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CHAPTER 8

Researching the links between parklands and health

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The concept for this chapter was derived from research into the development and subsequent expansion of a program in Australia and New Zealand known as 'Healthy Parks, Healthy People'. This program is based on the notion that access to parkland is an important means of improving the health of individuals and communities. This includes promoting the benefits of outdoor activities as well as the benefits of interactions with nature.

For the purposes of this chapter, the term *Health* is used in the context of the World Health Organization's (WHO) definition as a, 'state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity' (World Health Organization, 1946). This definition is based on an ecological theory of public health recognizing that health is influenced by many interrelated factors. This is a holistic view of health that encompasses the wellness paradigm, in terms of the presence of wellbeing as well as the absence of illness. That is, the WHO definition includes a positive construction of health that encompasses concepts such as happiness and quality of life. The World Health Organization identified that all settings of society and activity should provide greater opportunities for

promoting health, including provision of parklands for public access. *Parklands* refer to public open green space such as urban parks, national parks and other natural areas managed for recreation and tourism use. This includes managed areas with elements of nature ranging from contrived manicured gardens and lawn through to nature reserves with some or all endemic ecosystem processes intact.

Background: Healthy Parks, Healthy People

Tourism is, in part, an activity people undertake to escape the daily routine of life and encounter new or exotic experiences as a means of restoring wellness. In this context, it is no coincidence that parklands are a significant point of focus for tourism and leisure related activities (Eagles, 2002; Kuo, 2002; Nyaupane, Morais, & Graefe, 2004). The popularity of natural areas as tourism and leisure destinations seems to relate to a normative awareness of the beneficial health effects of experiencing nature to counter act the stress associated with modern living. For example, Heimstra and McFarling (1974) postulated that visiting natural areas was born from an instinctive need to escape from urban living and “re-connect” with nature to restore a sense of wellbeing. Similarly, Rolston (1998) commented on the human urge to connect with and experience nature based on the idea that the human experience of nature provided a sense of wellness. To explain this urge, Wilson (1984) put forward the ‘biophilia hypothesis.’ Wilson argued that humans have a fundamental affinity for nature which is genetically engrained as a result of our natural evolutionary origins. Living in isolation from nature thus has negative health effects. Contact with nature is thus connected with a sense of revitalizing physical and mental health, that is, wellness. This inherent connection between humans and nature perhaps explains why wellness tourism products commonly feature elements of nature or are located in destinations featuring parkland settings. Therefore, accessing parklands, as nature based tourism destinations, could be

classified in part as an activity intended to restore wellness. That is, parklands could be classified as a type of wellness tourism destination.

Linking public health to parklands access is officially identified as a priority concept by the various state based parks management agencies in Australia as well as New Zealand. This imperative was originally identified in Australia by the state of Victoria more than a decade ago. Subsequently, the Victorian state government agency directly responsible for management of public parklands, Parks Victoria, developed a concept labelled 'Healthy Parks, Healthy People' as a core component of a public campaign to encourage park access based on highlighting the associated health benefits. Healthy Parks, Healthy People (HPHP) is essentially a branding exercise conceived as a result of the more entrepreneurial approach to parkland management in Victoria. The perceived success of the campaign encouraged Parks Victoria to give the use of the HPHP brand to the Western Australian agency responsible for parks management, the Department of Environment and Conservation. Following on from this, Parks Victoria then sub-licensed it in 2007 to the regional parkland management peak body, Parks Forum. This enabled the use of the HPHP brand concept to expand across the various Australian and New Zealand parks management agency members.

HPHP was initially devised as a promotional campaign to increase awareness of parklands as tourism and recreation destinations that were beneficial to health, and hence grow park visitor numbers. It also triggered government sponsored reviews of available research to lend further substance to the health destination oriented brand. Branding is about providing imagery and information that helps build product recognition, loyalty, value, and market share. Success of a brand is based on the ability to deliver its promise and hence, encourage repeated 'consumption'. Consequently, the development of the HPHP brand was followed by an effort

to gather additional supporting research based evidence to lend it further substance. Fortunately, a substantial body of literature exists on the relationship between public access to green or natural environments (parklands) and human health both at the individual and community level. However, little is known about the underlying mechanisms for this relationship and the extent to which natural environments themselves influence health. Further, much of the research design is based on correlation rather than causal relationships so it is generally unclear whether healthy people tend to access parklands or whether parklands improve health. Also, it is not certain as to what extent health benefits accrue from secondary factors associated with parklands, such as participation in physical exercise, organised programs and socialisation. This chapter presents a review of published research on the relationship between parklands, health in terms of methodology and the subsequent types of knowledge created. From this review some potential research directions are suggested that could contribute to understanding the key factors in the relationship between accessing parklands and health.

Measuring the health effects of parklands

There are a range of methods for measuring health. The method selected depends on what aspect of health is being measured and why it is being measured. For example, Ware *et al.* (1981) described five broad reasons including: determining the effectiveness of interventions; assessing quality of care; estimating the needs of the population; improving clinical decisions and understanding causes and consequences relating to health. Each reason requires a different method and approach. Many of these are applied in research on the influence of parklands on health. Consequently, the research outlined in this chapter includes a wide range of health measurement techniques.

Broadly speaking, measures of health may be describe in terms of being subjective or objective. Subjective assessment, in the context of this chapter, usually involves participants self-reporting their health status using a questionnaire while objective assessment generally involves some sort of clinical measurement of bodily functions. Self-reporting could be based on quantitative or qualitative techniques. Quantitative methods require participants to rate their responses to statements using a scale or range of options (agree-disagree; good-bad and so on). This type of approach seems to dominate the literature with a proliferation of self-reporting scales gaining popularity amongst medical researchers in the 1970s. The quantitative approach to self-reported health gained acceptance over the following decades as research functioned to improve reliability and validity of the scales used (McDowell, 2006). Qualitative health assessment might include interviews and focus groups, requiring textual analysis of narrative responses that afford a greater understanding of the reported health status of an individual or group. However, the quantitative, subjective health measures enable greater ease of comparison between participants and groups as well as enabling more rapid data gathering to capture a larger sample within a given time frame .

The literature on the health effects of parklands and nature appears to be dominated by quantitative, subjective health measures. There is a wide range of questionnaires and scales available for self-reporting health status. The scale selected is determined by what is being measured and why it is being assessed. These subjective health scales can be broadly divided into positive and negative measures. The latter relates to reporting the presence of illness, stress and other physical and mental conditions that impede everyday life. Positive scales focus on reporting the presence of good health, happiness and wellbeing that enriches everyday life. Chapter 9 in this book provides a discussion of positive health measures in relation to parklands in relation to a specific case study. In terms of determining types and

acuteness of health condition, subjective or self-reported measures of health are prone to significant margins of error determined by factors such as lifestyle, participant knowledge of health, demographics and socio-economic status (Baker, Stabile, & Deri, 2001; Hunt & McEwen, 1980). As a consequence, subjective health measures are considered by some to be weak measures of actual physical health condition (Ambrasat, Schupp, & Wagner, 2011). However, subjective health measures can usefully indicate intangible concepts such as quality of life and level of happiness or satisfaction in connection to assessed physical and mental health. This can provide a more holistic understanding of health compared to objective, physiological measures (Streiner & Norman, 2008). That is subjective measures may also indicate why people have responded in a certain way in addition to their reported health status.

Objective measures of health include monitoring of physiological indicators such as heart rate, blood pressure, body temperature and hormone levels that are influenced by physical health or emotional state. It may also include measurement of cognitive function, such as reaction times and time taken to complete certain tasks as an indicator of fatigue, stress, and rate of mental or physical restoration. Objective measures at the community level may include statistical data such as crime rates, hospital admissions and education participation. Objective measures are considered to be more reliable than subjective measures in terms of physical health condition as they are not reliant on the opinion or perception of the observer or participant (Baker, *et al.*, 2001). A number of studies into the effect of parklands on health have used these objective measures. For example Pretty *et al.* (2005) measured blood pressure response to scenery and Takano *et al.* (2002) measured mortality in aged populations in relation to neighborhood greenness. However, objective health measures are difficult to link to why an individual or group is responding a given way. This is because there is a wide

range of confounding factors and variables that may influence physiological functions such as diet and life style and levels of stress in day to day living. Furthermore, objective measurement can include subjective influences that would not be accounted for unless the participant provides additional information to place the measurement in context. That is, the act of measuring medical status can also influence the result, introducing a subjective element that is difficult to control. This has been referred to as the 'white coat' effect where a person emotional response to being in the presence of a medical practitioner or researcher can influence physiological functions. For example, having blood pressure measured can cause blood pressure to rise as a stress response to the act of measurement in a clinical setting (Myers, Valdivieso, & Kiss, 2009). Given the multifaceted character of health, using a combination of objective and subjective measures can provide better insight into health and how it is influenced by interventions such as exposure to nature in parklands (Bowling, 2009).

Research on Parklands and health benefits

There is a considerable body of knowledge from a range of disciplines using various methods regarding the relationship between exposure to nature and its positive impact on human health. For example, research indicates a positive association between the amount of green space in an urban area and adults' self-reported general health (Maas, van Dillen, Verheij, & Groenewegen, 2008; Maas, Verheij, Groenewegen, deVries, & Spreeuwenberg, 2006; Mitchell & Popham). Other research has found the availability of access to parklands to be inversely linked with self-reported stress levels and depression (Morita *et al.*, 2007; Nielsen & Hansen, 2007). In terms of recovery from ill-health, Ulrich's 1984 objective study of hospital patient records was among the first to indicate a positive association between having a view of nature from the hospital ward and improved rates of recovery (Health Council of

the Netherlands & Dutch Advisory Council for Research on Spatial Planning, 2004). This study found that hospital patients with a view of a park with trees had faster physical recovery post-surgery than those with a brick wall view. Parklands are also known to facilitate socialization within a community, encouraging positive interactions and promoting stronger social networks among neighbors. A strong social network within a community has been shown to be conducive to better health (Berkman, Glass, Brissette, & Seeman, 2000; Kawachi, Kennedy, & Glass, 1999). It is apparent from research that parklands are linked to a wide range of physical, mental and social health related effects.

Physical health benefits of parklands

It is well documented that provision of access to parklands encourages physical activity within a population. Physical activity as a factor in itself is known to be directly linked to health within a population (Jago & Bailey, 2012). However, studies have indicated that the environmental setting for physical activity is associated with additional health benefits. Research suggests an association between physical activity in parklands may have greater physiological and psychological benefits than physical activity in other settings (Pretty, *et al.*, 2005; van den Berg, Hartig, & Staats, 2007). For example, Pretty *et al.* (2005) exposed subjects exercising on a treadmill in a laboratory to a sequence of rural and urban pleasant and unpleasant scenes. Viewing 'pleasant' rural and urban scenes while exercising on a treadmill was linked to a positive effect on blood pressure (an indicator of cardiovascular health) and self-reported mood measures relevant to mental health compared to those viewing 'unpleasant' scenes.

In terms of field based research, A longitudinal study in Japan focused on measuring the association between walkable green space in a densely populated urban area and local

resident senior citizen's survival rates over five years (Takano, *et al.*, 2002). Walkable green space included parkland and tree lined streets. Results suggested there was a positive influence on survival for people living in neighborhoods with walkable green spaces after controlling for age, sex, marital status, baseline health and socioeconomic status. However, convenience sampling techniques were used as were very generic indicators for health while the extent to which surrounding green spaces were actually used for walking was not measured. This means that the associations found are correlational and cannot be casually determined. Along similar lines, a study by Sugiyama, Leslie, Giles-Corti, & Owen (2008) also found a positive association between health indices and access to green environments. Respondents who perceived their neighborhood as having a high level of accessible green space was more likely to show better self-reported physical and mental health compared with those who reported low levels of accessible green space in their neighborhood. The researchers found that the level of recreational walking seemed to explain the relationship between greener neighborhoods and self-reported physical health. They also concluded that the positive relationship between green space and mental health was partly explained by the restorative effects of natural environments.

Related to this, physical activity in parklands has been identified as being more restorative than urban built environments and indoor settings (Bendell & Font, 2004; Hug, Hartig, Hansmann, Seeland, & Hornung, 2009; Wilson, 1984; Zeng, Gu, Purser, Hoenig, & Christakis). Restorative quality is known to predict the frequency of exercise and thus acting as a further motivator to engage in physical activity on a regular basis (Hug, *et al.*, 2009). Research also indicates that people tend to engage in exercise for a longer duration in parklands (Health Council of the Netherlands & Dutch Advisory Council for Research on Spatial Planning, 2004). This research suggests that readily accessible parklands are linked to

a higher frequency of physical exercise for longer duration in the surrounding population. The frequency and duration of exercise are important for public health benefit. For example, the Australian National Physical Activity Guidelines for Adults recommends engaging in at least 30 minutes of moderate intensity physical activity on most, preferably all, days of the week in order to achieve health benefit (Australian Government Department of Health and Ageing, 1999). The positive link between physical exercise and health is clear, while the link between green space and increased physical exercise is apparent. However, separation of the health effects of physical activity and that of parklands is more difficult.

Parklands are associated with increased levels of observed and self-reported physical activity within the nearby community which in turn is associated with healthier residents. It is difficult to establish a direction of cause and effect as research commonly involves in-situ residential and parkland user sampling, cross sectional and non-random design. Studies of communities and health in relation to parks access do not readily lend itself to an experimental design where a population can be randomly assigned to residential areas with or without parklands. While not practical, random allocation of neighborhood green space as part of a longitudinal experiment could enable a direction of cause to be established more clearly. In practice, it can be difficult to control for all factors and variables associated with the socio-economic differences that may exist in population living in generally wealthier “leafy” suburbs compared to residential areas without green space. That is, part of the parkland effect may be explained by selective migration to or retention in particular living environments. Direct selection occurs when people’s wellness influences their chances of living in a favorable environment whereas indirect selection occurs when people with particular attributes, such as a high income, that are related to wellness can afford to reside in a favorable environment (Groenewegen, van den Berg, de Vries, & Verheij, 2006). The field

based studies also tend to (out of necessity) use self-reported measures of health. Although there are validated and reliable instruments, self-reporting is potentially more prone to bias by the respondent than actual physical measurement of health. Thus, while access to parklands have been linked with improved health, it is not yet certain as to what extent the positive health benefits are accruing from other factors associated with living within proximity to and visiting parklands (Pretty, 2004).

Mental health benefits of parklands

The World Health Organization (2001) defines 'mental health' as, "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community." This specific definition is encompassed by the more general WHO definition of health cited earlier. The World Health Organization and the World Bank forecast that depression, a mental health issue, will become the second largest cause of disease burden world-wide (Walker, Moodie, & Herrman, 2004). Further to this, it is recognized that treatment of the symptoms will not address the problem adequately. Walker, *et al.* (2004) highlight the need for preventive measures to effectively reduce the rate of mental ill health. Mental health is recognized as being closely associated with physical health and quality of life, and therefore is an important element when considering overall health. Evidence indicates that promoting mental health, through a focus on key determinants, could not only result in lower rates of some mental disorders, but deliver individual and community benefits such as improved physical health, enhanced educational performance, increased worker productivity, increased community safety, improved relationships within families, and safer communities (Walker, *et al.*, 2004).

Research on mental health has predominantly focused on recovery from stress and attention fatigue, as these are common issues in urbanized and industrialized societies (Health Council of the Netherlands & Dutch Advisory Council for Research on Spatial Planning, 2004). There is a compelling accumulation of evidence from a large number of studies that indicate a positive association between exposure to parklands and recovery from stress and attention fatigue. Benefits are reported to include enhancement of mood, concentration and self-discipline and reduction of physiological stress. The research includes both laboratory and field studies.

Recovery from stress and attention fatigue occurs via the mechanism of 'restoration'. Restoration is the "process whereby a person returns to a state of unimpaired affective, cognitive, physiological and physical functioning" (Health Council of the Netherlands & Dutch Advisory Council for Research on Spatial Planning, 2004, p. 47) p.47). This could be in response to fatigue resulting from sustained direct attention to a task and active suppression of irrelevant information that affects cognitive performance. There are two dominant theories regarding the restorative effects of nature: Kaplan and Kaplan's attention restoration theory and Ulrich's Stress Reduction Theory (1983). Kaplan (1995) proposed that four main components that could contribute to the restorative effects of a natural environment including:

1. fascination – natural environments are rich with fascinating objects and processes which automatically attract the attention without requiring any effort;
2. being away – natural settings provide opportunities to distance oneself from everyday life and thoughts, allowing for the resting of one's directed attention;

3. extent - the environment must have extent, it must be rich enough and coherent enough so that it constitutes a whole other world. Even a relatively small area can provide a sense of extent; and
4. compatibility - there should be compatibility between the environment and personal purposes and inclinations.

Ulrich's stress reduction theory (1983) proposes that in addition to providing recovery from attention fatigue, natural environments also promote recovery from any form of stress. Ulrich postulates that people have an innate mechanism whereby experience of certain characteristics of natural settings triggers positive emotional reactions. These characteristics include a level ground surface, considerable spatial openness, the presence of a pattern or structure, curving sightlines and the presence of water. These reactions also ensure that humans are attracted by natural environments. This theory relates to the biophilia hypothesis put forward by Wilson (1984). Wilson postulates that humans have a fundamental affinity for nature which is genetically engrained as a result of our natural evolutionary origins. That is, humans are products of a natural evolutionary process and this strongly influences our fundamental cognitive and affective connection to nature. This in part could explain human attraction to nature and its positive cognitive and affective influence.

There has been very limited research to date about the particular components of the physical environment that support restoration (Nordh, Hartig, Hagerhall, & Fry, 2009). That is, little is also known about the effect of different types of parkland on mental health. Kaplan's (1995) theory suggests that the influence of parkland type may be highly subjective and variable, dependent on the perceptions and purpose of individuals. Rolston (1998) and Collins (1995) noted that the type and extent of past experience in natural areas is a key factor affecting how

nature is viewed and its subsequent influence on the individual. Similarly, Bixler and Floyd (1997) commented that childhood exposure to natural areas significantly increased the likelihood of nature-oriented career paths and strengthened positive association with nature later in life. While research suggests that people who believe nature to have a restorative effect tend to seek out parkland environments when they experience stress or fatigue, whether people with no connection, or a fear of nature, experience the same potential benefits is unclear. Louv (2005) noted that people living in urban environments, with little or no contact with natural places tend to harbor negative attitudes toward nature. Ironically they may also suffer mental and physical health problems due to lack of contact with nature.

The Health Council of the Netherlands & Dutch Advisory Council for Research on Spatial Planning (2004) note that the duration or frequency of exposure to nature that is necessary to prevent stress-related illness in the long term is unknown. However, studies regarding affective recovery show that short-term contact with nature is associated with a significant positive effect (T. Hartig, Book, Garvill, Olsson, & Garling, 1996; Terry Hartig, Evans, Jamner, Davis, & Garling, 2003). However, it seems that contact with nature needs to be rather more prolonged than for cognitive recovery (Taylor, 1994).

Community benefits of parklands

Social relationships and community networks are important to all individuals across all cultures. This particularly holds true for older adults, where social integration and the strength of social ties have been found to be significantly important predictors of health (Kweon, Sullivan, & Wiley, 1998). Research has indicated that the availability of accessible urban parklands can facilitate social interaction and social coherence. This can function to strengthen social ties and sense of community which has been associated with better personal

health (Berkman, *et al.*, 2000; Kawachi, *et al.*, 1999). Research has also found that urban housing developments with more greenery have fewer crimes reported to police while exposure to natural settings is associated with reduced aggressive behavior (Australian Bureau of Statistics, 2010; Soanes & Stevenson, 2008). However, there have been limited studies which have explored the underlying mechanisms explaining the social factors involved in the neighborhood greenness and health relationship. Other factors may also play a significant role in facilitating social contacts, such as social and psychological factors, the architecture and the level of maintenance of neighborhoods, combined with individual factors such as age, sex, education and earlier life experiences. Characteristics of a particular public area, including its accessibility, proximity, safety, and design and layout (including comfort), also appear to influence the extent of social contact (Health Council of the Netherlands & Dutch Advisory Council for Research on Spatial Planning, 2004).

Parklands as a Wellness Tourism Destination?

The Healthy Parks, Healthy People campaign has used this knowledge as a foundation for promoting parklands as tourism and recreation destinations that are beneficial to health. This is essentially a tourism and recreation branding exercise where parklands are promoted as wellness tourism destinations.

Research into the relationship between access to parklands and health consistently indicates a positive association. However, there is limited evidence indicating the direction of cause between health and access to parklands (Bell, Montarzino, & Travlou, 2007; Health Council of the Netherlands & Dutch Advisory Council for Research on Spatial Planning, 2004). This is generally because most research is cross-sectional in design, obtaining a snapshot at a given place and point in time. Sugiyama *et al.* (2008) note that longitudinal studies are

required to explore the effects of environmental interventions on health outcomes to clearly establish the casual direction of the relationship between natural environments and health. In addition, many field based research projects are not experimentally random in design. For example, researchers tend to locate an urban study area with a given level of 'greenness' or select parkland locations and sample people who are present within that area. This means the results of the sample could be bias toward the types of people who tend to reside in a given type of urban area or who tend to use parks. These issues can demonstrate a relationship between health and parkland but cannot establish whether healthy people tend to access or live near parks or if parks generate healthy people.

Research in this field also tends to focus more on indirect connections, by looking at how parkland influences actions or mechanisms which in turn influence health. For example, research into links between public access to parklands and increased physical activity or social interaction that then lead to health benefits. In this regard, research is needed to identify the underlying mechanisms of these health benefits and the extent to which they each account for the nature-health relationship. Admittedly, separating the influence of physical activity, socialization from the presence of nature itself is difficult. However the effects of physical activity and socialization associated with access to parklands obscure how active and passive use of natural environments is conducive to health (Sugiyama, *et al.*, 2008). Separating these effects could provide a better understanding of the influence of the parkland destination itself and whether it could be substituted for other settings.

In addition to clarifying existing research findings, there are also areas requiring further understanding. For example, there is little knowledge regarding what frequency, duration and type of experience in what type of park optimizes health benefits or represents the

minimum threshold at which health benefits could occur. Essentially, what the research appears to be lacking is identification of a relationship between dose of park experience and subsequent relative health benefits. This type of research could provide important insights into preventative healthcare for particular target groups, such as children, older people and people with disabilities (Bell, *et al.*, 2007). Such knowledge would also provide guidance into the types of parks and experiences that result in the best health outcomes for communities.

Finally, there appears to be limited research into the influence of parklands in 'ordinary' settings. Most research focusses on extreme settings, such as hospitals, prisons or extremely disadvantaged urban areas, where people are more prone to be highly stressed or frustrated. Research also commonly involves laboratory based experiments. While this allows for better control of confounding factors and potentially enables clearer results, the artificial character of the setting and common focus on isolated elements of health may provide limited insight into 'real-life' effects over time. This means that findings have limited application to a broader population context. Expanding the focus of research beyond these extreme or laboratory based environments may increase the generalizability and applicability of findings (Groenewegen, *et al.*, 2006). That is, it could provide better understanding of the influence of parklands as a wellness destination for the general population.

The review of research into the health effects of parklands as a wellness destination indicates a need for further research to:

- establish the direction of cause and effect;
- establish dose relationship between access to parklands and health ;
- establish relationship between type of parkland positive influences;
- separate the influence of parklands from activities in parks;

- understand the longitudinal effects of parkland access on health; and
- understand the influence of parklands on health in ‘ordinary’ settings.

The Healthy Parks, Healthy People brand is based on the premise that access to parklands and exposure to nature will create healthy people. While there is a growing body of evidence indicating a relationship between human health and access to parklands, a review of published research indicates the direction of this relationship is not clearly established. There is a lack of clarity in terms of whether healthy people tend to access parks or parks make people healthy. There is also a lack of clarity regarding the effect of providing access to different types of parkland in various urban and regional settings and the individual and community scale. The uncertainty as to the veracity of the HPHP claims could weaken the brand of parklands as a wellness tourism destination. Establishing a clear, evidence based understanding of the relationship between parklands and health could help to lend additional substance to the Healthy Parks, Healthy People concept. This type of research could also work to clearly identify the role of parklands as destinations for preventative health care rather than the general focus of health care on remedial effects. Preventative health measures are most likely to reduce the rate of health problems such as obesity and depression to a greater degree than remedial care and treatment of symptoms (Walker, *et al.*, 2004). Establishing whether there are clear casual links between access to parklands and improved health could guide support for investment in establishing and maintaining parklands as an important component of the wellness tourism destination brand.

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