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Translating the Design of Behaviour Settings for Aboriginal Well-Being

This paper examines the behaviour setting theory developed by the American environmental psychologist Roger Barker between the 1940s and -60s that prescribes how a congruent fit between architectural elements, management controls and user behaviour patterns results in repeated or 'standing' behaviour settings that are predictable phenomena. We explore the history and transfer of international ideas concerned with behaviour settings and more generally with behaviour and environment studies developed in architectural schools on the east coast of Australia in the 1970s, setting the background for a transfer of this theory base to generate an understanding of Australian Aboriginal architecture, one that supports an Indigenous well-being.

While the term 'well-being' is a broadly applied paradigm, it is also highly contested. Contemporary studies focussing on subjective 'well-being' and culture have highlighted a growing recognition of the need to examine broader social relationships, capabilities and culturally specific notions of well-being. More holistic definitions of health have paralleled a growing interest in spiritual and emotional well-being and the positive impacts of natural and built environments. A second theoretical aim of this paper is thus to introduce pieces of 'well-being theory' that are useful for understanding cross-cultural people-environment relations.

The paper outlines how behaviour setting theory has been applied to obtain improved understandings of the culturally appropriate design and management of service delivery environments for remote Australian Aboriginal people; specifically environments which promote a sense of well-being. A case study will be presented drawing from recent Aboriginal setting research in Camooweal, western Queensland. This investigation suggests that the combined concepts of 'behaviour settings' and 'well-being', which encompass cultural, social, emotional, spiritual and environmental relationships, have the potential to add a new and positive perspective on studies and policies concerned with the design of Aboriginal environments.

Introduction

Prior to the publication of *Gunyah, Goondie and Wurley: The Aboriginal Architecture of Australia*, in 2007, Australian architecture was generally considered by historians to have begun in 1788 with the construction of the first British Penal Settlement.¹ The direct transfer (with little translation) of architecture into this country from Europe in the late 18th century supported the colonial project of rendering invisible and overriding the culturally specific people-environment relationships of Indigenous residents which maintained their well-being. The widespread and negative impacts of this change to Indigenous people's lives, including the non-recognition by authorities of cultural beliefs and loss of control over the design and building of living environments, can be understood to have contributed to the on-going contemporary societal challenge in Australia, understood as "The Indigenous living condition problem".²

However, a small number of architects have worked to support Indigenous clients and rediscover the complex, culturally diverse and holistic notions of well-being entwined in Aboriginal built environments. The history of their engagement since the early 1970s, highlights the need to explore a range of theories and methods outside of the architectural profession's conventional traditions. Behaviour setting theory, developed by American psychologist Roger Barker, provides an example of this borrowing of ideas and methods to better analyse Indigenous living environments.

This paper is concerned with documenting the history of uncovering Australian Aboriginal behaviour settings and the significance of developing a cultural design paradigm to create living environments which support Indigenous concepts of well-being. It begins by introducing the early people-environment research in Australia in the 1970s, and an example of the first application of behaviour setting theory. Behaviour setting theory is then discussed in terms of a call to expand existing theories and definitions of architecture so they are inclusive of built environments valued within their own cultural contexts. We then introduce a case study of a modern Aboriginal behaviour setting (the Dungalunji Camp) which is supportive of well-being.

Aboriginal People-Environment Research

People-environment research in Australia became most visible in the early 1970s, with the establishment of the Architectural Psychology Research Unit at the University of Sydney under the leadership of architect Assoc. Prof. Ross Thorne in the Department of Architecture. The Unit included Terry Purcell, a Post Doctoral Fellow with a doctorate in psychology and Rob Hall, a Senior Tutor from the School of Behavioural Sciences, Macquarie University. At this time there existed a perceived need in Australia to improve both knowledge of the social sciences amongst architects and

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- 1 Paul Memmott, *Gunyah, Goondie and Wurley: The Aboriginal Architecture of Australia* (St Lucia: University of Queensland Press, 2007).
 - 2 Lester Thompson, "The Indigenous Living Conditions Problem: 'Need', Policy Construction and Potential for Change" (PhD Thesis, School of Architecture, University of Queensland, 2004).

knowledge about architecture amongst social scientists. The Unit invited Dr David Canter who was running a Master of Environmental Psychology course at the University of Surrey, U. K., to present a short course in Architectural Psychology in Sydney.³ These talks were among the earliest examples of the evolving discipline of environmental psychology (also known as architectural psychology or man-environment systems) in Australia. Other notable and influential American visitors to the Unit included Hans Esser, Claire Cooper, Amos Rapoport, Wolfgang Preiser and Adam Kendon.⁴

Around this time, Amos Rapoport, a Professor of Architecture at the University of Sydney (after lecturing at the University of California, Berkley and the School of Environmental Studies, London University), presented a paper in 1972 in Los Angeles at the third Environmental Design Research Association (EDRA) Conference, entitled "Australian Aborigines and the Definition of Place",⁵ which laid a number of key foundation stones for our current understanding of the culturally distinct nature of Aboriginal place constructs and reaching an expanded audience when re-published in Paul Oliver's book, *Shelter Sign and Symbol*, in 1975.⁶

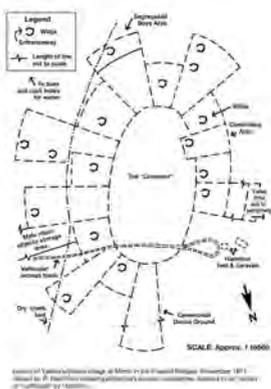


Fig. 1. Layout of Yankuntjatjara village at Mimili in the Everard Ranges, November 1971 (drawn by P. Hamilton) showing domiciliary spaces, sometimes referred to as 'niches' or 'curtilages' by Hamilton.

Peter Hamilton was one of Rapoport's earliest Australian post-graduate students at the University of Sydney who, in the early 1970s, wrote two influential papers based on his fieldwork with the Yangkuntjatjara people in north-western South Australia (1972, 1973)⁷. His seminal "Aspects of

- 3 David Canter, *A Short Course in Architectural Psychology: Proceedings of a Five Day Course*, edited by Architectural Psychology Research Unit (Sydney: Department of Architecture, University of Sydney, 1974).
- 4 Paul Memmott, "Aboriginal People-Environment Research: A Brief Overview of the Last 25 Years," *People and Environment Research* 55-56 (2000): 87-115.
- 5 Amos Rapoport, "Australian Aborigines and the Definition of Place," (paper presented at the 3rd Environmental Design Research Association (EDRA) Conference, Los Angeles, 1972).
- 6 Amos Rapoport, "Australian Aborigines and the Definition of Place," in *Shelter, Sign and Symbol*, ed. Paul Oliver (London: Barrie and Jenkins, 1975), 38-51.
- 7 See Peter Hamilton, "Aspects of Interdependence between Aboriginal Social Behaviour and the Spatial and Physical Environment," in *Aboriginal Housing: A report seminar* (Canberra: Royal Australian Institute of Architects, 1972), 1-13, and Peter Hamilton, "The Environment and Social Stress in a Traditionally Orientated Aboriginal Society," in *25th World Mental Health Congress, Cultures in collision* (Sydney: Department of Architecture, University of Sydney, 1973).

Interdependence between Aboriginal Social Behaviour and the Spatial and Physical Environment”, established part of the current theoretical framework for understanding domiciliary behaviour, spatial behaviours, sensory communication, vernacular architecture and well-being in traditionally orientated Aboriginal camps (fig. 1). The second introduced a quality of lifestyle analysis that was a precursor of the well-being paradigm to come 40 years later.

In 1973, Professor Balwant Saini became Head of the Department of Architecture, University of Queensland, and commenced building a post-graduate school with a research focus on what was then called ‘man-environment studies’. Saini had come from the University of Melbourne where in the 1960s, he had been studying Aboriginal housing as part of his tropical architecture field. He gained the first PhD in Architecture in Australia and wrote the first published scholarly paper on Aboriginal housing.⁸ Saini appointed Peter Bycroft as Lecturer in behaviour-environment studies, which commenced at the University of Queensland in 1976. Bycroft had been a first intake student of David Canter’s Master of Science in Environmental Psychology course at the University of Surrey, graduating in 1974.

The mid-1970s saw the importation of environmental psychology or “man-environment” theory and methods by a number of researchers into the Aboriginal people-environment area. For example, an American ethnologist, Woodrow Denham applied observation techniques amongst the Alyawarr of Central Australia during 1971-72, collecting 200 hours of observation data on domiciliary behaviour. Hamilton was carrying out a concurrent study at Mimili on daily camp architecture. In 1973, the first full-time architecture PhD student at University of Queensland, Paul Memmott,⁹ a contemporary of Bycroft’s, commenced research (under Saini’s supervision) on Aboriginal people-environment relations at the Mornington Island mission in the Gulf of Carpentaria. Memmott’s lifelong research interest in the links between architecture, culture and well-being in Aboriginal Australia had been sparked a year earlier.

“My professional involvement with Aboriginal people began in 1972, as a member of a small group of university students [including Bycroft] who were asked to advise on some Aboriginal architecture projects in Mt Isa and Cloncurry. The research of town camps has been of more than purely scientific or phenomenological relevance; a key premise ... is the importance of vernacular architectural styles in maintaining cultural identity and wellbeing. A knowledge of this is a potentially useful research and design tool, for by acquiring a first-hand understanding of how the Aboriginal people themselves perceive their humpies, and an understanding of everyday feelings and behaviour in relation to the environment, we can distil an appropriate and culturally supportive approach to the design and settlements and housing for these people.”¹⁰

8 Balwant Singh Saini, “Aboriginal Problems: An Architects View,” *Architecture Australia* (October 1967): 783-99.

9 Note that the parts of this paper written about Memmott are drafted by co-author Keys.

10 Memmott, *Gunyah, Goondie and Wurley*, 260.

people and the features and arrangements of physical objects within a setting is called behaviour-environment "synomorphy".¹⁸

Looking for approaches to explore Lardil properties of place, this transactional model of people-environment relations was attractive to Memmott in the early 1970s. In contrast, existing concepts of architectural determinism had argued that built environments directly shaped the behaviour of people within them, ignoring or underestimating the various influences of culture and representing people as passive participants.¹⁹

Behaviour setting theory concerned itself with the interdependencies of environment-behaviour relationships describing standing patterns of behaviour and the physical milieu (physical elements and time), which are supportive of the behaviour and surrounded it. These collective behaviours were considered unique to the setting (extra-individual), rather than just to individuals, and dependent upon the milieu. The physical environment and standing patterns of behaviour were considered to be similar in structure, or synomorphic, in order to create the behaviour setting.²⁰ Memmott's application of the theory was innovative in that he applied behaviour setting theory cross-culturally, in a non-urban setting, and in the case of Lardil dance grounds, to places that had minimal fixed architectural features.

Behaviour setting theory has underpinned a number of research areas to explain the relationships between individuals and the environment including ecological psychology, environment and behaviour studies, behavioural ecology, environmental psychology and sociological social psychology.²¹ Behaviour setting theory developed from an initial emphasis on time and space²² towards a greater focus on behaviour.²³ Barker's early treatment of behaviour setting theory which considered settings as stable unchanging entities was challenged throughout the 1980s, for example by Wicker²⁴ who explored transactions through the lens of change and life-cycle, Stokols

18 Allen Wicker, "Behavior Settings Reconsidered: Temporal Stages, Resources, Internal Dynamics, Context," in *Handbook of Environmental Psychology*, ed. Daniel Stokols and Irwin Altman (New York: Wiley, 1987), 613-53., here 614-5.

19 Karen Franck, "Exorcising the Ghost of Physical Determinism," *Environment and Behavior* 16, no. 4 (1 July, 1984): 411-35.

20 Paul A. Bell, Thomas C. Greene, Jeffery Fisher and Andrew Baum, *Environmental Psychology*. 5th ed. (Mahwah, New Jersey: Lawrence Erlbaum, 2001), 124-25.

21 Lubomir Popov and Ivan Chompalov, "Crossing Over: The Interdisciplinary Meaning of Behavior Setting Theory," *International Journal of Humanities and Social Science* 2, no. 19, Special Issue (October 2012).

22 Roger G. Barker, "On the Nature of Environment," *Journal of Social Sciences* 19, no. 4 (1963): 17-38.

23 Roger G. Barker, "Theory of Behavior Settings," in *Habitats, Environments, and Human Behavior: Studies in Eco-Behavioral Science from the Midwest Psychological Field Station*, ed. R. G. Barker (Stanford, CA: Stanford University Press, 1978), 213-28.

24 Allan Wicker, "Behavior Settings Reconsidered: Temporal Stages, Resources, Internal Dynamics, Context," in *Handbook of Environmental Psychology*, ed. Daniel Stokols and Irwin Altman (New York: Wiley, 1987), 613-53. Allan Wicker, "Making Sense of Environments," in *Person-Environment Psychology: Models and Perspectives*, ed. W. B. Walsh, K. H. Clark and R. H. Price (Hillsdale, NJ: Lawrence Erlbaum Associates, 1992), 158-91.

and Shumaker²⁵ who examined transactions involving the material and symbolic products of human action, and Fuhrer studying setting change over time.²⁶

One of the leading proponents of the people-environment field, Amos Rapoport, related behaviour setting theory to architecture with an emphasis on housing and culture, asserting that architecture is composed of activities, settings and meanings.²⁷ An important argument of Rapoport's work has been to improve the 'fit' between people's beliefs, behaviours and their residential environments, ensuring design is supportive of people's well-being. In his construction of a unified behaviour-environment theory, Rapoport includes 'systems of settings' as a key concept, which he develops through a cross-cultural study of housing, arguing that this is only methodologically feasible through a comparison of the systems of behaviour settings;²⁸ for the correlating set of activities performed in the house of one cultural group may be performed in a set of decentralized settings for another, involving implications for street and neighbourhood design. He goes on to describe "cultural landscapes" as consisting of systems of settings interconnected spatio-temporally in culturally distinct ways, and evolving as part of long-term socio-economic and cultural change processes. Each setting contains fixed, semi-fixed and non-fixed elements including embedded cues communicating the rules which shape lifestyles and activity systems.

More recently, a student of Memmott's, Dr Angela Kreutz, applied Barker's²⁹ (1968) concept of behaviour settings with James Gibson's³⁰ affordance concept to analyse Aboriginal children's use of space and place at Cherbourg, a 'Reserve' community in South-east Queensland, finding that existing planning and design configurations "frustrated rather than facilitated children's needs, aspirations and preferences".³¹ Kreutz used a transactional perspective in her application, based on Wicker's³² extension of behaviour setting theory which focused more on the role of the individual, the life-cycle of the setting and like Rapoport, an acknowledgement of the wider physical, cultural and social contexts. Kreutz's concern with 'perspectival bias' in existing behaviour setting theory led her to examine shared meanings in settings and 'triangulate' objective visual observations with more subjective observations based on interviews with children and adults,³³ which all resulted in planning and design recommendations for children's well-being in the community.

25 Daniel Stokols and Sally Ann Shumaker, "People in Places: A Transactional View of Settings," chap. 22 in *Cognition, Social Behavior and the Environment*, ed. John H. Harvey (Hillsdale, New Jersey: Lawrence Erlbaum, 1981), 441-88.

26 Uhrs Fuhrer, "Bridging the Ecological-Psychological Gap: Behaviour Settings as Interfaces," *Environment and Behaviour* 22 (1990): 518-37.

27 Amos Rapoport, *Culture, Architecture and Design* (Chicago: Locke Science, 2005), 21.

28 Rapoport, *Culture, Architecture and Design*, 20-29.

29 Roger G. Barker, *Ecological Psychology: Concepts and Methods for Studying the Environment of Human Behaviour* (Stanford, CA: Stanford University Press, 1968).

30 James J. Gibson, *The Ecological Approach to Visual Perception* (Boston, MA: Houghton Mifflin, 1979).

31 Angela Susanne Kreutz, "Munu Gukooreree: Aboriginal Children's Use and Experience of Space and Place in Cherbourg" (PhD diss., University of Queensland, 2012), ii.

32 Wicker, "Behavior Settings Reconsidered."

33 Kreutz, "Munu Gukooreree," 117-18.

Behaviour Settings and a Cross-Cultural Theory of Architecture

Memmott's research activities for the last 40 years³⁴ have been focused on exploring and arguing for recognition of an Aboriginal architecture that is supportive of Indigenous users' cultural beliefs and well-being.³⁵ From the Aboriginal Environments Research Centre, at the School of Architecture, University of Queensland, Memmott and his contemporaries have documented the social, cultural and physical properties of Indigenous environments with an aim of improving architectural design responses.

In 2008 Memmott returned to the use of behaviour setting theory not just as a descriptive tool to highlight how the cultural, social and physical properties of Aboriginal architecture support well-being but additionally as a means of challenging the existing and widely-held definition of architecture. In a paper written with James Davidson, a doctoral graduate of Memmott's, titled "Exploring a Cross-Cultural Theory of Architecture," they questioned the assumption that the temporary nature of an Aboriginal "travellers' camp" excluded such a setting from being architecture.³⁶

More recently Memmott has been concerned how behaviour setting theory can be combined with the emerging well-being theory to understand how Aboriginal people's cultural, social, physical and economic needs can be met through a combination of architectural design and service delivery programming and ideology.

Well-Being

Historically, well-being studies and initiatives have concentrated on individuals using Western constructs of economic and physical health, interventions that can be problematic when applied cross-culturally.³⁷ This physio-economic model continues to dominate approaches to well-being in social science theory and government policy.³⁸ Social policy also strongly associates well-being with "wellness" and "health", following initiatives by the World Health Organisation to re-conceive health in a holistic way.³⁹

Contemporary studies that focus on subjective well-being and culture have highlighted the weaknesses of these earlier approaches, highlighting broader social relationships, capabilities

34 Once again, this section on Memmott has been written by co-author Keys.

35 Memmott, *Gunyah, Goondie and Wurley*, 260.

36 Paul Memmott and James Davidson, "Exploring a Cross-Cultural Theory of Architecture," *Traditional Dwellings and Settlements Review: Journal of the International Association for the Study of Traditional Environments* 19, no. 2 (Spring, 2008): 51.

37 P. Boddington, and U. Raisanen, "Theoretical and Practical Issues in the Definition of Health: Insights from Aboriginal Australia," *Journal of Medicine and Philosophy* 34 (2009): 49-67.

38 Bill Jordan, *Welfare and Well-Being: Social Value in Public Policy* (Bristol: The Policy Press, 2008).

39 Boddington, "Theoretical and Practical Issues," 51. World Health Organisation, "Preamble to the Constitution of the World Health Organisation as Adopted by the International Health Conference, New York, 19-22 June 1946," *Official Records of the World Health Organisation*, No. 2 (1948): 100.

and culturally-specific notions of well-being. More holistic definitions of health have paralleled a growing interest in spiritual and emotional well-being and the positive impacts of natural and built environments. This shift also occurred in the Aboriginal health sector. The National Aboriginal Health Strategy Working Party provided the following definition of Aboriginal health in 1989.

“Health does not just mean the physical well-being of the individual but the social, emotional and cultural well-being of the whole community. This is a whole-of-life view and it also includes the cyclical concept of life-death-life... Health to Aboriginal people is a matter of determining all aspects of their life, including control over their physical environment, of dignity, of community self-esteem and of justice. It is not merely a matter of the provision of doctors, hospitals medicines or the absence of disease and incapacity.”⁴⁰

There is growing international concern with the ways built environments can support well-being, including in relation to psychological well-being (person-environment fit,⁴¹ restorative environments⁴²), social well-being (urban studies and the benefits of public space⁴³), emotional well-being (therapeutic landscapes⁴⁴), physical well-being (sensory design⁴⁵), and spiritual well-being (connection to spiritual places⁴⁶). In Australia, the Housing for Health programme which originated in the Pitjantjara Lands in the late 1980s led by architect Paul Pholeros, developed the most concentrated environmental design initiative directed at Aboriginal people and their living environments. However it focussed on physical infrastructure design and maintenance, but not Indigenous health knowledge and other relevant cultural factors.⁴⁷

The following case study describes an example of a contemporary Aboriginal camp located in a regional landscape at Camooweal, western Queensland. Through the moral teachings of Ancestral Beings in the ‘Dreamtime’, local Aboriginal people inherited ‘the Law’ which today provides a set of precepts for supporting their physical, social, cultural, spiritual and economic well-being as they administer and control the Dugalunji Camp as a modern system of Aboriginal behaviour settings.

40 National Aboriginal Health Strategy Working Party, edited by Department of Aboriginal Affairs, Canberra, 1989: xi.

41 Marjut Wallenius, “Personal Projects in Everyday Places: Perceived Supportiveness of the Environment and Psychological Well-Being,” *Journal of Environmental Psychology* 19, no. 2, 6 (1999): 131-43.

42 Stephen Kaplan, “The Restorative Environment: Nature and Human Experience,” in *The Role of Horticulture in Human Well-Being and Social Development*, ed. Diane Relf (Portland, Oregon: Timber Press, 1992).

43 Vicky Cattell, Nick Dines, Wil Gesler, and Sarah Curtis, “Mingling, Observing, and Lingering: Everyday Public Spaces and the Implications for Well-Being and Social Relations,” *Health and Place* 14 (2008): 544-61.

44 W. M. Gesler, *Healing Places* (Lanham, MD: Rowman and Littlefield, 2003).

45 Trevor Keeling, Derek Clements-Croome, Rachael Luck, and Philip Pointer, “How the Sensory Experience of Buildings Can Contribute to Wellbeing and Productivity” (paper presented at the 7th Windsor Conference: The changing context of comfort in an unpredictable world, Berkshire, UK, April 13-15, 2012).

46 Vicki Grieves, “Aboriginal Spirituality: Aboriginal Philosophy, the Basis of Aboriginal Social and Emotional Wellbeing,” in *Discussion Paper Series No. 9*, (Darwin: Cooperative Research Centre for Aboriginal Health, 2009).

47 Stephen Long, Paul Memmott, and Tim Seelig, *An Audit and Review of Australian Indigenous Housing Research* (Canberra: Australian Housing and Urban Research Institute), 2007.

The Dugalunji Camp at Camooweal⁴⁸

During 1999-2001, Indjilandji-Dhidhanu people worked successfully with Queensland Main Roads Department to ensure cultural heritage protection of sites associated with the development of a bridge over the Georgina River. The Indjilandji, using their Native Title claimant status, negotiated various benefits from Main Roads, including employment and training for Aboriginal members of the wider community. In addition, a modern construction camp (the 'Dugalunji Camp') was established for the group in 2001 by the Main Roads within the Camooweal Town Common.

The behaviour setting or more accurately the systems of behaviour settings under consideration in this paper is the Dugalunji Training and Accommodation Centre (the Dugalunji Camp), Camooweal. The standard technology utilized in road construction camps and mining camps was initially employed, comprising elongated, pre-fabricated, trucked-in, steel-framed buildings with attached wall-mounted air conditioners, bolted to concrete pad footings and equipped with a generator and water bore. This form of construction is normally regarded by architects to be of a low degree of sustainability. Drawing on Aboriginal domiciliary tradition, the camp is situated within a regional cultural landscape, which is believed to contain perpetual energies implanted into its many sacred sites during the 'Dreamtime'. The word 'Dugalunji' refers to the Mussel Shell Dreaming in the nearby Georgina River. The construction camp was left in the hands of the Indjilandji group who then formed Myuma Pty Ltd for on-going participation in highway upgrade contracts.



Fig. 3. Transformed Dugalunji Training and Accommodation Centre, prepared by James Davidson Architect, in collaboration with Colin Saltmere of Myuma Pty Ltd, 2010.

However the behaviour setting was completely re-designed and re-built by Myuma with a revised layout and upgraded facilities to improve its functioning. During 2009, because of the success of their training programme, Myuma received government funding to upgrade its architectural facilities and Colin Saltmere, the Camp Manager deconstructed the grid layout of the original prefabs and transformed the settlement layout emphasizing a socio-centric (inward-looking) configuration,

⁴⁸ The Dugalunji Camp was presented and described in Paul Memmott, "Architectural production and consumption as a complex process in Aboriginal Australia: Two case studies", in *Audience. Proceedings of the XXVIIIth International Conference of the Society of Architectural Historians, Australian and New Zealand*, ed. Antony Moulis and Deborah van der Plaats (Brisbane: SAHANZ, 2011).

reminiscent of a traditional camp and a better fit with residents' traditional beliefs and practices (fig. 3). Apart from individual internal behaviour settings in the personal rooms, dining hall, training rooms, offices and workshops there are numerous external spaces which could also be considered collectively as a camp behaviour setting (or a system of settings after Rapoport). They are subject to the overall camp rules which are revised in light of a daily incidents report every morning at the Pre-start Staff Meeting (7-7.30am) and the Pre-start Trainees Meeting (7.30-8am). The curved horseshoe shape of the residential rooms allows for peer group monitoring of the well-being of one's colleagues as well as 'panopticon' style monitoring by camp staff.

Myuma Pty Ltd runs an enterprise operation (including labour and plant hire) and also employs and delivers accredited training programs to Aboriginal people in civil and mining construction and related support services, including Land Rangers, hospitality and catering. The design success of the setting system of this Aboriginal training facility impacts positively on the economic and social well-being of its employees and trainees. At the time of writing, the number of workers ranged between 60 and 80, depending on shifting project demands and numbers of trainees; at peak staff, over 90% were Aboriginal. Myuma purposefully engaged people from the neighbouring Traditional Owner Aboriginal groups in all projects.

Senior Myuma staff act as informal social workers or counsellors to maintain the harmony and emotional well-being in the Dugalunji Camp. Above all, the Dugalunji Camp provides workers and trainees with a calm residential setting, relatively free of problems or chaos, where people can feel safe and at home in the world for a while, where relatedness is constructed for many with their fellows in the camp and with their aesthetic and spiritual environment in the Georgina River Valley. Camp harmony results from intra-group harmony which in turn results from the requirements of a strong personal moral code conveyed through the camp rules and the authoritative guidance of Indjalandji leader Colin Saltmere as Camp boss.

Myuma provides a private room for each of its employees and trainees, which for a good number of them is the first fully private space they have ever lived in and personalized. The Myuma prevocational training program has encouraged the development of career narratives and purpose in life. It has opened a window to alternative life-ways and career pathways that may not have been conceivable, apparent or available in the home communities of the trainees.

An Aboriginal Behaviour Setting

The Dugalunji Camp can be considered to be a system of 'Aboriginal behavioural settings', with recurring behaviour patterns in the interlocking physical settings, such that there is a synomorphic relation or 'fit' between the human behaviour episodes that occur and the physical and temporal environments of the settings. It is largely controlled by Aboriginal people and is designed by Aboriginal leaders in collaboration with an architect, to be comfortable for Aboriginal residents. This is achieved through a combination of behavioural patterns and environmental (landscaping)

features, artifactual features (built and loose structures, objects) and setting controls which are designed to be relatively comfortable, predictable, secure and conducive for Aboriginal people to use. There is also a sense of identity with and even ownership of such a system of settings by Aboriginal people.

In terms of designing the environmental, artifactual and temporal character of the Camp, the group leader Colin Saltmere has stated that he based the idea of the upgrade on a traditional camp firstly by setting it up on his country and drawing in as many of his family who were available and willing to participate. This established a clear role for the senior members of his family as Traditional Owners within the precepts of traditional Aboriginal law. Secondly, Colin controls and runs the Camp like a traditional multi-tribal camp. For planning, he drew on a number of socio-spatial elements deriving from traditional Aboriginal camps which were in turn utilized in pastoral stockcamps in which he, along with other Aboriginal stockmen, worked and lived in their younger years⁴⁹. Such elements include separate nocturnal sleeping areas for married couples, single men and single women, the capacity for separation of older single men and younger single men, provision for externally oriented lifestyle (verandas, open-walled roofed structures), with enclosed shelter mostly utilized for nocturnal sleeping, and a capacity for camp leaders to maintain visual surveillance (and thus setting control) from a central position of all the workers and those approaching the camp. With the assistance of the trainees, a variety of shade rooves and windbreak walls have been built throughout the camp using natural foliage materials such as spinifex grass as well as other landscaping features (lawn, shade and fruit trees).

Behaviour setting theory also allows us to appreciate the way time and people's behaviour interact to support well-being. The structure of time in the Dugalunji Camp is reminiscent of the pastoral stockcamps of Colin's earlier adulthood. The Myuma day starts early with the breakfast bell sounding at 6.30am. A cooked breakfast is consumed and then workers who are travelling away from the Camp prepare their own lunches. Management staff attend a 'pre-start' meeting, followed by a Workers' meeting to organize tasks in the Camp as well as off-site. As the working day progresses, there is thus a strong sense of order in the Dugalunji Camp, reminiscent of a mission institution in the sense of having a defined set of rules and a fixed timetable, but one that is not forcibly imposed (because individuals are free to leave); rather, one in which there is a voluntary engagement. Nevertheless individuals are instructed that they must accept the consequences of their actions if they break the Camp rules. In establishing the desired Aboriginal behaviour patterns with minimal behavioural deviancy or dysfunction, Colin Saltmere also believes that the conformity to the training regime and the successful completion rate are partly due to their being sufficient trainees for a critical mass to generate a peer group pressure over individual behaviour, albeit within an Aboriginal value system. Although behaviour setting theory as originally conceptualised by Barker and Wright emphasized the 'extra-individual' nature of the setting, with a salient property through time being

49 See Memmott, "Architectural production and consumption as a complex process in Aboriginal Australia," Figures 5 & 6 for camp layouts.

the replaceability of the actors, one of his students (Wicker 1992) later recognised the case of the unique individual as setting controller who may not be readily replaceable. This fit appears to be the case of the Dugalunji Camp where the Myuma Managing Director, Colin Saltmere has imposed both his strong control rules and design concepts. The Dugalunji Camp can be seen as a positive Aboriginal behaviour setting system supporting social, physical, mental, and spiritual well-being.

Conclusion

This paper has been concerned with describing the stages of translation of a theory from a discipline outside of architecture. Behaviour setting theory was initially borrowed to more fully understand Australian Aboriginal environments rendered largely 'invisible' by traditional architectural discourses. In a critique of the theoretical usefulness of behaviour setting theory, Popov and Chompalov concluded that "...due to its interdisciplinary nature and applied focus the theory has become influential and widely accepted in the field of environment and behaviour studies and by scientists in many disciplines that adopt the eco-systems approach."⁵⁰ The strength of this approach resulted in a re-evaluation and recognition of Aboriginal architecture and a call to revisit and expand mainstream definitions of architecture. More recent application of behaviour setting theory highlights the significance of contemporary settings, created by Aboriginal people, for the positive maintenance of their well-being. A further critical finding of our work is that behaviour setting theory can be usefully applied in cross-cultural settings undergoing cultural change processes once behavioural patterns and norms and architectural traditions (ethno-architectures) are well understood and interpreted through anthropological and empirical field research.

As shown in the Dugalunji Camp and other case studies, positive design examples exist of intercultural settings with a dominance of Aboriginal behaviour patterns, culturally appropriate design and with ultimate Aboriginal control and management. In our view Indigenous (or cross-cultural) behaviour setting theory makes an important contribution to the emerging concept of cultural sustainability in architecture.⁵¹ An exciting period of positive translation of ideas is currently upon us as the recognition of successful Aboriginal behaviour settings with concomitant architectural designs and a current global interest in societal well-being converge.

50 Popov and Chompalov (2012:26)

51 David Beynon, "Architecture, Identity and Cultural Sustainability in Contemporary Southeast Asian Cities (Online)," *RIMA: Review of Indonesian and Malaysian Affairs* 44, no. 2 (2010): 179-208. Soini, Katriina, and Inger Birkeland, "Exploring the Scientific Discourse on Cultural Sustainability," *Geoforum* 51 (2014): 213-23.