

Evaluating the impact of a healing garden on adults in custody at the Oregon State Penitentiary

by

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Abstract

There is an established and ever-growing body of literature that supports the use of green space for both treating and preventing illnesses both physical and psychological for the general public. An arm of this research has suggested that green space can also help to normalize carceral environments and make them more conducive to addressing the trauma of Adults in Custody (AIC) and reducing recidivism rates. However, more research is necessary for many stakeholders in the department of corrections to invest in green space for AIC. Thus, existing projects such as the Memorial Healing Garden (MHG) at the Oregon State Penitentiary (OSP) provide valuable opportunities to investigate potential impacts and gain insight into how green spaces could be incorporated into carceral settings and accordingly make informed decisions. Through this study, I seek to increase our understanding of the garden's impact from several angles: To what extent does the MHG benefit the well-being of AIC? Does the MHG have a distinguishably different effect on well-being than other outdoor spaces at OSP? What elements or garden features are most supportive of the well-being of incarcerated individuals? These questions were explored through Likert scale surveys with text and photo prompts related to the MHG that were distributed to AIC. Factor analysis of survey responses was then employed to determine overall trends. Findings reveal that the MHG has a distinguishably positive effect on AIC well-being and even more so among acutely stressed individuals. Water features and culturally inspired elements were the most endorsed aspect of the garden. These findings advocate for the inclusion of high quality green space in prisons and to reconsider operations to maximize its use in daily operations. Through their skill set for making impactful green spaces, landscape architects and designers should take this opportunity to expand the profession's positive impact on society.

Introduction

Current state of prisons

To better understand the setting of the Memorial Health Garden (MHG), the state of prisons in the United States is a necessary topic to introduce. An essential element to discussing the recent history of incarceration in the United States is mass incarceration. Mass incarceration has been acknowledged as increasingly problematic in the United States since the 1970's. Today, Adults in Custody (AIC) numbers have increased ninefold from 196,000 in 1970 to 1,800,000 people today (Kang-Brown et al., 2023) and facilities to keep AIC costs the national GDP approximately \$1 trillion on an annual basis (McLaughlin et al., 2016). Furthermore, the demographics of those who constitute this spike in incarceration seldomly reflect an unbiased, blind justice; most of this growth has been "concentrated among poor, minority males who live in impoverished neighborhoods." (Clear, 2009). Despite the resource intensiveness of this phenomenon, the U.S. prison system has not equivalently proven to be effective at achieving the desired outcome of safer communities (Clear, 2009). Recidivism rates in the United States further expose this lack of efficacy with "an estimated 68% of released prisoners arrested within 3 years, 79% in 6 years, and 83% within 9 years" (Alper et al., 2018). Danielle Sered (2018),

founder of Common Justice, has acknowledged these shortcomings by arguing that "we cannot incarcerate our way out of violence" and advocated that we step away from our current punitive methodology and embrace a public health approach to justice.

If seen from the lens of public health, the status quo of the past 50 years in US prisons has had adverse effects on AIC health. Roughly 3,000 deaths occurred every year in US prisons between 2001 and 2014; the leading causes of which were cancer, heart disease, liver disease, respiratory disease, suicide, and AIDS (Noonan, 2016). Conditions directly attributable to incarceration include: infectious disease, cardiovascular disease, weight gain, hypertension, and cancer- all of which have demonstrated elevated risk under incarceration (Massoglia, 2008; Massoglia & Pridemore, 2015). In regards to proposed mechanisms for these adverse health conditions, research has shown that the experience of incarceration itself can act as an acute stressor as well as a chronic stressor, both of which lend themselves to the development of the conditions above (Massoglia, 2008a; Massoglia 2008b; Pearlin, 1989, Thoits, 1995; Wheaton, 1994).

What makes the carceral environment so stressful is twofold: the setting itself is extremely stress-inducing and the AIC that populate them are particularly vulnerable to its effect. (Lindquist, 2000). A newly admitted AIC will endure the loss of their original support system, leading to potential isolation with implications for morbidity and mortality (Backlund et al., 1996; Ecob & Davey Smith, 1999; Gutzwiller et al., 1989; Ross & Mirowsky, 1995; Verbrugge, 1979). Creating a new support system within prison walls is complicated by hostility and stigma among AIC (Lindquist, 2000) and a range of stressors such as witnessing acts of violence, struggles in navigating a social hierarchy with other AIC and staff members, living under harsh conditions, and systematic overcrowding will tax them on the a regular basis (Massoglia & Pridemore, 2015; Abbott, 1981; Clemmer, 1960; Hassine, 2011; Sykes, 2020). It should be noted that it is not just AIC that suffer from this status quo; 70% of correctional officers have been exposed to violence in their line of work (Denhof & Spinaris, 2016).

AIC are ill-equipped to handle these conditions as the majority of them have lifelong physical and mental health problems from childhood abuse (Anda et al., 2002; Bonta & Andrews, 2016; Dube et al., 2003; Dube et al., 2005; Felitti et al., 1998; Horwitz et al., 2001). Recalling their life histories before the age of 18, AIC reported the following: "64% of AIC experienced emotional abuse, 60% experienced physical abuse, 43% experienced sexual abuse, 71% had divorced parents, 40% witnessed domestic violence, 64% had alcohol/drug use in their home, 34% had mental illness in their home, and 42% had an incarcerated parent" (Messina & Burdon, 2018; Messina & Calhoun, 2018). Experiences of this nature have a significant association with antisocial behaviors and mental health issues (Bloom et al., 2003; Greenfield & Marks, 2010; Herman, 1992; Herman, 1997). This trauma and violence follow AIC into their life in prison (Messina et al., 2007; Owen et al., 2017). However, such histories of trauma are seldom addressed by corrections-based treatment and recovery (Kubiak et al., 2017; Messina et al., 2004). It is also unlikely that AIC will have had their traumas addressed or be familiar with therapeutic processes prior to entry as they tend to seldomly use healthcare resources before incarceration (Schnittker & John, 2007).

Trauma-informed corrections and transformative justice movement

Responding to the United States' current punitive model's outcomes, recommended policy changes are to incorporate and expand upon programs that focus on improving carceral healthcare and ready AIC for reintegration into normal society (Massoglia & Remster, 2019). Trauma can prove to be an obstacle to procedures pertaining to healthcare in carceral settings; practices such as pat downs may trigger trauma-related symptoms such as impulsive or aggressive behaviors (Covington, 2008). Thus, an approach that incorporates an understanding of trauma to the delivery of services is a necessity; fortuitously such a model is well-researched and officially referred to as the "trauma-informed approach."

According to the Substance Abuse and Mental Health Services Administration (SAMHSA), a trauma-informed approach entails: "An understanding of trauma and an awareness of the impact it can have across settings, service, and populations." Staff at institutions can carry out "trauma-informed services" that rethink and avoid institutional practices that are likely to retraumatize and use evidence-based practices that facilitate recovery from trauma (*SAMHSA's Concept of Trauma and Guidance for a Trauma-Informed Approach | SAMHSA Publications and Digital Products*, 2014). This requires a change of mindset as prison staff are often taught to create an environment of "total control"; while such environments contain violence, they also intensify it (Hearn & Parkin, 2001). A mental health unit in Massachusetts stepped away from a total control ideology and by creating a trauma-informed environment, was able to decrease AIC assaults on staff by 62% and AIC on AIC assaults by 54% (Benedict, 2014). Implementation of trauma-informed practices in the staff to AIC relationship is crucial; interpersonal victimization has the capacity to inflict greater psychological harm than even natural disasters due to its deliberate nature (Green, 1990; Herman, 1992). Adopting these practices benefits staff members as it makes their jobs easier, facilities safer, and programming more effective (Kubiak et al., 2017).

While there is an intrinsic interest in reducing the use of incarceration for a trauma-informed approach and transformative justice, there also comes the question of how to create a rehabilitative environment for individuals who must be retained in the carceral system until it is safe to release them. This is precisely where green space enters the discussion: even though incorporating green space relinquishes some level of control and security within prisons, their benefits are numerous.

Green space in carceral settings

The few studies that have focused on the benefits of green spaces for AIC have demonstrated reduced recidivism (Khatib & Krasny, 2015; Felbaum, 2011), reduced self-harm (Moran & Turner, 2019), improved relationships with family and social connections (Baybutt et al., 2019; Jenkins, 2016), reduced risk-taking (Rice & Lremy, 1998; Richards & Kafami, 1999), enhanced learning, enhanced understanding of health, skill building, increased employability, and promotion of models of good citizenship (Baybutt & Chemlal, 2016).

While there is growing evidence of the benefits of green space for AIC, it has only been until very recently in 2023 that the Landscape Architecture Foundation sponsored a fellowship to educate practitioners in the field about carceral green space (Winterbottom, 2023). This latency may be due to carceral green space's controversial reception by the public since some perceive it

as a privilege that should not be allotted to felons (Moran & Turner, 2019). However, in recognition that many AIC will be rejoining society after their term in prison, arguments have been made for reforming the current U.S. penal system to incorporate green spaces to lower recidivism rates (van der Linden, 2015). As studies supporting the incorporation of green spaces to carceral settings accumulate, there is a need for further research into the impact of green spaces within carceral environments so that prisons with specific needs and circumstances can determine best practices to follow.

The health benefits of green space

Nature and by extension, green spaces have been recognized to possess therapeutic properties since at least the late 18th century (Koschnitzki, 2011). Nature has been described as “living systems with plants and nonhuman animals from a range of scales from small urban parks to pristine wilderness” (Bratman et al., 2015), and has been the subject of several theories regarding why humans gain psychological benefits from it. These include Privacy Regulation Theory (Altman, 1977), Prospect-Refuge Theory (Appleton, 1984), Biophilia (Wilson, 1984), Attention Restoration Theory (Kaplan & Kaplan, 1989), and Stress Reduction Theory (Ulrich et al., 1991). From these earlier studies, the field of environmental psychology has continued to seek empirical evidence to further understand the relationship between human well-being and nature experiences. A meta-analysis of over 240 studies supports the use of green space for an array of physical and mental illnesses (Annerstedt & Währborg, 2011). Examples of such benefits would be improved stress recovery (Aletta et al., 2018; Ratcliffe, 2021), lower levels of depression (Cox et al., 2017), and even fewer days in hospital and less need for pain-killing drugs (Ulrich, 1984). On an interpersonal level, nature contact has been shown to reduce aggression (Bogar & Beyer, 2015; Branas et al., 2011; Kuo & Sullivan, 2001; Troy et al., 2012; Younan et al., 2016) and encourage prosocial behavior (Broyles et al., 2011; Dadvand et al., 2016; de Vries et al., 2003; Fan et al., 2011; Holtan et al., 2014; Kuo & Sullivan, 2001; Piff et al., 2015; Sullivan et al., 2004).

Green space type and use

Numerous studies have investigated what qualities of green spaces are most preferential or restorative to various kinds of users. A recent systematic review by Harries et al. (2023) identified desirable attributes for the design of a “well-being garden”. The review named six key design recommendations: “accessibility, wayfinding, fostering serenity, variety of planting, spatial organization, and cultural artifacts.” Putting their review in brief, “accessibility” is ensuring the space is easy for people of varying abilities to find and access. “Wayfinding” was termed as making the space easy for users to navigate and encouraging exploration. “Fostering serenity” was regarded as the space’s capacity to provide a peaceful, silent, and caring environment. “Variety of planting” was conceptualized as having different colors, scents, and textures available to users through plantings in a space. “Spatial organization” was described as the creation of rooms with natural materials (trees, tall grasses, climbers.) Lastly, “cultural artifacts” facilitate fascination through cultural and historical significance.

Additionally, the concept of “place attachment”, defined broadly as an “emotional bond with a place” (Low & Altman, 1992; Manzo, 2023), has been shown to have a significantly positive role in nature connectedness (Basu et al., 2019). “Nature connectedness” demonstrates a strong

relevance to the benefit of green spaces as it significantly predicts happiness even when family and culture are controlled (Zelenski & Nisbet, 2012). All of this leads to the notion that familiarity with a given green space or nature plays a significant role in a user's capacity to benefit from its use. Conversely, traumatic experiences related to green space types may diminish its benefits. For example, due to a history of racial violence, some Black populations in the United States have disturbing mental associations with trees, fields, and forests (Johnson et al., 2001; Johnson et al., 2010). These studies indicate that the creation and use of green spaces require special consideration of the intended users' backgrounds and relationships to nature.

With the task of introducing the design of healing gardens, it is of value to include the concept of the "Japanese garden." In a general sense, Japanese gardens serve as inspirations for today's efforts to create well-being gardens. Modern professional texts regarding the design of well-being gardens such as *With People in Mind* cite Japanese gardens as examples to observe design recommendations in action (Kaplan et al., 1998, p. 72). A study from 2018 postulates that traditional Japanese garden design demonstrates an intuitive understanding of Appleton's 1984 Prospect-Refuge Theory (Senoglu, 2018). Prospect-Refuge theory posits that humans intrinsically prefer spaces that offer an adequate view of their surroundings and simultaneously conceal themselves from view (Appleton, 1984). These gardens' understanding of this principle follows logically, as the intent of Japanese gardens has always been to calm the mind and encourage reflection and contemplation (Goto et al., 2014). More specific to the context of the United States, studies conducted by Goto & Fritsch (2011) and Yang & Brown (1992) demonstrate a high preference for Japanese style landscapes by U.S. and western audiences. The calming aesthetic of Japanese gardens has even been proposed as a cost-effective method of reducing measures of stress in patients at healthcare facilities (Goto et al., 2014).

Green space implementation in healthcare facilities

As mentioned above, healthcare settings have had greater empirical attention and best practice recommendations than carceral settings for green space (Moran & Turner, 2019); thus discussing healthcare-based green spaces lends itself to introducing current institutional healing garden precedents. Examples of green spaces in healthcare settings include "Wilmington Hospital Atrium & Healing Courtyard" and "Nemours / Alfred I. duPont Hospital for Children East Roof Terrace Healing Garden" by Robinson Anderson Summers, Inc. The Wilmington Hospital Atrium & Healing Courtyard design gave each patient window a view into the garden and incorporated natural lighting and water to create a visually engaging environment and sense of enclosure. The Nemour / Alfred I. du Pont Hospital for Children East Roof Terrace Healing Garden uses similar methods to assist debilitatingly ill patients to enjoy nature despite not being able to leave their rooms (He, 2019).

While modern research has granted new insights into what makes an ideal healing garden, there are rich histories of healing garden design such as those in China and Japan. Such gardens have been shown to be highly preferable by participants in studies regarding healing gardens (Yang & Brown, 1992; Goto, 2012; Goto 2014). The 5th Xiangya Hospital Healing Garden by Payette Architects consulted with a Fengshui master to implement their water features and planted terraces in a soothing manner for their patient's benefit (He, 2019). Kurisu LLC incorporated traditional Japanese garden principles to create healing gardens for both the Samaritan Lebanon Community Hospital and Rosecrance Griffin Williamson Campus (Kurusu International, n.d.). In

the case of the Rosecrance Griffin Williamson Campus, a post-occupancy evaluation found the garden to reduce patient stress even with only a view of the garden (Bergeman, 2012).

To better connect professionals engaging in the construction of healing green spaces and create best practices for designing healing gardens, the American Society of Landscape Architects (ASLA) has created Professional Practice Networks (PPN): the Healthcare and Therapeutic Design PPN (He, 2019) specifically to share best practices for healing gardens.

Building upon existing literature

The study presented here contributes to the existing literature on carceral green space by adding a case study of the MHG at Oregon State Penitentiary (OSP). This is a unique context as most carceral green spaces and programs are designed with an emphasis on food production or job training to be more aligned with producing more tangible products and results from AIC. This focus on agricultural productivity is said to have roots in the penal system's original focus on self-sufficiency through hard labor and its often rural settings. (Jiler, 2006; Golbuff, 2016). A study on the MHG is valuable since it would address how gardens designed with the sole intent of providing respite and reflection for AIC may improve conditions in US prison systems.

The overall research questions are: "To what extent does the MHG benefit AIC well-being?", "Does the MHG have a distinguishably different effect on well-being than other outdoor spaces at OSP?" and "What elements or garden features are most supportive of AIC well-being?"

Methods

Site description

The MHG's conception and early reception at the end of construction have been discussed by Dr. Arimoto and Dr. Michaux of Western Oregon University and Willamette University (Arimoto & Michaux, 2020). Given the veracity of their work, this site description draws upon their publication to describe the MHG unless otherwise stated.

OSP is a 150 year old men's maximum security prison located in Salem, Oregon. On the day of the survey it housed 1750 AIC (Kempny, 2023). OSP provides programs and services for AIC, such as clubs based around cultural enrichment and cultivating job-relevant skills. These clubs include the Asian Pacific Family Club (APFC), Lakota Club, Uhuru Club, Lifers Club, the Music Program and others. An important development in recent years has been the Oregon Department of Corrections' (ODOC) adoption of a new philosophy for their operations known as the Oregon Way. With Norwegian correctional facilities as a model, the Oregon Way seeks to "improve conditions of confinement, humanize AIC and staff interactions, normalize prison operations, and reduce the overall use of incarceration" (Oregon Department of Corrections, n.d.).

The MHG itself was a project spearheaded by the APFC (150 members) and, under its leadership, a community of stakeholders realized the garden's construction. Beginning with the donation of the garden design by Japanese garden designer Hoichi Kurisu, the necessary \$400,000 for materials was fundraised by AIC through donations with no use of tax dollars. Most of the necessary labor was supplied by AIC, with gardeners from Hoichi Kurisu's company also participating.

The MHG is approximately 0.3 acres (1,174 square meters) in area and enclosed in a tall chain-link fence rendering it only accessible by its closely monitored entrance gateway. Designed from the ground up as a strolling reflection garden, the MHG strongly emphasizes the improvement and upkeep of AIC well-being. Regardless of club affiliation, AIC are welcome to use the garden or participate in its maintenance; however, the entrance is closely monitored through security cameras and the number of persons allowed in at a given time is limited for ease of surveillance. The garden is also understood as a privilege that can be revoked should its terms of use be violated or otherwise if security procedures call for its temporary closure.

Participants & recruitment

AIC were given notice of the survey by means of the OSP's electronic bulletin board system on June 2, 2023. This ensured a more equal degree of opportunity to be aware of the survey's distribution on June 16, 2023 since it would not be restricted to wherever print-out flyers could be posted. The particular time of 5pm to 8pm was chosen to follow OSP's request to hold the survey during the monthly APFC meeting. Non-members of APFC were allowed to participate if they had used the MHG prior to taking the survey. 100 survey copies were printed and 75 participants completed the survey. Of the 75 participants, 30.7% were White, 24% were two or more races, 17.3% were American Indian/Alaska Native, 9.3% identified as "other", 6.7% were Asian, 5.3% were Black/African American, 1.3% were Native Hawaiian/Pacific Islander, and 5.4% chose not to specify any race or ethnicity. Regarding age, 48% were 31-45 years old, 32% were 46-60 years old, 10.67% were 61+ years old, 6.67% were 25-30 years old, and 2.67% were 18-24 years old. Regarding Hispanic ethnicity, 17.3% identified as Hispanic, 77.3% identified as non-Hispanic, and 5.3% preferred not to say.

For reference, OSP's general population is 77.2% White, 9.9% Black, 8.6% Hispanic, 2.5% American Indian/Alaska native, 1.5% Asian, and 0.3% Native Hawaiian/Pacific Islander. In terms of age, 43.1% are 31-45 years old, 26.78% are 46-60 years old, 13.2% are 25-30 years old, 13% are 61+ years old, and 3.9% are 18-24 years old (Sterling, 2023).

Survey development

Surveys were developed by the Principal Investigator, Thomas Charney, in collaboration with thesis committee members Dr. Jason Duvall and Dr. William Sullivan. Other aspects of the survey were developed in cooperation with the APFC within OSP; in particular, AIC Randy Guzek relayed relevant information and materials through a screened email system. Review from the University of Michigan's IRB as well as the ODOC's External Research Review Committee introduced additional refinement of the surveys to follow ethical and security guidelines for conducting a survey in a carceral setting. The demographic questions of the survey were based on the US Office of Management and Budget to align with current US census standards (*Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity*, 1997). These paper surveys were designed to be completed in approximately 15 minutes.

Measures

The survey instrument consisted of multiple-choice demographic questions and a collection of Likert-rating scale questions designed to assess (1) perceived impact of time spent in the garden;

(2) the extent to which time spent in the garden helps to alleviate common stressors; and (3) the degree that various outdoor and recreational prison settings supported AIC wellness. The complete survey instrument can be found in Appendix A.

Perceived impact of the MHG

To investigate the perceived impact of the MHG, AIC were asked to indicate how strongly they agreed with 16 different impacts associated with spending time in the garden on a 5-point scale (*strongly disagree to strongly agree*). These impacts were similar to those investigated by Moran (2019) and selected to represent a range of physiological, psychological, and social benefits commonly associated with nature exposure, including reductions in anxiety, anger, and loneliness and enhanced feelings of relaxation, vitality, self-awareness, and emotional control.

Alleviation of common stressors

The ability of the garden to alleviate common stressors was assessed by first asking AIC to rate how much they were bothered by 10 stressors typically present in carceral settings on a 5-point scale (*not at all to very much*). The list of stressors was based on collaboration between thesis committee member Dr. William Sullivan and P.I. Thomas Charney; it was then refined with the help of AIC Randy Guzek to ensure the selected stressors were relevant to OSP. These included stressors related to loneliness, safety, privacy, and freedom/autonomy. In the survey prompt AIC were then asked to rate how much spending time in the garden helps to lessen these 10 stressors on a 5-point scale (*not at all to very much*).

Comparing outdoor and recreational prison settings

To determine how the MHG compared to other outdoor and recreational settings, AIC were asked to rate 26 photos of outdoor and recreational settings at OSP in terms of how helpful the setting supported wellness on a 5-point scale (*not helpful to very helpful*). The collection of images represented a range of different natural and build settings accessible to AIC. This included photos of the MHG, as well as photos of exercise and recreational spaces with varying levels of natural features. One photo was removed from subsequent analysis due to a minority of AIC having access to the setting represented (see image 24 of Appendix A and Appendix B). This resulted in ratings of 25 total settings.

Demographics

The survey instrument also included several demographic questions. These included questions assessing AIC age and ethnicity.

Analysis

To assess construct validity and identify a set of common underlying themes, separate factor analyses using a Principal Axis factor structure and Varimax rotation were conducted on measures related to perceived impact of the MHG, common stressors, and images of outdoor and recreational prison settings. All factor structures were based on item loadings of at least .50, Eigenvalues greater than 1.0, and Cronbach's Alpha coefficients of at least .60. Item loading on more than one factor at .50 or above were excluded. Once the categories were identified, each was given a short descriptive name and a mean score was calculated based on the average rating of items within each category, across all respondents.

A series of separate paired samples t-tests were used to compare the mean ratings of factor categories. This was done to determine if certain perceived impacts, common stressors, or types of settings were more strongly endorsed. To determine if ratings of settings varied as a result of common stressor ratings, independent samples t-tests were used to compare participants with higher stressor ratings for the factors generated earlier in the stressor analysis.

Procedure

100 printed surveys were distributed at OSP on June 16th, 2023 by study coordinator, David Komeiji. No OSP staff screened the surveys during their transport; however, the Research Operations Manager for the ODOC Office of Research, Data, and Decision Support observed the survey administration to maintain independence between IRB and CITI certified researchers and OSP facility staff. No identifying information regarding the AIC was recorded. In all, 75 participants completed the survey and scans of the completed surveys were sent to the principal investigator electronically for statistical analysis.

As participants joined the meeting, they were given tables to sit at (measuring 2' x 2' x 6') with groups of 4 participants at a table. While views of other participants were unable to be fully obstructed at the tables, the participants were distanced apart from each other and verbally briefed on the Informed Consent document detailing how to protect their own and other participants' privacy (e.g., avoiding writing one's own name on any page of the survey). The study coordinator remained in the room to take questions or provide clarification for the participants during the entire length of the survey.

Results

Perceived impacts of the MHG

Respondents endorsed feeling “more calm and relaxed” as the impact most strongly associated with spending time in the garden (M=4.80, S.D.=.57), followed closely by feeling “a sense of peace and contentment” (M=4.76, S.D.=.65), and feeling “more in tune with my own thoughts and feelings” (M=4.71, S.D.=.65). In total, every item except one, related to feeling less alone and disconnected, received a mean endorsement above 4.00, indicating that AIC commonly experienced a variety of benefits from spending time in the MHG.

Factor analysis of the 16 items assessing the perceived impact of the MHG resulted in 3 distinct categories: *Restoration & Reflection*, *Social Connection*, and *Slowing Down* (see Table 1). The first, *Restoration and Reflection*, included impacts related to feelings of relaxation, self-awareness, and emotional control. The second category, *Social Connection*, was composed of impacts associated with feeling more connected with others and less alone. The final category, *Slowing Down*, was composed of a single item that reflected feeling at a slower pace while interacting with the MHG.

Paired samples t-tests indicated that feelings associated with *Restoration and Reflection* were more strongly endorsed than *Social Connection*, $t(74)=5.77$, $p<.001$. These results also indicated

that feelings of *Slowing Down* were more strongly endorsed than *Social Connection*, $t(74)=4.41$, $p<.001$.

Table 1. Factor analysis on garden effects

Category name and items included		Mean	S.D.	Alpha
RESTORATION & REFLECTION		4.58^a	.61	.93
<i>Items</i>	<i>Loadings</i>			
Less anger and frustration	.83	4.65	.69	
Like it's easier to let go of things that are bothering me	.79	4.49	.80	
More in tune with my own thoughts and feelings	.78	4.71	.65	
More calm and relaxed	.77	4.80	.57	
A sense of peace and Contentment	.70	4.76	.65	
More aware of what's going on in my mind	.67	4.39	.90	
More alive and energized	.56	4.55	.72	
I can process my emotions	.50	4.29	1.02	
SOCIAL CONNECTION		4.10	.84	.83
<i>Items</i>	<i>Loadings</i>			
Less alone and disconnected from others	.81	3.92	1.11	
More connected to the people I most care about	.70	4.13	.89	
Like it's easier to listen and Talk to other people	.69	4.24	.90	
SLOWING DOWN		4.55^a	.86	--

Means are based on a 5-point scale rating with higher values denoting identification with the given outcome. Means sharing a superscript are *not* significantly different from one another in a paired sample t-test at $p \leq .01$.

Alleviation of common stressors

Respondents identified “lack of privacy” as the greatest stressor they experience ($M=3.79$, $S.D.=1.28$), followed very closely by “restricted movement” ($M=3.77$, $S.D.=1.26$), and “lack of intimacy with loved ones” ($M=3.67$, $S.D.=1.42$). Stressors related to “lack of safety” ($M=2.40$, $S.D.=1.39$), “how others treat me” ($M=2.35$, $S.D.=1.27$), and “lack of a job” ($M=1.79$, $S.D.=$) had the lowest mean scores.

When asked how much spending time in the MHG helps to lessen the impact of each stressor, respondents indicated that time spent in the MHG helps the most with stressors related to “restricted movement” ($M=3.99$) and a “lack of a view of the free world” ($M=3.87$). In total,

every stressor except one, related to “lack of a job”, received a mean rating of 3.29 or higher (3.0 indicating *somewhat* and 4.0 indicating *a lot* on the Likert scale); this would indicate spending time in the MHG helped at least somewhat to alleviate the majority of stressors.

Factor analysis of the 10 items assessing common stressors identified 2 distinct categories: *Lack of Privacy & Freedom* (M=3.66) and *Safety & Social Discomfort* (M=3.06) (see Table 2). The first, *Lack of Privacy & Freedom*, included stressors associated with limited privacy, a lack of personal autonomy, and constrained movement. The second category, *Safety & Social Discomfort*, included stressors associated with concerns about personal safety, as well as, feelings of isolation and social disconnection. Paired samples t-tests indicated that a *Lack of Privacy & Freedom* was a significantly stronger stressor than *Safety & Social Discomfort*, $t(74)=5.12, p<.001$.

When these same 2 factors are used to investigate how much spending time in the MHG lessens stressors, paired samples t-test results indicated that time in the garden reduced stressors related to a *Lack of Privacy & Freedom* (M=3.71) significantly more than stressors related to *Safety & Social Discomfort* (M=3.51), $t(74)=2.45, p=.017$.

Table 2. Factor analysis on common stressors

Category name and items included		Mean	S.D.	Alpha
LACK OF PRIVACY & FREEDOM		3.66	1.15	.85
<i>Items</i>	<i>Loadings</i>			
Lack of privacy	.84	3.79	1.28	
Restricted movement	.81	3.77	1.26	
Lack of control or autonomy	.70	3.38	1.37	
SAFETY & SOCIAL DISCOMFORT		3.06	.56	.81
<i>Items</i>	<i>Loadings</i>			
Lack of safety	.74	2.40	1.39	
Lack of intimacy with loved ones	.58	3.67	1.42	
Loneliness	.55	2.99	1.43	
How others treat me	.55	2.35	1.27	
Lack of communication with family and friends	.52	3.45	1.36	
Lack of view of free world	.50	3.47	1.53	

Comparing outdoor and recreational prison settings

The setting with the highest overall mean score was the “garden koi pond” (M=4.92), followed by closely by the “garden bridge” (M=4.88), “garden waterfall” (M=4.88), “garden lily pads” (M=4.81), and the “garden water feature” (M=4.77). Settings that received the lowest mean scores were the “outdoor fenced paved yard” (M=1.30), followed by the “outdoor fenced recreation yard” (M=1.68) and “outdoor phones and walkway” (M=1.88). In total, all of the MHG settings received a mean score above 4.00 and each of the lowest scoring settings predominantly featured fencing, walls, and/or prison buildings.

Factor analysis of the 25 images of outdoor and recreational settings generated 6 distinct categories with 16 of the images: *Water Features & Cultural Artifacts*, *Gym Equipment*, *Enclosed Lawn*, *Dry Rock Garden*, *Felled Tree Installation*, and *Garden Security Gate* (see

Table 3). *Water Features & Cultural Artifacts* (M=4.75) contained views of the MHG with either a prolific water feature such as a koi pond and a waterfall; cultural artifacts within this factor were views of a Japanese-style garden lantern, a garden statue, or a stone walking path. *Gym Equipment* (M=2.56) as a factor contained views that featured exercise equipment in both outdoor and indoor settings. *Enclosed Lawn* (M=1.93) consisted of images of multi-purpose recreational areas and outdoor phones surrounded by fencing. The remaining factors *Dry Rock Garden*, *Felled Tree Installation*, and *Garden Security Gate* were all single items. *Dry rock garden* (M=4.53) consisted of a Japanese style raked gravel garden located in the rear of the MHG. *Felled Tree Installation* (M=4.51) consisted of a felled Douglas Fir log placed intentionally near the entrance of the MHG. *Garden Security Gate* (M=4.32) consisted of a metal gate with bamboo ornamentation that serves as a partition between the MHG and the rest of OSP.

It is noteworthy that mean scores of all categories associated with the MHG were well above 4.00, indicating AIC felt strongly that various elements of the MHG were supportive of their wellness. Conversely, the factor categories dominated by exercise equipment and fencing received mean scores below 3.00. The paired samples t-test results underscore these findings, revealing that *Water Features & Cultural Artifacts* were rated as significantly more beneficial than *Gym Equipment*, $t(74)=17.14$, $p<.001$, or the *Enclosed Lawn*, $t(74)=23.50$, $p<.001$. The *Dry Rock Garden* was also rated as more beneficial than either the *Gym Equipment*, $t(74)=13.34$, $p<.001$, or the *Enclosed Lawn*, $t(74)=18.97$, $p<.001$. Likewise, the *Felled Tree Installation* was viewed as significantly more helpful than the *Gym Equipment*, $t(74)=15.10$, $p<.001$, or the *Enclosed Lawn*, $t(74)=19.40$, $p<.001$. Finally, the *Garden Security Gate* was also seen as significantly more helpful to wellness than the *Gym Equipment*, $t(74)=11.20$, $p<.001$, or the *Enclosed Lawn*, $t(74)=16.01$, $p<.001$.

In addition, paired samples t-test indicated that *Water Features & Cultural Artifacts* were rated as significantly more beneficial than the *Dry Rock Garden*, $t(74)=2.93$, $p<.001$, the *Felled Tree Installation*, $t(73)=3.02$, $p<.001$, or the *Garden Security Gate*, $t(74)=4.72$, $p<.001$.

Table 3. Factor analysis of outdoor & recreational prison settings

Category name and items included		Mean	S.D.	Alpha
WATER FEATURES & CULTURAL ARTIFACTS		4.75	.41	.90
<i>Items</i>	<i>Loadings</i>			
Garden water feature	.83	4.77	.56	
Garden lantern	.81	4.65	.65	
Garden statue	.75	4.57	.83	
Garden bridge	.74	4.88	.37	
Garden lily pads	.71	4.81	.49	
Garden waterfall	.66	4.88	.33	
Garden path	.60	4.51	.72	
Garden koi pond	.55	4.92	.27	
GYM EQUIPMENT		2.56	1.10	.87
<i>Items</i>	<i>Loadings</i>			
Gym equipment with tables	.91	2.72	1.33	
Sheltered outdoor gym	.89	2.72	1.41	
Gym equipment and lawn	.80	2.32	1.12	
Indoor gym	.57	2.39	1.09	
ENCLOSED LAWN		1.93	.98	.78
<i>Items</i>	<i>Loadings</i>			
Outdoor phones	.75	1.88	1.12	
Bleachers and field	.67	2.24	1.27	
Chain link fence gateway	.66	1.68	1.15	
DRY ROCK GARDEN (single item)		4.53	.77	--
FELLED TREE INSTALLATION (single item)		4.51	.76	--
GARDEN SECURITY GATE (single item)		4.32	.92	--

Concern-levels and response scores

Independent t-tests were used to determine if ratings of outdoor and recreational settings differed between respondents with higher and lower levels of self-reported stressors. These results indicated AIC that expressed greater concerns about a *Lack of Privacy & Freedom* rated the *Enclosed Lawn* as significantly less beneficial to their wellness ($M = 1.73$) compared to respondents with lower levels of concern about privacy and freedom ($M = 2.24$), $t(73) = -2.25$, $p < .05$. Similarly, AIC that expressed greater concerns about *Safety & Social Discomfort* rated the *Enclosed Lawn* as significantly less helpful ($M=1.70$) than respondents with less concerns about safety and social discomfort ($M=2.16$), $t(60)=2.07$, $p=.043$.

While there was also some evidence that Water Features & Cultural Artifacts were rated as more beneficial for those with higher concerns about Safety & Social Discomfort, this difference was not significant, $t(53)=1.83$, $p=.073$.

Table 4. Concern factors split on mean statistics

<i>Water features & cultural artifacts</i>	N	Mean	S.D.
Low freedom/privacy	29	4.68	.04
High freedom/privacy	46	4.79	.26
Low safety/social	37	4.66*	.51
High safety/social	38	4.83*	.26
<i>Gym equipment</i>	N	Mean	S.D.
Low freedom/privacy	29	2.69	1.09
High freedom/privacy	46	2.48	1.11
Low safety/social	37	2.72	1.20
High safety/social	38	2.41	.99
<i>Enclosed lawn</i>	N	Mean	S.D.
Low freedom/privacy	29	2.24**	1.11
High freedom/privacy	46	1.73**	.84
Low safety/social	37	2.16**	1.16
High safety/social	38	1.70**	.71
<i>Dry rock garden</i>	N	Mean	S.D.
Low freedom/privacy	29	4.59	.78
High freedom/privacy	46	4.50	.78
Low safety/social	37	4.49	.77
High safety/social	38	4.58	.79
<i>Felled tree installation</i>	N	Mean	S.D.
Low freedom/privacy	29	4.66	.67
High freedom/privacy	45	4.42	.81
Low safety/social	37	4.54	.69
High safety/social	37	4.34	1.02
<i>Garden security gate</i>	N	Mean	S.D.
Low freedom/privacy	29	4.31	.81
High freedom/privacy	46	4.33	.99
Low safety/social	37	4.30	.81
High safety/social	38	4.34	1.02

Asterisks denote significantly different means between low/high concerns. One asterisk (*) meaning a two-sided p-value <.1 and two asterisks (**) meaning a two-sided p-value <.05.

Discussion

Does the garden benefit the well-being of AIC?

This question can be addressed by three different means within the overall survey: the garden impact scores, garden effect & stressor scores, and the scores for photographs associated with the garden from the photographic survey.

From the garden impact segment of the survey, participants endorsed multiple benefits associated with spending time in the garden. This study consolidated said benefits into the factors *Restoration & Reflection*, *Social Connection*, and *Slowing Down*; all of which point towards an enhanced sense of well-being. The garden effect & stressor survey demonstrated that stressors common to the carceral environment were ameliorated by visiting the MHG. This would suggest not only that the MHG has the capacity to increase a sense of positive affect, but that it can mitigate negative affect as well. The settings representing the MHG in the photographic survey all received positive scores- in particular the factor *Water Features & Cultural Artifacts* was heavily endorsed. This would suggest that even without prompting AIC with text to ask about their experience of the MHG, they rate its settings as helpful to their well-being. All of these indicators point towards the reasonable conclusion that the MHG does benefit AIC well-being to a meritable extent.

While these results and interpretations are novel in their specificity to the MHG, existing literature supports them through generalizations regarding carceral green space and horticulture programs. Other studies have inventoried green space's contributions to AIC's well-being; specifically citing an improvement in their intrapersonal and interpersonal well-being as well as their optimism regarding employment (Baybutt et al., 2018; Jenkins, 2016). Several studies also indicate an amelioration of prison stressors similarly seen in this study (Moran & Turner, 2019; Jewkes, 2018; Baybutt & Chemlal, 2016; Richards & Kafami, 1999). This corroboration indicates that while the MHG is a precedent setting case study, its reported benefits rest upon a bedrock of literature regarding green space that reinforces its credibility.

Is the garden more beneficial than other outdoor spaces?

The design intent of the photographic survey was to provide a series of MHG settings to compare to non-MHG settings: a dichotomy between the two was hypothesized to emerge in factor analysis. While the MHG to non-MHG photo dichotomy was preserved in the sense that the factor analysis did not have any groups that contained both MHG and non-MHG photos- not all photos designed to represent the MHG came together into one grouping. *Dry Rock Garden*, *Felled Tree Installation*, and *Garden Security Gate* are all MHG settings but were seen as separate categories. Why these three settings were distinct is up for speculation- *Dry Rock Garden* and *Garden Security Gate* are located at the rear and front of the garden respectively, so it may not offer the same sense of enclosure as other settings in the MHG do. *Felled Tree Installation* may load in as a single item since it is not distinctly a Japanese cultural item; given it is a Douglas fir, it may be more reminiscent of Pacific Northwest forests. Another explanation may be its close proximity to the chain-link fence of the MHG- compromising AIC's sense of privacy. Despite the variety of MHG categories that emerged, it is worth noting that each MHG category received high levels of endorsement and, in every case, were seen as significantly more beneficial than the two non-MHG settings

It is noteworthy that participants reporting greater stress from *Lack of Privacy & Freedom* and *Safety & Social Discomfort* viewed *Enclosed Lawn* in a significantly more negative light than their less stressed counterparts. This may be due to the settings' high visibility which would diminish capacity for privacy, possibly forcing AIC in undesirable social situations. While not significant to the same extent, there was some indication that AIC with higher *Safety & Social*

Discomfort found *Water Features & Cultural Artifacts* to be more beneficial; the MHG's programming with these settings may play a role in providing a comfortable setting for socializing AIC or otherwise offer them a desirably private place to reflect.

Overall, these results indicate that the MHG is significantly more helpful to AIC well-being than other outdoor settings at OSP. Additionally, green spaces that have high visibility and exposure appear to be significantly less helpful to AIC suffering from stress.

What outdoor features are the most helpful to well-being?

Findings from the image ratings indicate that the most beneficial features were *Water Features & Cultural Artifacts*, *Dry Rock Garden*, *Felled Tree Installation*, and *Garden Security Gate* as opposed to *Gym Equipment* and *Enclosed lawn*. This may suggest that the MHG has a greater capacity to meet the needs of AIC than the more conventionally allotted recreational fields. A possible explanation for this may be the layout of the MHG being more in line with what Harries et al., (2023) identified as desirable attributes for green space. Hypothesizing from the settings of the photographic survey, there may be a discrepancy between the two groups in regards to the inclusion of accessibility, variety of planting, and cultural artifacts. In terms of accessibility, the MHG's programming is open to most AIC that express an interest, while the intimidating culture of prison may prove to reduce the approachability of the gym equipment or recreation fields. Variety of planting is in favor of the MHG with its numerous Japanese and Oregon-native plants; conversely, the other green spaces on site have little more than continuous turf grass. Aside from the Native American longhouse garden (see page 44 for Appendix A image, and item #24 of Appendix B), the MHG has the highest density of cultural artifacts in terms of outdoor settings at OSP; it should be noted, however, that the Native American longhouse garden is not as accessible as the MHG- its access is restricted by club affiliation.

The design recommendations for restorative spaces from *With People in Mind* may also point out reasons for the discrepancies between the MHG and non-MHG settings. These include "quiet fascination," "wandering in small spaces," "separation from distraction," and "wood, stone, old."

The MHG is arguably a more suitable place to find "quiet fascination" (defined as observable features or activities that encourage reflection) since its programming encourages immersing AIC in the garden setting and contemplating their lives. Gym equipment and open fields in prisons likely do not foster quiet fascination since the sense of being observed or judged in those settings may encourage hypervigilance rather than introspection.

The book's concept of "wandering in small spaces" calls for creating spaces rich with detail and to choreograph it to seem that it has a large extent. Looking at the MHG, the stone paths guide the AIC slowly through various features and the plantings create rooms that make it impossible to see the entire garden from just one vantage point. In contrast, the non-MHG spaces can be traversed and mentally grasped very quickly given their emptiness and thus do little to fascinate the viewer.

"Separation from distraction" is another key point made that advocates for the creation of a sense of physical and thematic enclosure that prevents visuals and noise from beyond the site boundaries from interfering with the experience of the design. The MHG has plantings and

hardscaping that both physically block sounds and visuals as well as create a sense of thematic cohesiveness. Non-MHG settings have unobstructed views into the rest of the outdoor spaces at OSP and have no capacity to filter noise from its surroundings.

Lastly, there is the concept of “Wood, stone, and old.” When designing with a natural setting in mind, it is recommended to choose materials such as wood and stone and to execute their incorporation so that it would appear as if they had always been there. As a Japanese garden, the MHG pulls off this tenet quite well through its wooden structures such as its gateways and bridges and stone elements such as its stone lantern and boulders. There are also subtle techniques such as positioning the boulders to make them appear naturally embedded in the site and through planting greenery between them to suggest a patina of age. Other outdoor spaces at OSP do little to accomplish this as most structures are constructed of sturdy metal and placed in orderly rows- more transparently demonstrating a recent human hand in their placement.

The results of this study fall in line with many of the current theories in environmental psychology. As Privacy Regulation Theory (Altman, 1977) would propose, a lack of privacy is a significant problem when experiencing the landscape. A notably lower preference for highly exposed environments by AIC supports this theory. Prospect-Refuge Theory (Appleton, 1984) postulates that environments designed with a sense of enclosure and quality views can help alleviate these concerns; this rationale may explain the alleviation of stressors by AIC in this study. Another attribute of the MHG for consideration may be the greater capacity for engaging with wildlife. A highly endorsed setting from the garden was the koi pond, and beyond their presence, AIC have happily reported the visitation of ducks, dragonflies, hawks, and hummingbirds to the garden- perhaps due to the provision of water, stones for basking, and various vegetative structures for roosting. As Biophilia (Wilson, 1984) would suggest, this interaction with other forms of life may be enhancing AIC sense of restoration; the Kaplan’s concept of “being away” (Kaplan et al., 1998, p. 18) may also be at play here since these various forms of wildlife and greenery may remind AIC of life outside prison walls. This study’s factor, *Restoration & Reflection* included items about improved introspection and processing of thoughts is consistent with Attention Restoration Theory (Kaplan & Kaplan, 1989). Improvements in AIC capacity to handle stressors as indicated by the stressor survey also corroborate with Stress Reduction Theory (Ulrich et al., 1991) which states similarly that unthreatening natural settings promote recovery from stress.

This study’s results may be further explained by other studies on carceral green space or serve to strengthen the plausibility of their findings. Engstrom & van Ginneken (2022) found that softer materials (less resilient, sound-absorbing properties, such as wood) in the built environment aid in making restorative spaces. This point may relate to the popularity of cultural artifacts in the photographic survey as all of them are made of natural materials such as wood and stone and will likely require maintenance. It is plausible that the positive impact the MHG seems to contribute to AIC well-being may be connected to their participation in the upkeep of the garden as Baybutt & Chemlal (2016) and Jewkes (2018) would imply. Jewkes (2018) also found that unstimulating settings in the built environment can be perceived as “damaging” by traumatized AIC, which corroborates with the finding that open fields yielded significantly lower scores from stressed AIC in this study.

Water elements are important to consider for designing carceral green space. After all, AIC strongly endorsed settings associated with water in this study. Particularly deep water may be reason for concerns in regard to hiding contraband or potential for injury in a prison, a topic thoroughly discussed during the design phase of the MHG (Arimoto & Michaux, 2020). At least in regards to public green space, its benefits are very well documented and advocated for (White et al., 2010). However, the existing literature regarding the use of water in outdoor carceral spaces is, at present, very limited. At the scale of a view of a seascape from a prisoner cell, Jewkes et al. (2019) described carceral blue space's benefit as "ambiguous" and urged for further study of carceral blue space. Given the high popularity of water features indicated by the results of this study, it is clear to see it contributes greatly to AIC well-being when incorporated thoughtfully as it is in the MHG; more studies regarding water features in carceral green spaces should be conducted to determine the veracity of these results.

What are the implications for policy and practice in prisons?

While there may be public stigma against providing high quality green spaces for AIC (Moran & Turner, 2019), this study and the cited works supporting it endorse its implementation for the sake of AIC well-being- and by extension to improve their chances of successfully reintegrating back into society. Even in the case of life-sentences, the improvements made on conduct within prison would be a worthwhile investment towards fostering a safe and productive environment for those who live and work in prisons. The resources and tax dollars saved by a high quality green space may prove so cost efficient through its reductions in these factors that it may well warrant budgeting funds towards their construction and maintenance.

Security and control are often the bottom line for prisons by their very nature, but this study found the flexibility the MHG demonstrated with this priority to be its greatest strength. By giving AIC a sense of privacy, a space for constructive socialization, and a representation of culture and nature reminiscent of life outside prison walls, the garden was capable of providing a sense of peace and positive affect. Both of which are necessary for AIC's transformation to upstanding citizens and reintroduction into our communities. Therefore, it would be in the best interest of management to open their minds to revisiting existing landscapes and working with the idealistic concepts pitched by AIC and designers. Ideally, following up with constructive feedback towards realizing it rather than outright denying their proposal. Compromise will likely be necessary, but if the MHG is any indication, it is possible to maintain both ideals and maximize the benefit to AIC.

Lastly, a key finding of this study was that the MHG benefited highly stressed AIC to a significantly greater extent than the general population. This may have widespread implications across management in prisons. We already know that providing green space for AIC reduces the burden of recidivism and violence in prisons (Khatib & Krasny, 2015; Felbaum, 2011)- so it would follow logically to maintain accessibility and encourage use of greenspace for all AIC as a preventative measure, and possibly even a remedial one. To speak more pointedly on the topic of remediation, I propose a re-evaluation of solitary confinement. While it may seem necessary or logical to remove particularly violent individuals away from the general population, the practice of solitary confinement has been shown to deteriorate AIC's mental capacities and has associations with future violence (Luigi et al., 2022) . Considering the weighty influence that trauma and the stressful conditions of the prison environment have on AIC conduct (Messina et

al., 2007; Owen et al., 2017), integrating green space into the management of offending AIC may help address underlying causes for their misconduct and ultimately be the most effective approach.

What are some considerations for landscape architects?

Through thoughtful design, the hands of landscape architects have already been shown to reduce crime rates in communities (Bogar & Beyer, 2015; Shepley et al., 2019; Troy et al., 2012); there is little reason this same skill and ethic should not be extended to the carceral environment. Considering the influence the built environment has on the rehabilitation of AIC (Jewkes, 2018), designing green space for carceral institutions is a weighty task indeed. Golbuff & Winterbottom (2023) provides excellent orientations for designers about the general conditions and priorities for management in the carceral environment. Regarding how this study's results may be helpful to the design process of a given carceral project, I offer the following.

In addition to the typical site analysis, it is of key importance to understand the population the design will be serving. AIC suffer from various kinds of stress and lack much of any sense of freedom or agency in their daily lives. To effectively create a restorative space for this population, it is important to include AIC early in the design process- an opportunity they are unlikely to take for granted. Through collaboration, the AIC can recommend concepts that would resonate most with their population, and the landscape architect can synthesize these concepts into a comprehensive master plan. It is notable that the MHG concept grew out of a simple desire by AIC for a koi pond and then expanded out to a full-scale Japanese stroll garden (Arimoto & Michaux, 2020). When exploring possibilities for the design of the green space, do not assume social spaces, privacy, and water features are off the table simply because of security concerns; given their high preference by AIC, it is a worthwhile endeavor to idealistically include them in the initial concept and adjust the finer points as necessary when negotiating with management.

When negotiating with prison management, it is useful to remember that this study corroborates with several other studies regarding carceral green space on the following: access to nature is beneficial to the well-being of AIC. This study as well as the cited body of literature here are useful sources of empirically-grounded support that budget-minded institutions such as prisons need in order to confidently buy-in to green spaces. Bearing this in mind, it is important to research the status quo of prisons and tailor the delivery of this information appropriately to the client; transformative justice and green space access for AIC are still a relatively new initiative in the United States and sensitively worded but persistent advocacy on behalf of natural features in a plan with a client or benefactor will likely be necessary. Incorporating a maintenance plan and post-occupancy analysis will also be effective ways to encourage buy-in. Conditions such as tree-height and growth density will need to be addressed for the space's continued compliance with code. In the case of the MHG, Kurisu LLC is still retained to prune and otherwise adjust the site as necessary.

As noted by other sources, the concept of the Japanese garden is a valuable precedent to consult when designing a healing garden (Kaplan et al., 1998, p. 72); given the MHG was designed as a Japanese style healing garden, this cultural influence cannot be ruled out in this study. That being said, while it may be tempting to ad hoc import Japanese cultural artifacts for use within the landscape, I concur with the account of MHG's designer, Hoichi's Kurisu: the intangible aspects

of Japanese gardens are far more critical to their success than their furnishings (Brown, 2017). Specifically, the thought processes, attention to detail, and spatial relationship between elements found in Japanese gardens should be the focus of emulation. In that spirit, it would be most productive to take inventory of the cultural backgrounds and aspirations of the AIC and then determine the depth to which Japanese garden inspiration would be appropriate to the project.

Future research directions

This study has furthered the credibility and specificity of design recommendations for green space in prisons. The unprecedented nature of the MHG warrants further research on its impact on the AIC, employees, and wider community involved in the operations of OSP. A cost-benefit analysis with factors such as recidivism rates and incident rates would further the veracity of green space's benefit to prison operations. There is of course a wide diversity found in prison security levels and policies, AIC populations, and green space types; just as this paper served as a case study for a Japanese-style healing garden within a maximum-security penitentiary, other case studies could provide new insights on other carceral green spaces with unique make-ups of these factors.

Among green space types, this study found cultural artifacts and water features to make up the most preferred settings for AIC. "Cultural artifacts" as a concept is flexible and further research on how to effectively implement them would be helpful to the literature. Considering there are many ways to incorporate water or to suggest the concept of water through design, it would be helpful to have future studies address more kinds of water features to clear the ambiguity that Jewkes (2019) describes. Japanese gardens have been compared to other styles of landscape in previous studies, but never in a carceral setting outside of this analysis; there may be opportunities in the future for researchers to compare Japanese gardens' and other settings' impact on AIC; with different settings and methodologies, new factors and recommendations may emerge.

Limitations

There are limitations to the generalizability of this study that should be considered when interpreting the results. First, the participant population were AIC of a maximum security prison-some who had not so much as touched a tree in 35 years before the MHG was constructed. Such a population may be particularly appreciative of green space than different populations with more freedom. Additionally, AIC that participated in building the garden (Arimoto & Michaux, 2020) or some of its guided programming may have a significantly stronger connection to the MHG as Place Attachment Theory would postulate (Basu et al., 2019). On the level of survey development, efforts were made to keep bias out of the photographic survey, however, some settings shown may have unintended connections to AIC lived experiences (e.g. traumatic experiences in non-MHG settings). Lastly, as Liebling (2002) makes note of, improving the conditions of the carceral environment should not be interpreted as license to increase the use of incarceration.

Conclusions

Considering the MHG's clear benefit to AIC well-being, it successfully serves as an extension of OSP's commitment to the "Oregon Way" philosophy- especially its goal to "improve conditions of confinement"(Oregon Department of Corrections, n.d.). On the case study level, it would be in

OSP's best interest to maintain the quality of the space and access for as many AIC (particularly individuals stressed by the factors highlighted in this study) as feasibly possible. While resource limitations may strain such efforts, the results presented here act to support the maintenance of this course.

Challenging the status quo of carceral design and prison administration will be a necessary process to unlock the potential of carceral green space. Opening access to green space to as many AIC as possible, especially the highly stressed individuals and fostering a capacity for AIC to engage in the design process will prove most fruitful for the aim of creating effective green space. Designers will need to patiently and persistently push the envelope when collaborating with stakeholders in prisons. Taking the time to understand the lived experience of AIC will offer great insight into how to design for their rehabilitation. Designers must also commit to the needs of the facility through maintenance plans and post occupancy evaluations. Future studies will also be needed to further hone and refine our understanding of effective green space design and programming under diverse conditions in our prisons; through this effort, the impact of green spaces on AIC populations and the communities to which they return will be better inventoried and understood. This will be slow and painstaking work, but the potential benefit inside and outside our prisons is too great to ignore.

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Appendix A: Full Survey Instrument

How would you describe yourself? **You may choose two or more answers.**

- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian and other Pacific Islander
- Two or more races
- Other race
- Prefer not to say

Do you consider yourself to be of Hispanic, Latino, or Spanish origin? **You may choose only 1 option.**

- Yes
- No
- Prefer not to say

What is your age group? **You may choose only 1 option.**

- 18-24 years old
- 25-30 years old
- 31-45 years old
- 46-60 years old
- 61 years old and older
- Prefer not to say

Please take a moment to reflect upon your day-to-day experience in prison. Then compare your experience of the Memorial Healing Garden.

"Compared to other parts of my day, when I spend time in the garden I feel..."	Strongly disagree		Not Sure		Strongly agree
More calm and relaxed	1	2	3	4	5
More "in tune" with my own thoughts and feelings	1	2	3	4	5
Less anxiety	1	2	3	4	5
Like it's easier to listen and talk to other people	1	2	3	4	5
More hopeful about the future	1	2	3	4	5
More alive and energized	1	2	3	4	5
A sense of peace and contentment	1	2	3	4	5
More connected to the people I care most about	1	2	3	4	5
Less irritated and annoyed by other people	1	2	3	4	5
Less anger and frustration	1	2	3	4	5
Like it's easier to let go of things that are bothering me	1	2	3	4	5
More aware of what's going on in my mind	1	2	3	4	5
Less alone and disconnected from others	1	2	3	4	5
Less worried about things	1	2	3	4	5
I can slow down	1	2	3	4	5
I can process my emotions	1	2	3	4	5

"I am bothered by..."	Not at all	A little	Somewhat	A lot	Very much
Lack of communication with family and friends	1	2	3	4	5
Lack of intimacy with loved ones	1	2	3	4	5
Lack of control or autonomy	1	2	3	4	5
Lack of privacy	1	2	3	4	5
Restricted movement	1	2	3	4	5
Lack of safety	1	2	3	4	5
How others treat me	1	2	3	4	5
Lack of a job	1	2	3	4	5
Loneliness	1	2	3	4	5
Lack of view of free world	1	2	3	4	5

"The garden helps me lessen the effect of..."	Not at all	A little	Somewhat	A lot	Very much
Lack of communication with family and friends	1	2	3	4	5
Lack of intimacy with loved ones	1	2	3	4	5
Lack of control or autonomy	1	2	3	4	5
Lack of privacy	1	2	3	4	5
Restricted movement	1	2	3	4	5
Lack of safety	1	2	3	4	5
How others treat me	1	2	3	4	5
Lack of a job	1	2	3	4	5
Loneliness	1	2	3	4	5
Lack of view of free world	1	2	3	4	5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

2

Somewhat Helpful
3

4

Very Helpful
5



How helpful is this setting to your wellness?

Not Helpful
1

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Somewhat Helpful
3

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Very Helpful
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Appendix B: Photographic survey item names

Image Number	Name
1	<i>Garden security gate</i>
2	<i>Chain link fence gateway</i>
3	<i>Garden bamboo gate</i>
4	<i>Garden statue</i>
5	<i>Garden plants</i>
6	<i>Bleachers and field</i>
7	<i>Felled tree installation</i>
8	<i>Outdoor basketball</i>
9	<i>Garden lantern</i>
10	<i>Garden bridge</i>
11	<i>Outdoor mini golf</i>
12	<i>Garden waterfall</i>
13	<i>Garden water feature</i>
14	<i>Outdoor phones</i>
15	<i>Sheltered outdoor gym</i>
16	<i>Gym equipment and lawn</i>
17	<i>Dry rock garden</i>
18	<i>Gym equipment with tables</i>
19	<i>Veteran memorial</i>
20	<i>Garden koi pond</i>
21	<i>Outdoor fenced corridor</i>
22	<i>Garden lily pads</i>
23	<i>Garden tree</i>
24 (omitted)	<i>Native American longhouse garden (omitted)</i>
25	<i>Garden path</i>
26	<i>Gym rec room</i>

Appendix C: Photographic Survey Factor Visualization

WATER FEATURES & CULTURAL ARTIFACTS



Garden water feature



Garden lantern



Garden statue



Garden bridge



Garden lily pads



Garden waterfall



Garden path



Garden koi pond

GYM EQUIPMENT



Gym equipment with tables



Sheltered outdoor gym



Gym equipment and lawn



Indoor gym

ENCLOSED LAWN



Outdoor phones



Bleachers and field



Chain link fence gateway

DRY ROCK GARDEN (single item)



FELLED TREE INSTALLATION (single item)



GARDEN SECURITY GATE (single item)

