising and novel, but less different to expected and less contrasting than mindless visitors. It is possible that, like affective responses, visitors have different perceptions for the settings than for the information displayed. Thus mindful visitors, who had greater familiarity with museums, found the information more surprising, but the display techniques more as expected. This suggests that greater attention needs to the paid to this issue in future studies.

In summary, the two studies reported in this chapter set out to investigate, through surveys of visitors, relationships between mindfulness/ mindlessness and reason for visiting, arousal, familiarity with museums, learning, enjoyment, mood and visitors' perceptions of the settings. Overall, the predictions of the Mindfulness/Mindlessness Model as set out in Table 5.1, were supported by the data collected. Further, the results suggested that motivation, which can be seen as including reason for visiting, interest in a topic and arousal, is a major determinant of visitors' cognitive state.

CHAPTER 6

Psychologists in Museums: Summary, Conclusions and Future Developments

Above all, remember me, the user of your museum, because I am your god and your friend, and your bread and butter. Remember me, and teach me, and entertain me, and learn who I am.

(Morris, 1983, p. 18.)

6.1 Summary of the Research Programme and Results

This thesis began by describing in its first chapter the history of psychological research in museums, commencing with Sir Francis Galton's work in the late Nineteenth century. In the early years of this century in the United States several prominent psychologists, led by Robinson, were involved in major research programmes in museums with the dual aims of improving psychology through the collection of data in non-laboratory settings, and improving the quality of life, specifically in the area of leisure pursuits, through the application of methods and concepts from psychology to the design of these non-laboratory settings. The research programme reported in this thesis was conceived with these same dual aims. In the present instance the aims were more specific in that the research was guided by a particular conceptual model developed from Ellen Langer's work in social cognition on mindful and mindless functioning.

These concepts and the model developed from them were described in detail in Chapter One and summarised in a diagram reproduced in Figure 6.1. A series of predictions was then this Mindfulness/Mindlessness Model of

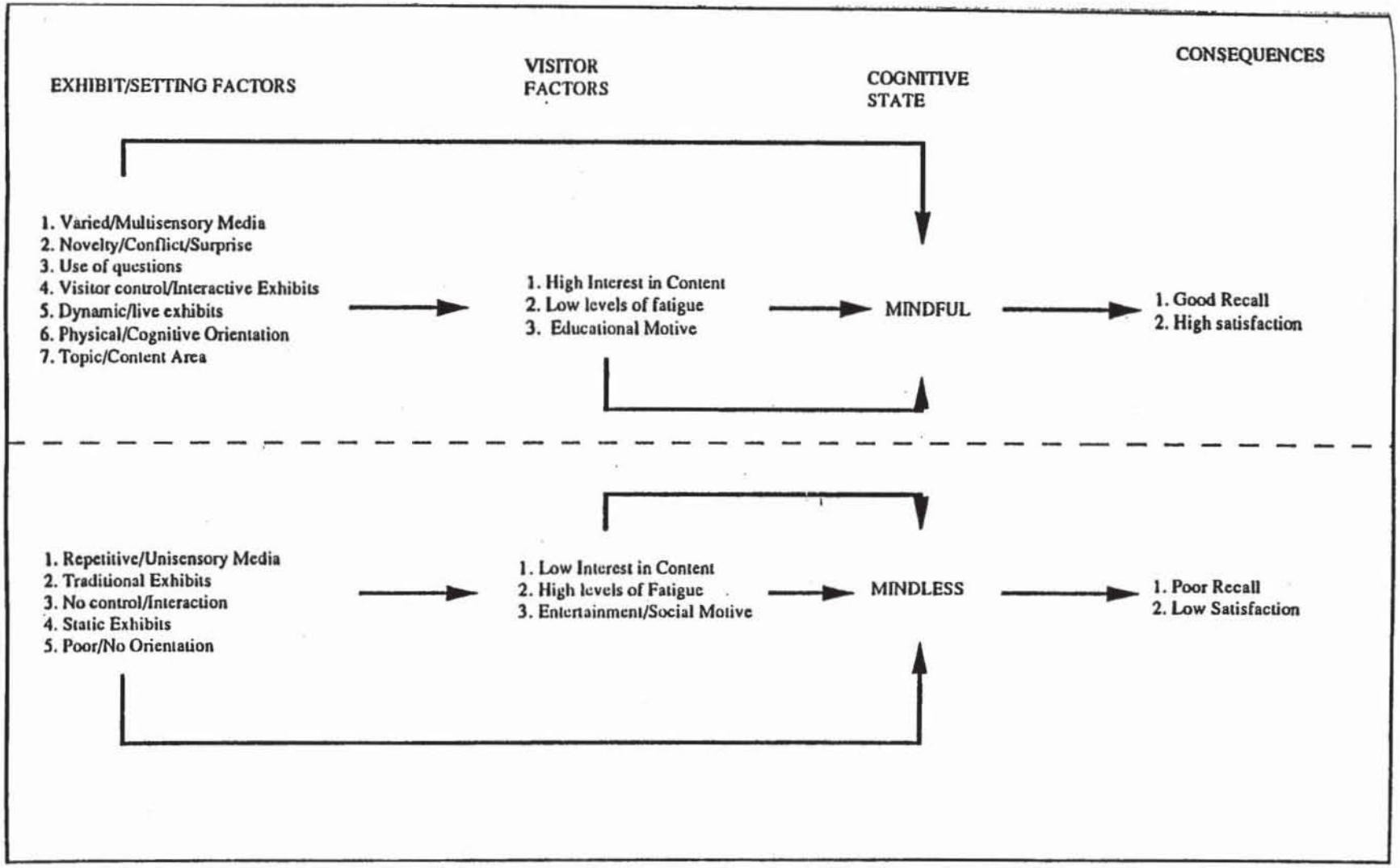

Figure 6.1: Mindfulness/Mindlessness Model of Museum Visitor Behaviour and Cognition

Museum Visitor Behaviour and Cognition (summarised in Table 6.1). It was also proposed that there existed other variables which could be related to mindfulness/mindlessness, but which had not been discussed or studied in sufficient detail to develop predictions about the nature of the relationships. These variables were motivation, familiarity with museums and affect. The research programme then set out to test the specific predictions and to explore the relationships between mindfulness and motivation, familiarity with museums and affect. The research programme involved a review of existing research results and original research conducted in two Australian museums.

As a preface and addition to these analyses a study was conducted eliciting emic descriptions of museum visits. The concept of scripts, a schema based concept setting out sequences of actions for social situations, is an important one in Langer's conceptualisation of mindless behaviour. The study reported in Chapter Three took the concept of a script and examined the emic descriptions in order to determine the key elements or actions involved in a museum visit. The results were consistent with conclusions drawn from previous research on museum visitors suggesting that visitors follow a routine of walking through a museum, looking briefly at exhibits before leaving. The basic script in the descriptions elicited in the present study was one of arrive, look at exhibits and leave, with few visitors including in their descriptions any suggestions of thinking, learning or processing the information available in the setting. The data collected in this study also provided an opportunity to examine the relationships set out in the Mindfulness Model and the results of these analyses will be discussed in detail in the following sections.

Table 6.1

Summary of Predictions Derived From the Mindfulness/Mindlessness Model of Museum Visitor Behaviour and Cognition.

Any exhibit which differs in some way from traditional museum exhibits will be likely to induce mindfulness. Interactive/participatory exhibits which give visitors control over the type and amount of information they receive, dynamic or living exhibits, and exhibits with features which are extreme in size, colour or sound will all be more likely than traditional exhibits to induce mindfulness. The more participation and control that visitors have, the more likely it is that visitors will be mindful. In terms of attracting and holding power, preference ratings and measures of learning, the model predicts that the greatest difference will lie between traditional/expected exhibits and any change in an exhibit, with increasing participation and control reflected in increases in these measures.
Repetition of exhibit media or structure will induce mindlessness.
Effective physical and cognitive orientation systems will enhance learning in mindful visitors.
Visitors who have a personal interest in a topic area will be more likely to be mindful than other visitors.
Visitors with high levels of fatigue should be less likely to be mindful than other visitors.
Arousal should be related to mindfulness/mindlessness with moderate to high levels of arousal resulting in mindfulness and low levels of arousal resulting in mindlessness.
Visitors who perceive exhibits to surprising, novel or different to their expectations will be more likely to be mindful than other visitors.
Mindful visitors should learn or remember more from exhibits and be more satisfied with their experiences than mindless visitors.

6.1.1 The specific predictions

Any exhibit which differs in some way from traditional museum exhibits will be likely to induce mindfulness. Interactive/participatory exhibits which give visitors control over the type and amount of information they receive, dynamic or living exhibits, and exhibits with features which are extreme in size, colour or sound will all be more likely than traditional exhibits to induce mindfulness. The more participation and control that visitors have, the more likely it is that visitors will be mindful. In terms of attracting and holding power, preference ratings and measures of learning, the model predicts that the greatest difference will lie between traditional/expected exhibits and any change in an exhibit, with increasing participation and control reflected in increases in these measures. Repetition of exhibit media or structure will induce mindlessness.

The Mindfulness Model stresses that it is any change away from the expected, any novelty or unfamiliarity in settings which is most likely to produce mindfulness. Examination of a large set of studies which compared different types of exhibits (See Tables 2.5 and 2.6) found support for these predictions. Most of the reviewed studies which investigated different exhibit conditions, found the greatest difference on dependent measures lay between the traditional exhibits and exhibits with any change away from that format. These results also indicated that increased opportunities for visitor participation and control were associated with increased scores on dependent measures. The accompanying prediction that repetition in museums is likely to result in mindlessness was also supported by the results of several studies.

The results of the scripts study were also supportive of these predictions. The major conclusion from this study was that many visitors were likely to be mindless in museums settings. The study also found that few visitors reported or described the presence of audiovisual or interactive exhibits suggesting that the participants' experiences, or images, of museums were most likely to be of traditional, static, repetitive exhibits. These results are consistent with the findings of Prince's (1985, 1990) studies of perceptions of museums.

The observation studies conducted at the Semaphore to Satellite exhibition and in the Gallipoli and Sinai and Palestine galleries of the Australian War Memorial (reported in Chapter Four) also provided evidence consistent with the Mindfulness Model's predictions. In the Semaphore to Satellite studies interactive and audiovisual exhibits had the highest means scores for attracting and holding power and the highest proportions of visitors making comments about the exhibits. The analyses also showed that visitors who encountered interactive exhibits at the beginning of their visit were more likely than visitors who began their visit with traditional exhibits, to spend longer in the setting, stop at more exhibits and become more involved with exhibits. The pattern of results from the observation studies conducted at the Australian War Memorial, while not as clear as that found for the Semaphore to Satellite studies, was generally supportive of the predictions as set out above. The exhibits in the two galleries studies with high holding and attracting power were either much larger than others in the galleries or were different in some way from the other exhibits. Further, exhibits which were repetitive in format had the lowest attracting and holding power.

Effective physical and cognitive orientation systems will enhance learning in mindful visitors.

The importance of orientation, both physical and cognitive, was highlighted in the study of museum scripts. The investigation of differences in the museum visit descriptions provided by participants with different levels of experience found that increased experience with museums was related to increased concern with getting maps and deciding on a plan for the visit. In the case of cognitive orientation, the research review included several studies demonstrating that the use of guides, questions and instructions, all devices for providing cognitive orientation, was effective in terms of attention to, learning from, and satisfaction with exhibitions. There was also some evidence that effective physical orientation was related to mindfulness. Some indirect support for this prediction can also be found in the observations of visitors in the two galleries of the Australian War Memorial. The Gallipoli gallery, which had higher attracting and holding powers for all but one of its exhibits, was designed such that visitors had a clear pathway through the gallery. The Sinai and Palestine gallery, with several entrances and exits and multiple exhibits in the centre of the gallery, did not provide such a pathway and this could have detracted from the attention visitors paid to the exhibits. Further, the most successful exhibits in both galleries were large dioramas of major battles fought during the campaigns. These dioramas could be seen as providing cognitive orientation for the visitors.

Visitors who have a personal interest in a topic area will be more likely to be mindful than other visitors.

Several of the reviewed studies included analyses concerned with visitor interest in exhibit topics or contents and the conclusions drawn from these analyses were consistent with this prediction. It was noted in the discussion of these analyses, however, that interest in a topic could be a result of mindfulness as well as a factor inducing mindfulness and that measuring levels of interest in a topic only after the visitors had experienced an exhibit would not distinguish between these two possibilities. The surveys conducted in the thesis research programme attempted to overcome this problem by asking questions about visitors' interests that were not likely to be influenced immediately by the experience of the exhibit. Thus in the Semaphore to Satellite survey, visitors were asked if they were members of a group with a special interest in the topic displayed, and in the Australian War Memorial studies visitors were asked if they had any personal connections to the campaigns displayed. Both questions were aimed at identifying visitors with an existing personal interest in the exhibit topics. The analyses conducted on the responses to these questions revealed a significant positive relationship between membership of a group with a special interest and mindfulness and between having personal connections to the Gallipoli and Sinai and Palestine campaigns and mindfulness.

Visitors with high levels of fatigue should be less likely to be mindful than other visitors.

Both Australian surveys found that visitors who described themselves as drowsy or tired were more likely to be classified as mindless visitors.

Arousal should be related to mindfulness/mindlessness with moderate to high levels of arousal resulting in mindfulness and low levels of arousal resulting in mindlessness.

Again both Australian surveys found that visitors choosing a word denoting low arousal (according to the Circumplex Model of Affect) to describe how they felt in the setting were more likely to be mindless than other visitors. Further, it was found that the arousal dimension of the Circumplex Model of Affect was a better predictor of mindfulness/mindlessness than the evaluative dimension supporting the importance of arousal in mindfulness.

Visitors who perceive exhibits to surprising, novel or different to their expectations will be more likely to be mindful than other visitors.

The Semaphore to Satellite survey included a question which required visitors to rate the exhibition in terms of how different it was to their expectations. A Mann-Whitney U-test identified a significant difference between the mindful and mindless visitors with mindful visitors having a higher mean score on this scale. The surveys conducted at the Australian War Memorial studied visitor perceptions of the settings in more detail using the rating scales; novel-familiar, simple-complex, dense-sparse, similar-contrasting, usual-surprising, crowded-uncrowded, different to expectations and the exhibits contained surprising information. For all these scales, except usual-surprising and different to expected, the Mindful visitors had higher mean scores, although the differences were not large.

Mindful visitors should learn or remember more from exhibits and be more satisfied with their experiences than mindless visitors.

This prediction was also supported by the two survey studies reported in Chapter Five. In both instances the mindful visitors had higher mean scores on indices of satisfaction and knowledge of exhibit contents. The differences between mindless and mindful visitors in the Semaphore to Satellite survey were statistically significant.

6.1.2 Explorations of familiarity with museums, motivation for the visit and affective responses to exhibits

The three variables, familiarity with a setting, goals or motivation, and affective responses to settings were all identified from the social psychological literature as likely to be related to mindfulness. The literature, however, was either lacking in detail or contradictory about the nature of the these relationships and so no specific predictions were set out for these variables. The examination of previously published visitor studies provided some initial information on the first two of these variables allowing for some tentative predictions to be made. Specifically it seemed that visitors with an educational goal for their visit should be more likely to be mindful than other visitors, and that regular museum visitors (those with greater familiarity with museums) were more likely to have an educational goal for their visit and thus more likely to be mindful than other visitors. Further, an educational goal was identified as being most common for visitors in family groups and this suggested that visitors in family groups should be mindful.

The results of the scripts study were supportive of the first part of this prediction that visitors with an educational goal and regular museum visitors

should be mindful. Increasing experience of museums and stating an educational goal for the visit were both positively related to increasing inclusion of actions such as *read labels* and *think/learn*. The second part of the prediction referring to visitors in family groups was not, however, supported by the results. Visitors in family groups were not more likely than visitors in other groups to report an educational goal or to be mindful.

This pattern of results was also found in the Semaphore to Satellite survey with families not being clearly distinguished from other groups by the reason for their visit. A greater proportion of visitors on their own, however, did state an educational goal for their visit and were mindful. Other analyses of this data set found that females were less likely to give an educational motive for their visit and less likely to be mindful. It was concluded that the reason for a museum visit did influence mindfulness/mindlessness and that it was this variable that explained the relationships found between the demographic variables and mindfulness/mindlessness. Motivation at several levels, that of arousal, of general reasons for a visit and specific personal interests, appears to be an important predictor of a visitor's cognitive state.

The studies conducted at the Australian War Memorial had as a major goal the examination of affective responses to exhibits. It was proposed that the Gallipoli gallery would elicit a greater or more intense affective response from visitors than the Sinai and Palestine gallery and consequently that visitors would be more likely to be mindful in the former setting. The first part of this proposal was supported by the results of a pilot study and the surveys conducted in the galleries. The second part of the proposal was consistent with the results obtained from both the observation and surveys studies. The observation studies found greater attracting and holding power

for the Gallipoli gallery exhibits and the survey studies demonstrated a positive link between mindfulness and indices of affective response to the exhibit content.

6.1.3 Other findings from the analyses

The data collected in the two survey studies reported in Chapter Five were also analysed in an attempt to determine the relative influence of the variables measured on mindfulness/mindlessness. This was done using descriptive discriminant analyses and thus was restricted to those variables measured on either an ordinal or interval scale. In the Semaphore to Satellite study the variables examined were familiarity with museums, satisfaction with the visit, knowledge of exhibit contents, interest in the exhibition topic, ratings of how different the exhibits were to expectations, and reported time spent in the exhibition. The analysis found that these variables were significantly related to mindfulness/mindlessness and that the most important variables in distinguishing between mindful and mindless visitors were satisfaction with the visit, familiarity with museums and level of interest in the exhibition topic.

In the Australian War Memorial study a descriptive discriminant analysis found that the following variables in decreasing order of importance, interest in the exhibition topic, satisfaction with the visit, rating of the exhibits as usual-surprising, affective response to the exhibits and knowledge of the exhibit contents, were together significantly related to mindfulness/ mindlessness. In both analyses satisfaction and interest in the exhibition topic were important variables, which is consistent with both other results of the research and the Mindfulness Model.

6.1.4 Methodological issues

In the previous discussions of the results of the research programme several limitations to the analyses were described. In the case of the discriminant analyses it was noted that only a subset of the variables studied could be included in these analyses because of differences in the levels of measurement. While it could be suggested that this problem could be overcome by exploring alternative measures for some variables it is difficult to imagine a valid interval level measure of variables such as reason for the visit. Further, the Mindfulness Model suggests that certain variables precede mindfulness/mindlessness and that other variables result from mindfulness/mindlessness. In this sense the model resembles a causal model and this would seem to suggest that some sort of path or regression analysis might be more appropriate than discriminant analysis for any investigation of the data. The use of such analyses, however, assumes an interval level dependent variable and mindfulness and mindlessness were conceptualised as two qualitatively different states in accordance with Langer's descriptions.

Another major set of methodological issues raised was the problem of reactivity. That is, it is difficult to conduct pre- and post-visit surveys with the same samples because the procedure of asking an individual about their cognitive state and about exhibits is very likely to make them mindful. Thus it was difficult to determine whether variables such as interest in a topic was a cause or an effect of mindfulness. An attempt was made to overcome this problem by using several different measures of interest in a topic and in the Australian War Memorial study by surveying visitors at several points in the galleries. This procedure was only partially successful because ti relied on visitors to volunteer to complete the surveys and the results indicated that these volunteers were likely to be mindful visitors. As all survey or interview

techniques rely upon visitor cooperation, all will be subject to this problem to some extent. The value of conducting observation studies is highlighted here as such studies allow for more systematic sampling of all visitors.

In terms of conducting evaluation research it could be argued that the measurement of mindfulness/mindlessness is not important as it is the outcomes of mindfulness, learning and satisfaction, that are of most interest to museum professionals. The major problem with this argument is that it assumes that mindfulness automatically results in learning and satisfaction. The Mindfulness Model stresses, however, that mindfulness is a necessary but not sufficient condition for learning and satisfaction. It is possible that mindful visitors to learn little or to remember incorrect information because of problems with the exhibits. McManus (1990b), for example, presents evidence of visitors reading and processing information in exhibit labels, yet drawing incorrect conclusions. It is suggested that mindful visitors who are dissatisfied with their experience and/or who learn little from their experience are a critical group for evaluation studies. their perceptions should point to problems with exhibits.

6.2 Conclusions of the Research Programme

Taken as a whole the research results reported in the various sections of this thesis support the predictions derived from the Mindfulness/Mindlessness Model of Museum Visitor Behaviour and Cognition as set out in Figure 6.1. The research also explored several additional variables and the results suggested various modifications to the model which are set out in Figure 6.2. This figure also highlights the relative importance of variables as suggested by the discriminant analyses.

The model can be considered as a valuable tool for museum professionals. It sets out principles to guide the design of museum settings and a theoretical framework for evaluating exhibitions. The research programme also extended the understanding of mindfulness/mindlessness. Research in this applied domain found that the affective tone of a setting can influence an individual's cognitive state and reinforced the importance of motivation and personal relevance for mindfulness.

6.3 Mindfulness and Museums: Future Directions

6.3.1 Some future directions for museums

The most easily identified future direction for museums is that of increasing use of computers and related technology in interactive exhibits. In a recent issue of the ILVS Review several papers were devoted to discussions of such exhibits (Driscoll, 1990; Mintz, 1990; Screven, 1990b; Whitney, 1990; Worts, 1990). Such technology has the potential to provide visitors with control over the information that they receive and thus allows them to choose according to their interests (Borun, 1983; Coates, 1984; Diamond, Smith & Hirumi, 1989; Driscoll, 1990; Mintz, 1990; Screven, 1990b; Taylor, 1983). According to the Mindfulness Model such exhibits should be effective in producing mindful visitors and the existing evidence supports this proposal (Diamond, Smith & Hirumi, 1989; Hayward, 1988; Hilke, Hennings & Springuel, 1988; Moscardo, 1989; Worts, 1990). Two points, however,

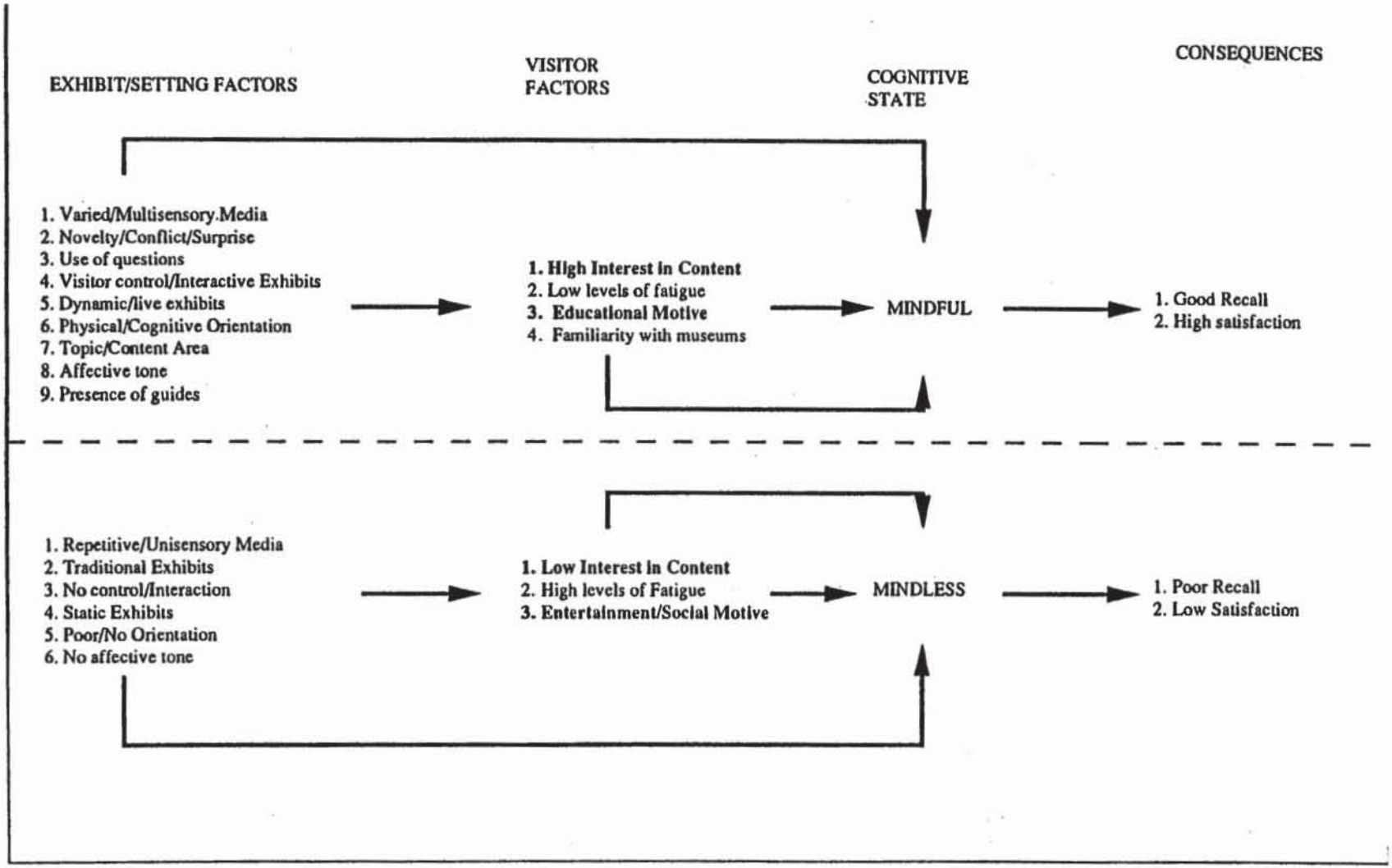

Figure 6.2: Revised Mindfulness/Mindlessness Model of Museum Visitor Behaviour and Cognition

need to be stressed. Firstly, it is control and the opportunity to choose personally relevant information that results in mindfulness rather than the technology of the exhibit. That is, computer exhibits, such as games, which do not allow for visitor control may not be successful exhibits (Moscardo, 1989). Secondly, the existing research has all been conducted in settings in which the computer exhibits studied were the exception rather than the rule. It could be argued that their effectiveness is at least partly due to their novelty. Increasing use of computers as exhibits may be associated with decreased effectiveness. The importance of variety of experience should not be forgotten.

6.3.2 Some future directions for mindfulness

The Mindfulness Model described and discussed in the present thesis focussed on exhibits in museums. The review of existing visitor research in Chapter Two included some studies of guided tours and interpretive trails and the discussion of theoretical approaches to understanding visitors in this chapter pointed out the similarities between mindfulness and Csikzentmihalyi's flow experiences in leisure settings. It can be proposed that the Mindfulness Model can be applied to other communication techniques and other leisure settings. Figure 6.3 provides an example of an adaptation of the model for interpretive trails. Each demonstrates the value of the Mindfulness Model for providing specific guidelines for the design of better experiences.

Both Cszikzentmihalyi and Langer also discuss the importance of improving work experiences and settings and there are lessons for museum management in this literature. Langer (1989a) has developed training programmes to encourage mindfulness in work and formal educational

settings. In these programmes mindfulness is encouraged by role play, where the participants have to think about a situation from a series of different perspectives, and by thinking conditionally, where information is presented as a series of possibilities. Recent research by the author has found that such techniques can be effective in enhancing problem solving (Moscardo, 1991). In this study the participants were students in a tourism management course and the problem content was that of designing tours in various regions for disabled visitors. As several authors have noted that a major obstacle to effective exhibit design is the lack of understanding of visitors by museum professionals (Alter & Alter, 1988; Chambers, 1990; McManus, 1990a; Screven, 1990a), the potential value of specific mindfulness training programmes for museum managers is clear. It could be further argued that one critical component in such programmes would the involvement of museum managers in evaluation research which provides the best insight into visitor perspectives.

This thesis began with a quote from Robinson in which he claimed that the solution to problems of museum design could only be found through psychological investigation. This thesis was based upon this premiss and it is hoped that the Mindfulness Model may be seen as a major step along the road towards Robinson's suggested destination.

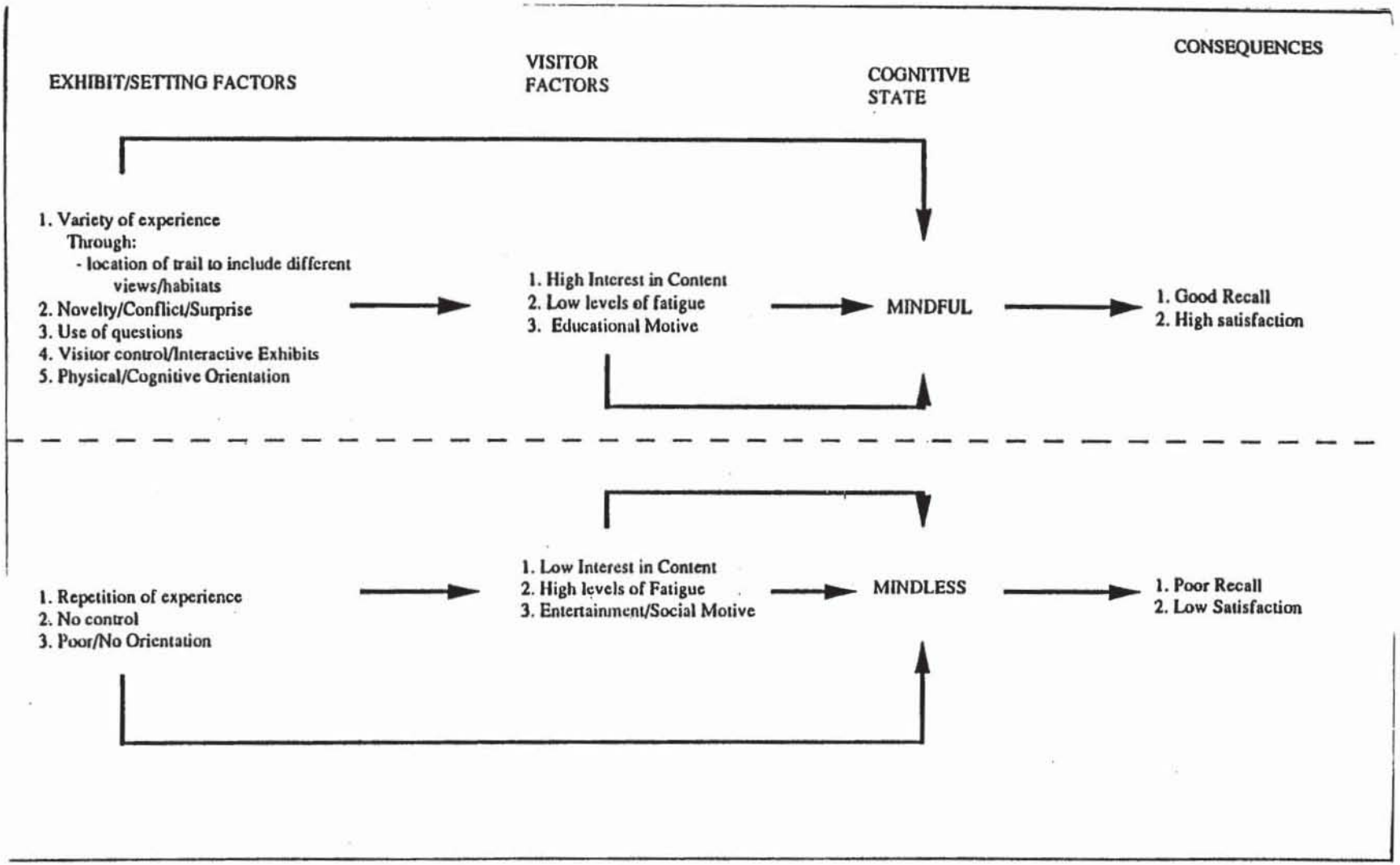

Figure 6.3: Mindfulness/Mindlessness Model Adapted for Interpretive Trails

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APPENDICES

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APPENDIX A: DATA COLLECTION INSTRUMENTS

A1 Survey Form for Museum Scripts Study

A SCRIPT FOR VISITING A MUSEUM

Please imagine for a minute that you are visiting a museum. When you have thought about this visit for a few minutes I would like you to briefly outline a "script" for the visit that could be used by someone else to visit a museum.

What is the major reason for the visit (e.g., learning, having fun, enjoying an activity with a friend, relaxing)?

_____

Who would you be visiting with?

_____

How long is the visit?

_____

What do you do (in the correct order please)?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

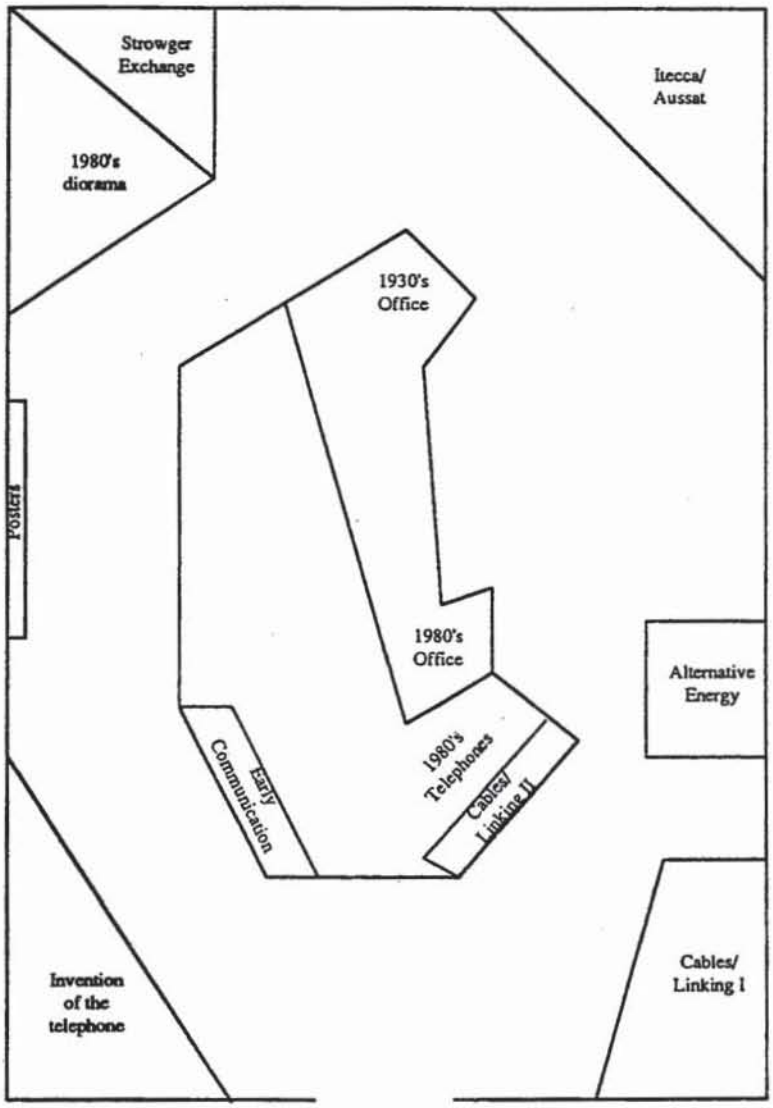
Thank you, and now just a few details for comparisons.

Your age_____ sex_____ occupation_____

Have you ever visited a museum?_____. If yes, how many times?_____

A2: Tracking Observations Recording Sheet - Semaphore to Satellite Exhibition

Date:_____ Time Entered:_____ Time Left:_____



Sex:_____

Age:_____

Size of Group:_____

A3: Exhibit Targetted Observations Recording Sheets - Semaphore to Satellite Exhibition

Exhibit Name: **Date:** **Time:**

Sex	Age	Group size	Time	Touch	Interact	Comment

A4: Survey Form for Pilot Study on Familiarity With, and Importance of, Gallipoli and Sinai and Palestine Campaigns

Australian Military History Survey: Pilot

The Australian Defence Forces have been involved in many military campaigns during both World Wars. I am currently involved in a project concerned with the levels of awareness amongst the public of this aspect of Australia's history. Could you please answer the following questions about what you know and think about some of these campaigns. Please remember there are no right or wrong answers, only your opinions.

1. Could you please rank the following campaigns according to how much you feel you know about them? Place a number from 1, for the one that you know the most about, to 6, for the one that you know the least about, in the spaces provided.

_____ **Tobruk/Northern Africa**

_____ **New Guinea**

_____ **Sinai & Palestine**

_____ **France/Western Front**

_____ **Gallipoli**

_____ **Crete**

2. Now could you rank them again according to how important you think they were in Australia's history, where 1 indicates that you think the campaign was the most important in Australian history and 6 indicates that you think the campaign was the least important in Australian history.

_____ **Tobruk/Northern Africa**

_____ **New Guinea**

_____ **Sinai & Palestine**

_____ **France/Western Front**

_____ **Gallipoli**

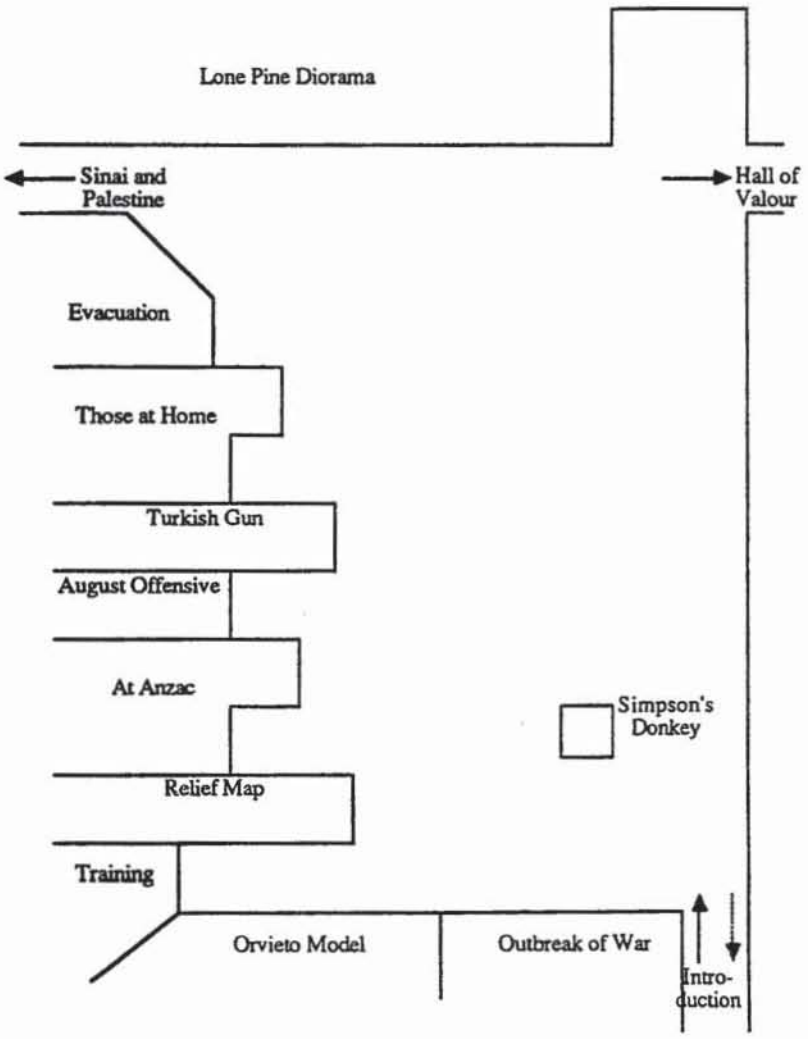
_____ **Crete**

Thank you

Gianna Moscardo

A5: Tracking Observations Recording Sheet - Gallipoli Gallery, Australian War Memorial

Date:_____ Time Entered:_____ Time Left:_____



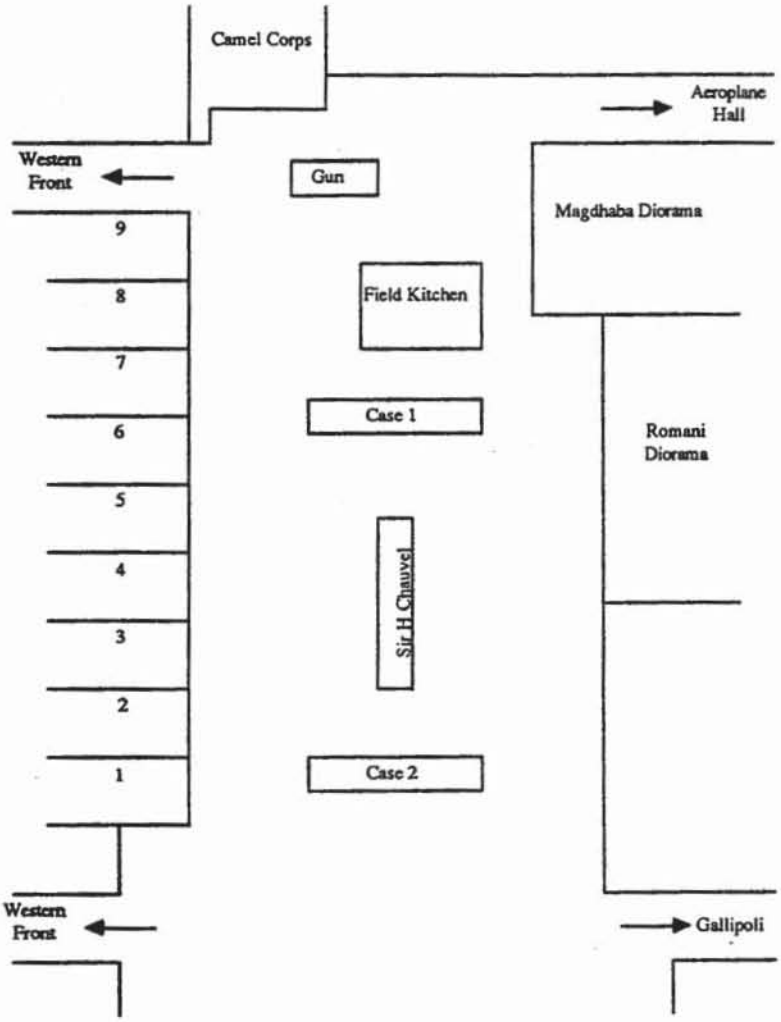
Sex:_____

Age:_____

Size of Group:_____

A6: Tracking Observations Recording Sheet - Sinai and Palestine Gallery, Australian War Memorial

Date:_____ Time Entered:_____ Time Left:_____



Sex:_____

Age:_____

Size of Group:_____

A7: Exhibit Targetted Observations Recording Sheets - Both Galleries, Australian War Memorial

Exhibit Name:	**Date:**	**Time:**

Sex	Age	Group size	Time

APPENDIX B: PILOT STUDY TO SELECT ADJECTIVES TO DESCRIBE AFFECTIVE RESPONSES MILITARY CAMPAIGNS

Table B1

List of All Adjectives Chosen by at Least One Respondent and Frequency of Choice

Adjectives	No. of Respondents Choosing Adjective	Adjectives	No. of Respondents Choosing Adjective
* Troubled	15	Hopeless	5
* Thoughtful	14	Disappointed	5
* Regretful	13	Low	5
* Respectful	12	Reverent	5
* Sympathetic	12	Alive	4
* Worried	11	Inspired	4
* Sad	10	Outraged	4
* Honoured	10	Pessimistic	4
* Despair	10	Alone	3
* Afraid	8	Alive	3
* Angry	8	Defiant	3
* Grateful	8	Offended	3
Upset	7	Glad	3
Proud	7	Calm	1
Shocked	7	Indifferent	1
Helpless	7	Ashamed	1
Grief	6	Contempt	1
Gloomy	5	Forlorn	1

* Adjectives used in survey.

APPENDIX C: ADDITIONAL ANALYSES FOR OBSERVATIONS IN AUSTRALIAN MUSEUMS (CHAPTER FOUR)

Table C1

Rank Orders of Measures of Holding Power - Semaphore to Satellite Exhibition

	Rank Order for				
Exhibit	**Mean**	**Median**	**Mode**	**Range***	**Mean Rank****
Early Communication	8	7	5.5	3	5.87
Invention of the Telephone	3	4	10.5	2	4.87
Advertising Posters	6	8	10.5	5	7.37
1880s Exchange Diorama	9	11	7	9	9.00
Strowger Exchange	1	1	2	1	1.25
Aussat/Iterra	2	6	3.5	4	3.87
1930s Office	10	10	8.5	10	9.62
1980s Office	11	9	12	12	11.00
1980s Telephones	12	12	8.5	11	10.87
Alternative Energies	4	2	3.5	8	4.37
Cables/Linking	7	5	5.5	6	5.87
Cables/Optical Fibres	5	3	1	7	4.00

* The longest time spent was used to determine rank order.

** Calculated using the ranks for mean, median, mode and range.

Spearman Rho Rank Order Correlations (corrected for ties).

Mean with Median = 0.853

Mean with Mode = 0.563

Mean with Range = 0.811

Mean with Mean Rank = -0.942

Table C2

Rank Orders of Measures of Holding Power - Australian War Memorial Galleries

A. Gallipoli Gallery

	Rank Orders				
Exhibit	**Mean**	**Median**	**Mode**	**Range**	**Mean Rank**
Outbreak of War	9	9	10.5	10	9.62
Orvieto Model	10	10	8.5	9	9.37
Training	3	4	7	5	4.75
Relief Map	6	5	8.5	3	5.62
At Anzac	2	2	2	2	2.00
Turkish Gun	7	6	4	8	6.25
August Offensive	8	8	6	6	7.00
Those at Home	4	3	3	7	4.25
Lone Pine Diorama	1	1	1	1	1.00
Simpson's Donkey	11	11	10.5	11	10.90

Spearman Rho Rank Order Correlations (corrected for ties).

Mean with Median = 0.964

Mean with Mode = 0.813

Mean with Range = 0.864

Mean with Mean Rank = -0.982

Table C2 cont.

B. Sinai and Palestine Gallery

Exhibit	Rank Orders			
	Mean	Median	Range	Mean Rank
Small Diorama 1	7	7	7	7.00
2	11	10	12	11.00
3	9	11	10	10.00
4	12	14	11	12.33
5	14	12	8	11.33
6	15	13	9	12.33
7	10	8	13	10.33
8	17	16	17	16.67
9	8	9	14	10.33
Camel Corps	5	3	5	4.33
Gun	13	15	15	14.33
Field Kitchen	16	17	16	16.33
Magdhaba Diorama	2	2	2	2.00
Romani Diorama	3	4	4	3.67
Case 1	6	5	6	5.67
Sir H. Chauvel	1	1	1	1
Case 2	4	6	3	4.33

Spearman Rho Rank Order Correlations (corrected for ties).

Mean with Median = 0.954

Mean with Range = 0.836

Mean with Mean Rank = -0.976

Note: The modes were excluded from these analyses because of the large number of ties.

Table C3

Crosstabulation of Exhibit Variables, Media by Topic - Semaphore to Satellite Exhibition

			Media				
		n Row % Column %	Static	Diorama	Audio-visual	Inter-active	Total
Topic	History		2 33.3 50.0	3 50.0 100.0	1 16.7 50.0	0 0.0 0.0	6
	Science		0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	3 100.0 100.0	3
	Technology		2 66.7 50.0	0 0.0 0.0	1 33.3 50.0	0 0.0 0.0	3
	Total		4	3	2	3	12

Chi-square = 15.0, df = 6, $p < 0.05$.

Table C4

Crosstabulation of Exhibit Variables, Media by Strategy - Semaphore to Satellite Exhibition

		Media				
	n / Row % / Column %	Static	Diorama	Audio-visual	Inter-active	Total
Topic	Story	1 16.7 25.0	3 50.0 100.0	2 33.3 100.0	0 0.0 0.0	6
	Cause and Effect	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	3 100.0 100.0	3
	Facts and Identification	3 100.0 75.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	3
	Total	4	3	2	3	12

Chi-square = 19.5, df = 6, $p < 0.05$.

Table C5

Crosstabulation of Exhibit Variables, Topic by Strategy - Semaphore to Satellite Exhibition

		Topic			
	n Row % Column %	History	Science	Technology	Total
Strategy	Story	5 83.3 83.3	0 0.0 0.0	1 16.7 33.3	6
	Cause & Effect	0 0.0 0.0	3 100.0 100.0	0 0.0 0.0	3
	Facts & Identification	1 33.3 16.7	0 0.0 0.0	2 66.7 66.7	3
	Total	6	3	3	12

Chi-square = 15.0, df = 4, $p < 0.05$.

Table C6

Crosstabulation of Age by Attracting Power (Measure 2) - Gallipoli Gallery, Australian War Memorial

	n Row % Column %	Age <30	 31-50	 >50	Total
	Outbreak of War	12 30.8 7.3	14 35.9 8.3	13 33.3 10.3	39
	Orvieto Model	3 7.1 1.8	17 40.5 10.1	22 52.4 17.5	42
	Training	8 20.0 4.9	14 35.0 8.3	18 45.0 14.3	40
	Relief Map	17 40.5 10.4	13 31.0 7.7	12 28.6 9.5	42
EXHIBITS	**At Anzac**	10 25.0 6.1	18 45.0 10.7	12 30.0 9.5	40
	Turkish Gun	15 31.9 9.1	19 40.4 11.3	13 27.7 10.3	47
	August Offensive	31 68.9 18.9	12 26.7 7.1	2 4.4 1.6	45
	Those at Home	22 53.7 13.4	12 29.3 7.1	7 17.1 5.6	41
	Evacuation	19 47.4 11.6	17 42.5 10.1	4 10.0 3.2	40
	Lone Pine Diorama	13 31.0 7.9	14 33.3 8.3	15 35.7 11.9	42
	Simpson's Donkey	14 35.0 8.5	18 45.0 10.7	8 20.0 6.3	40
	Total	164	168	126	458

Table C7

Crosstabulation of Sex by Attracting Power (Measure 2) - Sinai and Palestine Gallery, Australian War Memorial

		Sex		
	n / Row % / Column %	Male	Female	Total
EXHIBITS	Small Diorama 1	23 57.5 5.9	17 42.5 5.7	40
	2	26 66.7 6.6	13 33.3 4.4	39
	3	19 47.5 4.9	21 52.5 7.0	40
	4	15 35.7 3.8	27 64.3 9.1	42
	5	17 41.5 4.3	24 58.5 8.1	41
	6	20 50.0 5.1	20 50.0 6.7	40
	7	20 48.8 5.1	21 51.2 7.0	41
	8	23 56.1 5.9	18 43.9 6.0	41
	9	23 56.1 5.9	18 43.9 6.0	41
	Camel Corps	22 53.7 5.6	19 46.3 6.4	41
	Gun	23 57.5 5.9	17 42.5 5.7	40
	Field Kitchen	24 58.5 6.1	17 41.5 5.7	41
	Magdhaba Diorama	26 63.4 6.6	15 36.6 5.0	41
	Romani Diorama	33 80.5 8.4	8 19.5 2.7	41
	Case 1	22 55.0 5.6	18 45.0 6.0	40
	Sir H. Chauvel	29 72.5 7.4	11 27.5 3.7	40
	Case 2	26 65.0 6.6	14 35.0 4.7	40
	TOTAL	391	298	689

Table C8

Crosstabulation of Age by Attracting Power (Measure 2) - Sinai and Palestine Gallery, Australian War Memorial

	n / Row % / Column %	AGE ≤30	31-50	≥50	Total
EXHIBITS	Small Diorama 1	23 47.5 6.6	11 27.5 4.8	10 25.0 5.8	40
	2	19 47.5 6.6	12 30.0 5.3	9 22.5 5.2	40
	3	22 55.0 7.6	13 32.5 5.7	5 12.5 2.9	40
	4	16 38.1 5.5	22 52.4 9.6	4 9.5 2.3	42
	5	19 46.3 6.6	19 46.3 8.3	3 7.3 1.7	41
	6	18 45.0 6.2	12 30.0 5.3	10 25.0 5.8	40
	7	13 31.7 4.5	15 36.6 6.6	13 31.7 7.6	41
	8	26 63.4 9.0	8 19.5 3.5	7 17.1 4.1	41
	9	24 58.5 8.3	9 22.0 3.9	8 19.5 4.7	41
	Camel Corps	17 41.5 5.9	18 43.9 7.9	6 14.6 3.5	41
	Gun	12 30.0 4.1	11 27.5 4.8	17 42.5 9.9	40
	Field Kitchen	7 17.1 2.4	10 24.4 4.4	24 58.5 14.0	41
	Magdhaba Diorama	9 22.0 3.1	11 26.8 4.8	21 51.2 12.2	41
	Romani Diorama	23 56.1 7.9	12 29.3 5.3	6 14.6 3.5	41
	Case 1	12 30.0 4.1	12 30.0 5.3	16 40.0 9.3	40
	Sir H. Chauvel	17 42.5 5.9	18 45.0 7.9	5 12.5 2.9	40
	Case 2	17 42.5 5.9	15 37.5 6.6	8 20.0 4.7	40
	TOTAL	290	228	172	690

Table C9

Crosstabulation of Type of Visiting Group with Attracting Power (Measure 2) - Sinai and Palestine Gallery, Australian War Memorial

		GROUP			
	n Row % Column %	Alone	Couples	Groups	Total
EXHIBITS	Small Diorama 1	8 20.0 4.9	22 55.0 6.3	10 25.0 5.6	40
	2	9 22.5 5.5	20 50.0 5.8	11 27.5 6.1	40
	3	6 15.0 3.7	20 50.0 5.8	14 35.0 7.8	40
	4	8 19.0 4.9	20 47.6 5.8	14 33.3 7.8	42
	5	8 19.5 4.9	18 43.9 5.2	15 36.6 8.3	41
	6	7 17.5 4.3	16 40.0 4.6	17 42.5 9.4	40
	7	4 9.8 2.5	20 48.8 5.8	17 41.5 9.4	41
	8	9 22.0 5.5	18 43.9 5.2	14 34.1 7.8	41
	9	9 22.0 5.5	23 56.1 6.6	9 22.0 5.0	41
	Camel Corps	12 29.3 7.4	25 61.0 7.2	4 9.8 2.2	41
	Gun	14 35.0 8.6	18 45.0 5.2	8 20.0 4.4	40
	Field Kitchen	9 22.0 5.5	22 53.7 6.3	10 24.4 5.6	41
	Magdhaba Diorama	11 26.8 6.7	21 51.2 6.1	9 22.0 5.0	41
	Romani Diorama	15 36.6 9.2	15 36.6 4.3	11 26.8 6.1	41
	Case 1	14 35.0 8.6	25 62.5 7.2	1 2.5 0.6	40
	Sir H. Chauvel	8 20.0 4.9	24 60.0 6.9	8 20.0 4.4	40
	Case 2	12 30.0 7.4	20 50.0 5.8	8 20.0 4.4	40
	TOTAL	163	347	180	690

APPENDIX D: ADDITIONAL ANALYSES FOR SURVEYS IN AUSTRALIAN MUSEUMS (CHAPTER FIVE)

Table D1

Summary of Selected Survey/Interview Studies Examining Exhibit Setting Factors. (Further details of these studies are available in Table 2.5.)

Authors (Date)	Exhibit/Setting Factors Studied	Visitor Characteristics Analysed (for survey/interview data only)	Dependent Measures (From surveys and interviews only)
1. Birney (1988)	Visitors using a participatory exhibit which simulates bird wing movement were compared to visitors to the exhibit area prior to the installation of the participatory exhibit.	Age of children in 5 year categories from 4 to 15 years. Sex.	1. Asked children to demonstrate how birds move their wings when they fly. 2. Asked children if they knew what the exhibit was about.
2. Blud (1990)	Compared adult-child dyads at 1. a Static exhibit 2. a Push-button exhibit 3. an Interactive exhibit.	Sex of child. Sex of adult. Children vs adults.	Eight questions on exhibit contents, e.g. Do all the gear wheels go round at the same speed?
3. Borun (1977)	1. Visitors using a questions game, quiz sheet or brochure which highlighted exhibits were compared to visitors using no handouts.	Age. Educational level. Occupation. Number of visits to the museum.	1. Enjoyment of the visit. 2. Attitudes towards science. 3. Multiple choice quiz questions on exhibit contents.
	2. Short survey of visitors in different halls.	None.	Asked visitors if they liked/disliked exhibits.
4. Brockmeyer, Bowman & Mullins (1982)	Visitors on a sensory hike (guide encouraged visitors to touch, feel & smell objects on hike) were compared to visitors on a non-sensory hike (guide gave verbal presentation.	None.	1. Ratings of enjoyment. 2. Questions on improvements and future repetition of activity. 3. 15 true/false quiz questions.
5. Derwin & Piper (1988)	Several multisensory and participatory exhibits were compared to traditional animal exhibits.	None.	1. Multiple-choice & open-ended questions on information in exhibits. 2. Evaluation of the exhibits on 14 5 point Likert scales, e.g. Boring-interesting, Needs improvement-well done. (Note these were the only two scales reported.)
6. De Waard, Jagmin, Maisto & McNamara (1974)	Compared visitors to the traditional exhibits to visitors who used quiz cards directing attention to the exhibits. 4 types of quiz were used, low versus high levels of information by feedback versus no feedback on questions.	None	12 multiple choice questions on exhibit contents.

cont.

Table D1 cont.

Authors (Date)	Exhibit/Setting Factors Studied	Visitor Characteristics Analysed (for survey/inter-view data only)	Dependent Measures (From surveys and interviews only)
7. Diamond, Smith, & Bond (1988)	Traditional exhibits (objects in cases, text and illustration panels) were compared to objects that could be touched and interactive games.	None.	Preferences for exhibits. Positive features of exhibition.
8. Dowell & McCool (1985)	Compared a slide show, booklet, slide show and booklet to a control group with no information on minimum impact camping.	None.	1. 23 wilderness knowledge questions. 2. 5 point Likert scales on beliefs and attitudes (e.g. I believe people should do whatever they want in wilderness areas) and behavioral intentions (e.g. on my next wilderness camping trip I plan to bury all aluminium and cans).
9. Eason & Linn (1976)	Compared children seeing no exhibits to those using an exploratory booth where they could manipulate objects or participate in an experiment.	None.	1. Multiple choice quiz questions on exhibit contents. 2. Interview assessing ability to use apparatus.
10. Gillies & Wilson (1982)	Compared visitor reactions to 33 exhibits, some traditional and a range of interactive exhibits.	None.	1. Enjoyment of exhibits. 2. Preference for exhibits. 3. Subjective learning.
11. Hilke, Hennings & Springvel (1988)	Visitors to a display with an interactive computer exhibit were compared to visitors to the display when the computer was not on.	None.	1. Time spent in exhibition. 2. Time spent at computer. 3. Recognition of exhibit themes. 4. Ability to recall 3 uses of a laser.
12. Horn (1980)	Two types of guided tours were compared, a traditional tour where guide gives a lecture and an inquiry tour where guide asks visitors questions and encouraged discussion.	None.	Ratings of enjoyment of the tour overall and enjoyment of tour components.
13. Jacobson (1988)	Compared visitors in the following conditions: guided walk, self-guided walk with booklet, self-guided walk with signs along the trail and a control group with no interpretation on the trail.	Language. Residence. Age. Education. Level of interest. Self rating of prior knowledge. Sex. Previous visits.	Multiple choice test of information in interpretive material.

cont.

Table D1 cont.

Authors (Date)	Exhibit/Setting Factors Studied	Visitor Characteristics Analysed (for survey/inter-view data only)	Dependent Measures (From surveys and interviews only)
14. Korn (1988)	Three groups of visitors were studied. Those using a self-guiding brochure, those using a brochure with questions and a control group.	Self rating of prior knowledge. Previous visits. Sex. Age. Occupation. Education.	Test of knowledge of information in brochures.
15. Landay & Bridge (1982)	4 groups were compared: a video display, a video display & wall panel display, a wall panel display, no displays.	Education.	1. 6 item true-false test of knowledge of exhibit contents. 2. 11 point Likert scale of liking for the exhibit. 3. 5 semantic differential scales describing the exhibit.
16. Mallon & Bruce (1982)	Participatory astronomy show where lecturer encourages questions & discussion was compared to traditional lecture only show.	None.	1. 22 questions on the show contents. 2. 20 Likert scale ratings of attitudes towards astronomy.
17. Olson, Bowman & Roth (1984)	Compared visitors in 1. Control group with no education programme. 2. Group using brochure. 3. Group using signs. 4. Group with guides.	Education. Members of conservation group.	Questions on knowledge of, and attitudes towards park management policies and regulations using 7 point Likert scales.
18. Peart (1984)	A single exhibit was systematically changed as follows and visitors to each condition were compared to a control group who did not see the exhibit changes: label only, picture only, object only, object & label, and object, label & sound.	None.	Questions on knowledge of exhibit contents. Questions on attitudes towards birds.
19. Prince (1982)	The following exhibit types were compared: Text only. Text/photographs. Text/photographs/slides. Text/drawings. Text/photographs/ drawings. Text/artefacts/models. Text/photographs/models/artefacts. Text/artefacts/models/ drawings. Text/photographs/models/artefacts/drawings. Text/slides. Sight/sound. Sight only.	Social class. Membership of special group. Familiarity with centres.	1. Recognition of exhibits. 2. Recall of information for exhibits identified as most interesting. 3. Preference for exhibits.

cont.

Table D1 cont.

Authors (Date)	Exhibit/Setting Factors Studied	Visitor Characteristics Analysed (for survey/interview data only)	Dependent Measures (From surveys and interviews only)
20. Screven (1974a, 1974b)	The following conditions were studied: 1. Control group who saw traditional exhibits. 2. Control group who saw traditional exhibits after completing a quiz game. 3. Visitors using an audio cassette which directed attention to exhibit details & asked questions. (Pauses after questions.) 4. Visitors using an audio cassette and a punchboard quiz game. 5. Visitors using an audio cassette without pauses after questions. 6. Visitors using audio cassette without questions. 7. Visitors using card with instructions on how to approach the exhibits. 8. Visitors using a booklet with questions about the exhibits.	None.	12 multiple choice questions on exhibit content.
21. Screven (1975)	The following conditions were studied. 1. Control group who were given a pre-test and then saw the traditional exhibits. 2. Control group who were given a booklet only. 3. Traditional exhibits with labels. 4. Exhibits with labels which include more detailed information. 5. Exhibit with labels with questions. 6. Condition 5 and a punchboard quiz game. 7. Condition 3 and audio-tape - pace set by visitor. 8. Condition 3 and audio-tape - pace set by tape. 9. Condition 8 but no questions on tape. 10. Condition 3 with booklet of questions.	None.	1. Multiple choice questions on exhibit contents.
22. Sneider, Eason & Friedman (1979)	Children in a traditional gallery were compared to children using a participatory exhibit.	Age. Sex.	1. Quiz questions on use of instruments. 2. Ability to use a telescope. 3. Choice of book subjects would like to win.

cont.

Table D1 cont.

Authors (Date)	Exhibit/Setting Factors Studied	Visitor Characteristics Analysed (for survey/inter-view data only)	Dependent Measures (From surveys and interviews only)
23. Washburne & Wagar (1972)	Compared a variety of exhibit types including audiovisuals, models, objects which could be touched, photographs and flatwork.	None.	Choice of most interesting exhibit.
24. White & Barry (1984)	Visitors to traditional animal exhibits were compared to visitors in Herplats area containing interactive and audiovisual objects.	None.	1. Preference for exhibits. 2. Recall of exhibits. 3. Enjoyment of experience.
25. Worts (1989, 1990)	Visitors to traditional gallery were compared to visitors to the gallery after the installation of several interactive displays.	None.	Evaluation of exhibits (no details given).

Table D2

Crosstabulation of Sex by Level of Interest in Exhibition Topic and Reason for Visit - Semaphore to Satellite Exhibition

A. Sex by Level of Interest in Exhibition Topic

	n / Row % / Column %	SEX: Male	SEX: Female	Total
LEVEL OF INTEREST	Not at all Interested	17 44.7 11.7	21 55.3 18.9	38
	Not Particularly Interested	9 39.1 6.2	14 60.9 12.6	23
	Neither	22 59.5 15.2	15 40.5 13.5	37
	Interested	52 62.7 35.9	31 37.3 27.9	83
	Very Interested	45 60.0 31.0	30 40.0 27.0	75
	TOTAL	145	111	256

Chi-square = 6.75, df = 4, $p > 0.05$.

B. Sex by Reason for Visit

		n Row % Column %	SEX Male	Female	Total
REASON FOR VISIT	Knowledge		48 73.8 35.8	17 26.2 16.3	65
	Specific Exhibition		10 38.5 7.5	16 61.5 15.4	26
	Relax		21 56.8 15.7	16 43.2 15.4	37
	Something Different		22 50.0 16.4	22 50.0 21.2	44
	Family Friends		15 62.5 11.2	9 37.5 8.7	24
	Fill in Time		12 48.0 9.0	13 52.0 12.5	25
	Recommended		6 35.3 4.5	11 64.7 10.6	17
	TOTAL		134	104	238

Table D3

Pearson Correlation Matrix for Variables Entered into Discriminant Analysis - Semaphore to Satellite Exhibition

2.	Interest in Topic	0.082				
3.	Satisfaction with Experience	*0.155	*0.370			
4.	Knowledge of Exhibit Contents	*0.127	0.066	0.021		
5.	Time Spent in Exhibition	*0.118	-0.088	*-0.103	0.026	
6.	Rating of Different to Expected	0.071	*0.152	*0.185	0.100	*-0.135
		1. Familiarity with Museums	2	3	4	5

* $p < 0.05$.

Table D4

Results of Mann-Whitney U-Tests for Differences in Ratings of Affect Scales for Two Orders of Presentation - Both Galleries, Australian War Memorial

Scale	Means (SD) Order 1	Order 2	z (corrected for ties)	p
Afraid	1.4 (1.8)	1.7 (2.0)	-1.29	>0.05
Grateful	2.8 (2.4)	2.6 (2.3)	-0.99	>0.05
Thoughtful	3.7 (2.1)	3.8 (2.2)	-0.77	>0.05
Regretful	3.6 (2.3)	3.6 (2.3)	-0.50	>0.05
Honoured	3.1 (2.4)	3.2 (2.3)	-0.09	>0.05
Troubled	2.5 (2.3)	2.4 (2.2)	-0.44	>0.05
Respectful	4.2 (2.1)	4.0 (2.0)	-1.17	>0.05
Angry	3.0 (2.4)	3.0 (2.3)	-0.42	>0.05
Despairing	2.3 (2.3)	2.6 (2.1)	-1.19	>0.05
Worried	1.7 (2.2)	1.9 (2.0)	-0.87	>0.05
Sympathetic	3.9 (2.3)	4.0 (2.1)	-0.06	>0.05
Sad	4.2 (2.1)	4.1 (2.0)	-1.22	>0.05

Table D5

Pearson Correlations Between Setting Descriptive Scales - Both Galleries, Australian War Memorial

Scales	1. Different to expected	2	3	4	5	6	7
2. Novel-Familiar	-0.054						
3. Simple-Complex	0.102	*-0.177					
4. Dense-Sparse	-0.121	*0.404	*-0.201				
5. Similar-Contrasting	0.047	-0.052	0.147	-0.147			
6. Visual-Surprising	0.211	-0.033	*0.194	*0.164	*0.340		
7. Crowded-Uncrowded	0.040	0.097	*-0.192	*0.173	0.030	0.037	
8. Surprising Info.	0.107	*-0.181	-0.037	-0.050	-0.004	*0.293	0.110

* $p < 0.05$

Table D6

Pearson Correlation Matrix For Variables Entered Into Discriminant Analysis - Both Galleries, Australian War Memorial

Variables					
2.	Interest in Topic	*0.243			
3.	Satisfaction with Experience	*0.224	*0.378		
4.	Usual-Surprising	-0.069	*0.153	0.078	
5.	Distress	0.071	*0.245	0.071	0.055
		1. Knowledge of Exhibit Contents	2	3	4

* $p < 0.05$