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Back to nature? Attention Restoration Theory and the restorative effects of nature contact in prison

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Abstract

This paper considers the potential for elements of custodial environments to have a restorative effect on those who are incarcerated within them. Considering the applicability and practicality of using Attention Restoration Theory (ART) to frame experience in a custodial context, it interprets results of a survey of prisoners at a large medium-security prison for men in the United Kingdom. It reflects on prisoners' experiences in relation to elements of the environment in which they reside; specifically, outdoor green spaces and green views in the form of whole-wall photographic images of the natural environment. In an otherwise stressful context, such elements were self-reported to enable restorative effects, and to increase feelings of calm, and the ability to reflect. It finds that the potential benefits differed between environmental elements, and that compatibility with prisoners' own needs was a key issue. It concludes with suggestions about the potential utility of ART-informed design of custodial landscapes. The paper also reflects on the methodological challenges of using ART to understand the experience of prisoners.

Keywords

nature contact; health effects; prison; custodial environment; green spaces

Introduction

High levels of self-harm and violence suggest that prisons are highly stressful settings. In England and Wales, at the time of writing, such incidents stand at their highest levels in thirty years, with 52,814 self-harm incidents – or 145 per day - recorded in the year to September 2018. Violent incidents stand at 33,803 per year, with 24,138 prisoner-on-prisoner assaults, and over ten thousand assaults on staff (Ministry of Justice 2019). Studies of levels of stress for serving prisoners are absent, but individuals with a history of incarceration are consistently more likely to be afflicted with stress-related illnesses (Massoglia 2008), and others spending long periods of time in prison, such as prison officers (Jordan 2011), are known to experience high levels of stress (Rutter and Fielding 1988; Keinan and Malach-Pines 2007). Recent qualitative and ethnographic research has complemented pre-existing understandings of the hardships of imprisonment, bringing to light the role of prison environments in their amplification or mitigation (Wener 2012, Moran and Jewkes 2015; Moran and Turner 2018). As a result, we are moving closer to understanding the importance of the sociophysical environment of prisons (i.e. what they are like as built environments), and particularly the significance of nature contact.

This nascent literature builds upon research into the restorative characteristics of the built environment in general. Originating with Ulrich's (1984) study of the effects of nature views on patients' recovery from surgery, subsequent work demonstrates the effects of a variety of built environment features on health and wellbeing (see Huisman et al. 2012). Within this literature, nature contact is often identified as a health-enabling element, producing calming effects, reducing stress and tension, and improving health outcomes.

This paper advances such understandings by considering the potential for nature contact within custodial environments to have a restorative effect on those incarcerated within them. Deploying Attention Restoration Theory (ART) as an analytical framing to interpret results of a survey of prisoners at a large medium-security facility for men in the United Kingdom, it reflects on prisoners' experiences of elements of the environment in which they reside; specifically, outdoor green spaces and nature images (whole-wall photographic images of the natural environment.) The paper first discusses ART and restorative environments, before outlining the potential applicability of this analytical framework to custodial environments. It next discusses the methodology deployed, the context selected to generate the data, and the challenges of working in this way in this setting. It then analyses data generated in relation to the constructs of ART. The conclusion draws the analysis together and makes recommendations both for further research and for the management of nature contact in custodial environments.

Restorative environments

A restorative environment helps restore depleted emotional and functional resources and capabilities (Hartig 2004), but how this takes place is more complicated than simply removal of stress-inducing factors. Attention restoration theory (ART) is concerned with recovery from directed attention fatigue (Kaplan 1995). Not necessarily accompanied by stress, mental fatigue can be considered a stress after-effect that increases *further* vulnerability to stress (see also Berto 2014, 396). ART focuses on restoration of diminished attentional capacity, premised on understandings of attentional mechanisms that distinguish between two modes of attention – 'Directed' and 'Effortless'. Directed Attention is the volitional and effortful control of attention – necessary for 'reasonable' conduct – controlling impulses, considering responses, and treating others with respect and kindness (Sullivan 2015), and for engagement in education, concentration on tasks, and complex cognitive processes. The capacity to achieve it is depleted over time, eventually leading to mental fatigue, impulsivity, irritability and unreasonableness, which increase likelihood of missing subtle social cues and making mistakes, and impair capacity to make and follow plans. Restoration of capacity for directed attention requires 'an alternative mode of attending that would render directed attention temporarily unnecessary' (Kaplan 1995, 172). This is involuntary/effortless attention (Basu et al. 2018, 3) or 'fascination' - the attraction of attention without sustained effort or conscious control. directed and effortless attention are complementary and parallel; restoration of the capacity for directed attention relies on easing demands on it, via effortless attention.

Although 'fascination' is effortless, not all types are equally restorative Kaplan (1995). 'Hard' fascination (such as television) grabs the attention and is hard to resist. Whilst entertaining, this type of fascination is not necessarily restorative. 'Soft' fascination, whilst also capturing attention effortlessly, does not completely occupy the mind, instead leaving 'headspace' for emergence of unrelated thoughts, and for reflection. Features of settings providing soft fascination (such as waves on the shore, or wind in long grass) aid restoration by leaving enough mental space to reflect almost absent-mindedly. As von Lindern et al. (2017) (in Basu et al. 2018) point out, such environments cannot be fully appraised objectively, but must be understood relationally. As Basu et al. (2018, 4) note, 'the role of fascination in restoration is thus a transaction between qualities of the environment and the person's past experiences as well as current state'.

ART proposes that restorative environments sustain relatively high levels of four components of experience: Being away; Extent, Fascination and Compatibility. 'Being away' is a departure from attentionally-fatiguing activities achieved by eliminating distractions, taking a break from usual

contexts and activities, and ceasing pursuit of attentionally-demanding tasks (Kaplan and Kaplan 1989). For 'extent', a setting needs content and structure to occupy the mind for long enough to allow directed attention to rest (Herzog et al. 2003, 160). Described as 'whole other worlds' (Kaplan 1995), settings such as gardens with unfolding sections or deflected vistas, suggest different experiences around the corner but out of sight, allowing the mind to engage, and supporting extended exploration. 'Fascination' refers to the effortless capturing of attention – but for the best restorative effects it must be 'soft', enabling reflection. Finally, 'compatibility' means a fit between an individual's purposes or inclinations, and the activities supported. This characteristic is complex because inclinations and needs vary between individuals, and for the same individual depending on the situation. The transactional nature of this engagement with restorative environments – between qualities of the environment and a person's past experiences and current state – is a defining aspect of all four constructs.

Prison environments and ART

Mental fatigue is an outcome of extended periods of focused attention, such as long working days, but 'it can also be induced by living in a dangerous setting, with a difficult person, or without enough resources to meet your needs' Sullivan (2015, 56). Prisons, with their intrinsic hardships and denials; the forced proximity of people enduring these (de)privations; high rates of mental health problems making co-existence challenging, and in many cases a pervasive sense of danger and uncertainty, seem prime sites for chronic stress and mental fatigue. This is problematic not just because of impacts on individual wellbeing, but because stress and mental fatigue limit the capacity to act in a 'reasonable' manner. It seems highly likely that this situation contributes to high levels of violence, unrest and self-harm which characterise many prison environments.

As Kaplan and Kaplan (2003, 1485) argued, for early humans, we may speculate that "most of the things that were important" (such as finding food, finding a partner, and avoiding potential dangers) "were also innately interesting". But for today's humans, "many things that are important" (such as abiding by rules and regulations) "are not interesting, and many things that are interesting" (such as advertising) "are not important". Directed attention is perhaps used much more now than then, and is perhaps more likely to become depleted and require restoration to address mental fatigue. At the same time, today's urban environments may also be less restorative than those of pre-modern humans – limiting capacity for restoration. If this general picture of greater demands on directed attention, and reduced capacity to restore is characteristic of contemporary life in general, then it is especially true of prison environments, which tend to be austere, robust, monotonous and lacking in green spaces accessible by or visible to the incarcerated.

Despite the apposite nature of ART (noted by Söderlund and Newman 2017), this analytical framing has not been widely deployed in prisons, and relevant published studies of the potentially therapeutic effects of nature contact are scarce. Moore's 1981 paper reported fewer sickness calls made by prisoners with a view of nature from their cell, but since then knowledge about the impact of nature contact in prison had advanced relatively little until two recent and significant contributions by Nadkarni et al. (2017) and Moran and Turner (2018). In framing their experimental study of the impact of viewing nature videos on solitary-confined prisoners in a US facility, Nadkarni et al. (2017) differentiate between direct, indirect, and vicarious nature contact. For them, direct contact was contact with natural settings independent of human intervention (so-called 'wilderness'); indirect contact occurred in a more controlled environment (a park/garden), and vicarious contact was mediated (e.g. watching nature videos, or looking at images). All three have been shown to reduce stress, anxiety, irritability, and aggression to varying degrees in a range of human populations and contexts (ibid). Nadkarni et al. (2017, 400) found that nature videos shown in individual sessions to persons otherwise entirely nature-deprived, resulted in self-reported reductions in 'negative emotions such as irritability and agitation', and 'a calming effect that lasted beyond the viewing period, suggesting an enhancement of emotional self-regulation', as well as reductions in violence and improvements in behaviour and communication. Moran and Turner (2018) considered the self-reported effects of nature contact for conventionally- (not solitary-) confined prisoners in two facilities in the UK and Norway. In the Norwegian facility, pre-existing forest had been incorporated at the time of construction, and in both facilities there were park/garden-like areas within prison grounds. For prisoners who, unlike those in Nadkarni et al.'s (2017) study, did have access to green spaces, such nature contact delivered self-reported feelings of calm and ability to reflect. In very different custodial contexts, and with individuals experiencing different forms of incarceration, both studies suggest that restorative effects of nature contact are to be found in prisons.

These two papers represent key advances in knowledge about effects of nature contact for a critical but under-researched population. Although both note the potential relevance of attention restoration theory for understanding effects of nature contact, in neither does ART directly inform analysis of data. Yet in both papers, reported testimony reflects the potential for nature contact to provide, 'temporary respite from a horrible environment', 'places to daydream about' (Nadkarni et al. 2017, 399), and the potential for nature to 'clear my head' (Moran and Turner 2018) – sentiments which seem to lend themselves to interpretation via properties of being away, fascination, extent and compatibility. The present paper therefore builds on and extends this scholarship in three novel ways. First, by combining consideration of nature contact via green spaces and nature images to offer a direct comparison between these two forms. Second, by deploying ART to explore the detail of self-reported

experiences of nature contact, and third, by considering the explicatory potential of this approach in this under-researched but important context.

Methodology and Context

Data derive from an anonymous self-completed paper-based questionnaire survey carried out in summer 2018 at a large medium-security prison for men in the United Kingdom. Although an administered questionnaire would have been preferred, financial constraints precluded it. The entire population of the prison (n=1000) was provided with a paper questionnaire, a return self-sealing envelope, and a pen, all distributed on the same day by prison staff. Completed questionnaires were returned in sealed envelopes via boxes in the accommodation units, which were emptied by staff every day for five days after initial distribution. Participation was voluntary and optional. No identifying information was collected. The only question which did not pertain to nature contact asked how long respondents had been at the host prison. (The majority had been there for more than six months). Other than the pen, which recipients kept, no recompense was offered. 86 questionnaires were returned. Whilst low, this response rate of 8.6% is typical of customary return rates for self-completed paper-based prisoner surveys distributed by prison staff rather than by members of an external research team (Fazel and Danesh 2002, Gojkovic et al. 2011). Data for some PRS items were missing for up to four respondents.

Survey self-completion is problematic in prison for several reasons: prisoners may not necessarily understand all items, standardized psychological test instruments may not be user-friendly, and language used may not reflect own perceptions and meanings; those with poor literacy skills, or who do not read or write English as a first language may not be able to respond; and response bias is also a potential problem, where response rates are low (Anthony and McFadyen, 2005). For mitigation, the questionnaire was short, and written in clear and concise language.

The questionnaire asked the same set of questions about both green spaces, and whole-wall photographic images of natural environments (hereafter 'nature images'). The green spaces referred to were mown lawns, a double row of saplings flanking an interior roadway, and shrub/perennial beds. Adjacent to routes linking accommodation and industrial/training/education units, they were experienced as prisoners moved around the prison site, and many were also visible from some cell windows. (Only prisoners held temporarily in a 'Care and Separation Unit' would view these green spaces *solely* through windows.) Prisoners were in general not permitted to spend time sitting on the grass in any of these areas – the majority only experienced them transiently, whilst on the move. The nature images were high-resolution, colour images of local natural environments. Scaled to fit floor-to-ceiling on specific walls within the accommodation units, and printed onto adhesive film, they

provided a static 'window' onto a natural landscape, much as Heerwagen and Orians (1986) described pictures in windowless offices as 'surrogate views'. These had been installed in the prison ahead of its opening, as part of a strategy to offer a more colourful and interesting interior design for this new facility. In an otherwise relatively monotone prison interior, these immersive images were striking, and in the UK context, their presence was unusual. Since prisoners moved around within the facility on a day-to-day basis, and were occasionally relocated from one accommodation unit to another, respondents potentially saw a range of different nature images during their sentences. They were asked to comment on their experience of *any* of these images.

Fourteen closed (i.e. with a range of possible responses pre-determined) were asked, ten of which were based on Hartig et al.'s (1997) Perceived Restorativeness Scale (PRS), designed to measure the four restorative properties of ART. (Table 1 shows the questions and the properties towards which they were directed, where appropriate). PRS was not intended to be used in any context in particular, and as has been the case in numerous previous studies (e.g. Bagot 2004, Peschardt and Stigsdottir 2013, Felsten 2009) it was adapted for this setting and the intended respondents. (Ethical approval, including scrutiny of the questionnaire, was applied for and granted in advance by the author's host institution. Formal research access was granted by Her Majesty's Prisons and Probation Service (HMPPS) and the governor of the facility. Both approved the questionnaire ahead of circulation.)

"Green spaces/nature images…	
PRS	**Restorative Property (*= adapted)**
…are more like areas I would usually see outside of prison"	*Being Away
…give me a break from my day-to-day routine"	Being Away
…make me think about things I wouldn't usually think about"	*Being Away
…help me feel connected to the outside world"	*Being Away
…help me to think about things that are important outside of prison"	*Being Away
…are interesting to look at"	Fascination
…make me want to look at them for longer"	Fascination
…give me a sense that my time here could be worthwhile"	*Compatibility
…give me a sense that I could find ways to be myself here"	*Compatibility
…help me to focus on who I really am"	*Compatibility
Other	
…give me a sense of normality"	
…help me find a sense of peace"	

…help me to feel calm"
…remind me about the changing seasons"

Table 1 Survey questions and relationship to restorative properties of ART

Questions proposed by Hartig et al. (1997) to evaluate 'being away', ('[…]gives me a break from my everyday routine'); and fascination, ('[...] is interesting to look at' and 'I would like to spend more time looking at [...]') were adapted only very slightly, if at all, from their original form. But the further adaptation of PRS was more challenging. Questions about 'compatibility' were much more difficult to adapt, given the fundamental lack of congruence between individuals' own intentions and the fact of incarceration. Hartig et al (1997)'s proposed questions are 'I have a sense that I belong here', and 'I have a sense of oneness with this setting'. Since researchers would not be present to offer an explanation, it would have been very challenging for incarcerated self-completing respondents to address these questions *purely* in relation to the green spaces and nature images, rather than their incarceration in general. Given the significant challenges of achieving reasonable response rates from staff-administered prisoner questionnaires, it was therefore decided that adapting these questions would be preferable to leaving them in this original form and risking respondents either skipping them, or possibly failing to complete and return the survey at all. (The implications of this strategy are discussed later). These questions were therefore reworded into '[…] gives me a sense that I could find a way to be myself here', and '[…] helps me focus on who I really am'. Respondents represented their level of (dis)agreement with such statements on a five-point Likert scale.

Formulating statements to assess 'extent' was very difficult. Hartig et al. (1997) proposed 'there is too much going on', '[…] is a confusing place', and 'it is chaotic here'. . Other PRS adaptations, for study of urban green spaces, and college campus nature murals, have used 'I experience this place as very large' (Peschardt and Stigsdottir 2013, 28) and 'How much does this setting feel like a world of its own?' (Felsten 2009, 164), but again it was felt that isolating the green spaces and images from the prison context as a whole would be a significant challenge for respondents without support from a research team. It was therefore hoped that 'extent' would emerge in answers to open-ended questions, even though these were intentionally designed *not* to 'steer' respondents towards any of the four constructs of ART. They simply asked 'What difference do/es green space/nature image(s) make to you?'; whether such elements should feature in other prisons; and why (not). Respondents frequently gave extended answers, with many writing outside of the 'box' provided, and appending extra sheets of paper. Response bias was likely to have been present, and given the low response rate, survey responses are analysed guardedly, and conclusions drawn are tentative rather than definitive.

As Table 1 shows, four of the fourteen questions did not relate directly to restorative properties of PRS. They asked about feelings of peace, calm, normality and awareness of the passing of the seasons, and were intended to give a general sense of wellbeing. Results from these questions are also discussed below, but they do not directly inform findings in relation to ART.

Since the data generated by the five-point Likert scale questions were not on continuous numerical scales, they were analysed using the Wilcoxon signed-rank test to assess the difference in responses given by each prisoner for the green spaces versus the nature images. This test is the non-parametric equivalent of the paired samples Student's *t* test. Cronbach's alpha was also calculated for the questions asking about Being Away, Fascination and Compatibility, for the green spaces and the nature images, to test the internal consistency of responses to these questions following the adaptation of the PRS questions for this context. Handwritten free-text responses to open-ended questions were transcribed verbatim from the surveys, and then coded in two stages. The first stage was a categorisation of comments as indicative of restorative, non-restorative or neutral experiences. A second stage saw all experiences considered in relation to outcomes indicative of ART constructs, such as forgetting about worries, facing matters on one's mind, reflecting on one's self and priorities in life, relaxation, and decrease in negative feelings. In this way, it was possible to ascertain whether contact with green spaces and nature images was felt as restorative or not, and in which ways.

To consider the effects of these forms of nature contact, the following sections first consider the quantitative survey data, and then the free-text responses. These are presented with reference to the restorative properties of being away, extent, fascination and compatibility. Finally, the implications for prison environments are considered.

Results

Quantitative data are depicted in Figures 1 and 2, and show that responses to almost all questions, for both green spaces and nature images, were supportive of the statements provided.

Regarding green spaces, more than two thirds agreed that they were like areas outside of prison (84%); helped them to feel calm (78%); gave a sense of normality (79%); helped find a sense of peace (71%); and reminded them of the changing seasons (82%). Green spaces seemed to enable 'being away' and 'fascination' more effectively than compatibility. For fascination, they were interesting to look at (84%), and made respondents want to look at them for longer (67%). For being away, most agreed that they made them think about things they wouldn't usually think about (60%); provided a break from routine (62%); helped thinking about things important outside of prison (58%) and helped

with connections to the outside world (64%). Unsurprisingly, less than half agreed with 'compatibility' statements that green spaces gave a sense that time in prison could be worthwhile (49%); or that they could 'find themselves' (45%); or focus on who they really were (39%).

Although the prison is not ostensibly *intended* to be a 'compatible' environment, the low scores for compatibility are indicative of the challenges of creating prison environments which *can* enable those incarcerated within them to feel as if their experience in custody can have any beneficial effects.

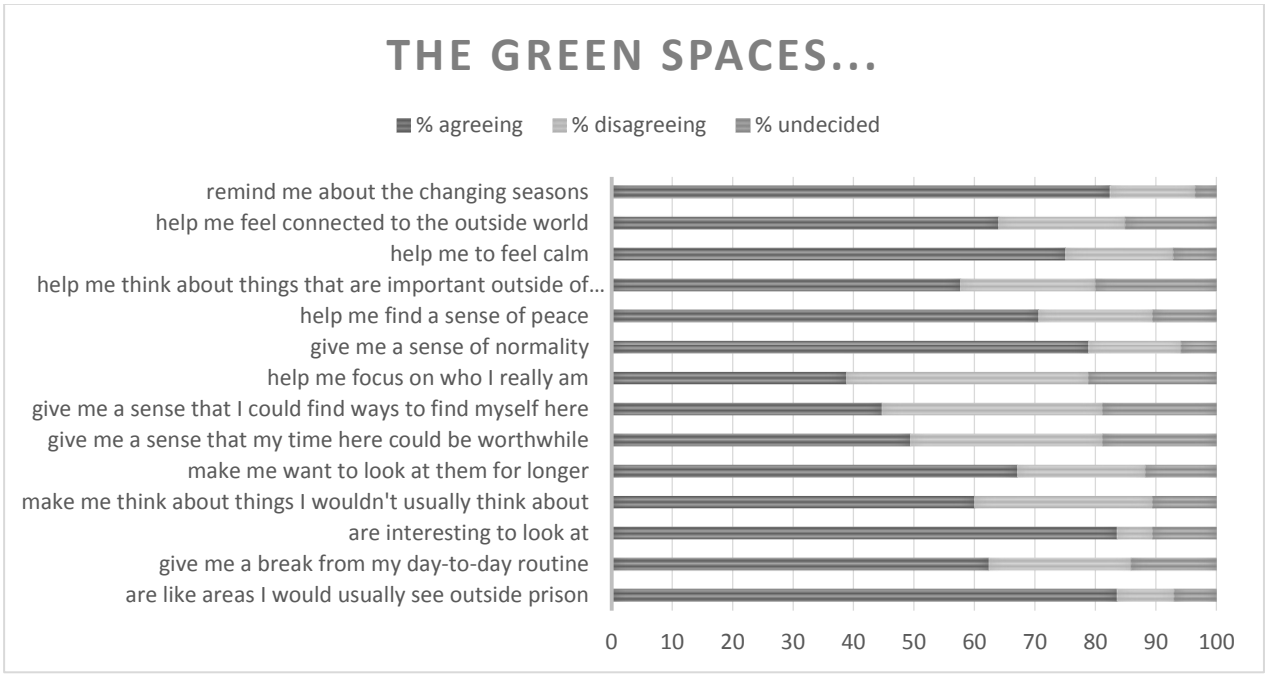

Figure 1 Responses relating to nature contact via outdoor green spaces

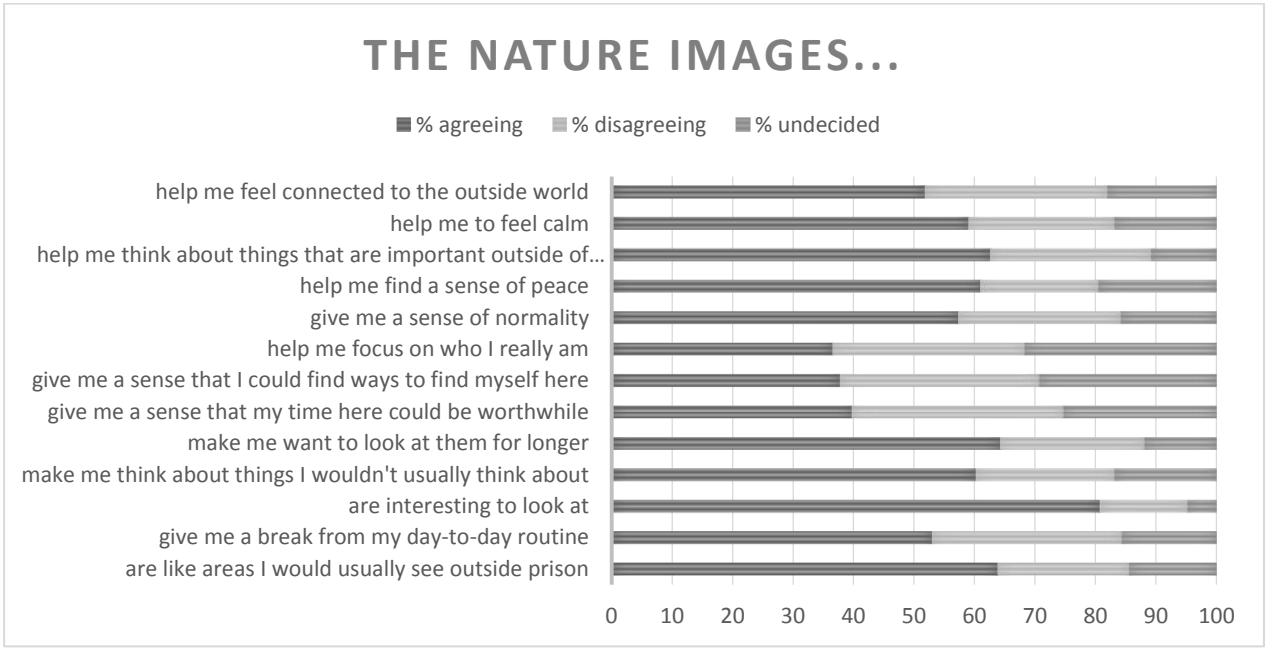

Figure 2 Responses relating to nature contact via large nature images

For nature images there was a similar pattern. Most felt they helped find a sense of peace (61%); gave a sense of normality (57%); resembled areas outside of prison (64%), and helped them feel calm (59%). There was a high degree of agreement on fascination (interesting to look at - 81%, wanting to look for longer - 64%), but otherwise responses were more muted. Regarding being away, most agreed that nature images provided a break from routine (53%); helped feel connected to outside (52%); and encouraged thoughts they wouldn't usually think (60%). Levels of agreement with statements about compatibility were 40% or lower.

Results of calculations of Cronbach's alpha coefficient, considered to be a measure of scale reliability, are presented in Table 2. These were calculated with the scores for the fascination items alone, for the being away items alone, and for the compatibility items alone, in relation to both green spaces and nature images, to give a sense of the internal consistency of these items after their adaptation to the custodial context. Although the standards for what makes a 'good' alpha coefficient are somewhat arbitrary, a minimum coefficient between 0.65 and 0.8 is usually required. The scores suggest that these items all have good internal consistency.

Restorative Property	Being Away	Fascination	Compatibility
Green Spaces	0.7722	0.8088	0.9039
Nature Images	0.8262	0.8755	0.9482

Table 2 Cronbach's alpha

Differences between responses to questions about green spaces and nature images are shown in Table 3.

	are like areas I would usually see outside prison		*give me a break from my day-to-day routine*		*are interesting to look at*		*make me think about things I wouldn't usually think about*		*help me focus on who I really am*		*make me want to look at them for longer*		*give me a sense of normality*		*help me find a sense of peace*		*help me think about things that are important outside of prison*		*help me to feel calm*		*help me feel connected to the outside world*	
	S	I	S	I	S	I	S	I	S	I	S	I	S	I	S	I	S	I	S	I	S	I
% agreeing	84	64	62	53	84	81	60	60	39	37	67	64	79	57	71	61	58	63	75	59	64	52
% disagreeing	9	22	24	31	6	14	29	23	40	32	21	24	15	27	19	20	22	27	18	24	21	30
% undecided	7	14	14	16	11	5	11	17	21	32	12	12	6	16	11	20	20	11	7	17	15	18
n=	85	83	85	83	85	83	85	83	85	82	85	84	85	82	85	82	85	83	84	83	86	83

Table 3 Differences in responses for green spaces (S) and nature images (I)

Comparing the results for green spaces and nature images via the Wilcoxon signed-rank test showed that for four questions the difference between higher levels of agreement with questions about green spaces and lower levels of agreement with questions about nature images was statistically significant (Table 4). (For these data, Z measures the difference between the samples, with a larger a Z value indicating a bigger a difference between the samples; and the p value indicates the level of significance of the difference).

	Z	p	Significance level
…are like areas I would usually see outside prison	3.218	0.001	99%
…help me focus on who I really am	1.911	0.056	90%
… give me a sense of normality	4.311	<0.001	99%
…help me to feel calm	1.867	0.062	90%

Table 4 Comparing green spaces and nature images – statistically significant results

The variables with by far the largest statistically significant difference between green space and nature images were those relating to 'normality', and to agreement that elements 'were like those outside', with green spaces producing higher levels of agreement in both cases. These outcomes are perhaps a function of respondents' greater familiarity with cultivated parks and gardens than with the 'wilder' and often mountainous landscapes portrayed in the nature images. Since prisoners are more likely than the general population to have been urban residents, and to have experienced economic disadvantage, they are likely to have had limited access to green space (Kuo 2001), and the green spaces to which they are likely to have had access may have been urban parks rather than 'wilderness' areas of the type depicted in many of the nature images at the prison. This familiarity may also underpin the differences between levels of agreement about feelings of calm, and with the 'compatibility' statement about 'focus on who I really am', for which differences between the two samples (again with higher levels of agreement for green spaces) were smaller, but still statistically significant (albeit at the 90% rather than the 99% level).

Other (albeit not statistically significant) differences were found for questions about breaks from daily routine (62% for green spaces vs. 53% for nature images). This difference possibly arises because nature images are located where prisoners spend the majority of their time (hence no break in routine was associated with access to them). It is also possible that agreement that green spaces helped with 'a sense of peace' (71% vs. 61%) reflects the quieter environment outdoors than on busy accommodation units. Only for the question about 'thinking about things important outside of prison'

was the level of agreement *higher* for nature images than green spaces (63% vs. 58%), perhaps suggesting that such contact better enabled a shift from thinking about the day-to-day, literally to a 'bigger picture'.

Open-ended questions prompted deeper reflections, with a variety of views expressed. Some dismissed both green spaces and nature images as a pointless use of resources ('In my opinion it is a complete waste of money that can be used in other aspects of prison life'). Although most thought that it was better to have green spaces and nature images than not ('It's better than a plain wall', and 'It would be very dull without them'), many felt no benefit personally ('Makes no difference to me'). However, even those who *didn't* notice a difference *could* still point to an outcome, for themselves or others. On green spaces, one noted that these didn't make '…much of a difference but it does remind me of my mother's garden when she was alive'. Others wrote 'Maybe others appreciate and admire nature's beauty more than I do' and 'I see people admiring them, they also talk about them, what they don't do for me they do for others - each to their own!' There was also support for 'inadvertent' benefit: 'I would like to think that they have a positive effect on people without them realising'. Some felt that other prisoners' conduct indicated whether or not these elements were valued: 'I've never seen anybody intentionally damage these [green spaces]'. Although one respondent noted 'I would think that many prisoners simply see [nature images] as something to rip off the walls', none of the images which were within reach had actually been damaged in this way.

Mirroring those in previous studies (Nadkarni et al. 2017, Moran and Turner, 2018), respondents frequently reported that both types of nature contact helped reduce stress and increased feelings of calm. They described them as relaxing, and supportive of a sense of peace and wellbeing; 'It makes a big difference to how I feel. I feel much calmer and don't feel as though I'm trapped in a concrete jungle. I feel much happier and less stressed' (green spaces); and 'It is nice to see them and it makes me feel calm and relaxed and chill out' (nature images). Although these views were regularly expressed, many free-text responses went beyond describing feelings of calm. These are explored in the following sections.

Being away, fascination, extent and compatibility

The four overlapping and interconnected properties which structure analysis of qualitative data are understood here as follows. 'Being away' considers whether and how incarcerated respondents feel green spaces/nature images help them get 'away' from everyday prison life. 'Extent' asks whether these elements have sufficient content and structure to occupy the mind, involving 'stimulation that is extended in time and space, …perceived as an environment that one can enter and spend time in' (Kaplan et al. 1993, 727). To deliver extent, they must be large enough, physically/conceptually, to

'move around in… and explore' (ibid.), and must suggest that there is more to be discovered than can be seen at first glance. 'Fascination' considers whether green spaces/nature images capture the attention effortlessly, while not completely occupying the mind. If these properties transfer to prison relatively easily, 'compatibility' is more complex. Green spaces/nature images will be compatible if there is a good fit between an individual's own purposes, inclinations and intentions and the kinds of activities these elements enable, facilitate or demand. Compatibility is a challenging idea; although some incarcerated individuals *may* engage with imprisonment in terms of rehabilitation, few would find the overall setting compatible with individual intentions. Although most perhaps share a common desire *not* to be incarcerated, and perhaps to remain connected to the outside world, more specific immediate needs (e.g. for privacy, respect, family contact, and so on) will vary. Bearing in mind these contextual interpretations, the following sections consider green spaces and nature images in turn.

Green spaces

A recurring and dominant theme was a feeling that green spaces enabled escape from both daily prison life and its austere built environment. Two respondents expressed this as follows (emphases added):

> Having green areas makes a huge difference compared to concrete, hard finishes. The main difference is that it *takes away the feeling of prison*.

> For me it *takes me away from being in jail* to look out my window and seeing different coloured flowers really can change how you feel just like that.

For many, 'being away' merged with concerns about familiarity with 'normal' life outside prison. It meant having a material reminder of 'normality' and a sense of outside connection, including to the changing seasons. For one, green spaces made 'the prison a little less 'prison-like'. [They are] Pleasant to look at and reminds me of the world on the outside'. For another 'They will also enable me to be able to be connected with the outside world and also be an obvious indicator of the passing of the seasons.' Others noted that walking through these green spaces made them 'feel normal like you are walking in the park', and one anticipated feeling further benefits after release: 'The green outside areas make things look and feel more natural so when I get out normal things like trees and gardens don't feel so alien.'

Fascination and, (as had been hoped), extent also featured (emphasis added):

> There are more grass areas or small gardens and parks where I can go to relax if the weather is nice. I sit down on the grass and *let my mind wander* in peace whereas [prison] is like a concrete jungle.

Although levels of agreement with initial questions about compatibility were low, for all the respondents quoted above, green spaces seemed to deliver something that they desired – be that a sense of escape or a space to relax away from the 'concrete jungle', and as such they arguably delivered compatibility on some level. However, perceived *lack* of compatibility was another recurrent theme. Many respondents were positive about the benefits green spaces *could* offer, but disappointed in the lack of access to them:

> …we are not allowed any amount of time to be able to stand there and take it all in. We can't walk through those areas, feel the grass, smell the flowers, so do not reap any benefit to those areas being there.
>
> It is all well and good having these areas, but what's the point when the only time we can appreciate it by movements 15 minutes mornings to and from work and afternoon 15 mins again to and from work.

Putting this more strongly, another wrote

> ... you're not allowed to use them so it's just a [privilege] if you use them so it's more of a wind-up than a positive.

Although many benefitted from the transient experience of passing through green spaces, others craved longer exposure and deeper engagement. They felt that if they could not linger, green spaces were at best tantalising, and at worst frustrating. Because this desire for a form of immersion in green space was not currently accommodated within facility management priorities meant that although these spaces could potentially deliver being away, fascination and extent, these properties were impeded by lack of compatibility.

Nature images

By virtue of their presence on the accommodation units, there was no such problem of access to nature images. Unlike green spaces, they could not physically be 'walked through', but there were greater opportunities for extended engagement. Like green spaces, they also provided a means of being away, reminding respondents 'that there is an outside beyond the fence'. One noted that 'they make me think about outside more than ... in the last 11 years [in custody] and [about] places I've never been'. Another described them as 'a focal point that *takes me away* [and] makes me think of things that I'm missing' (emphasis added). For another, nature images 'Help relax my 'hate' of white walls, steel doors, noise and generic prison environments'.

Respondents noted frequently and in detail that nature images held attention whilst allowing other thoughts to permeate; they seemed readily to provide a source of soft fascination which overlapped

with notions of being away, extent and compatibility. Three respondents summed this up well (emphases added).

> They help me take my mind away from [this prison] and prison in general… most people don't want to be in prison and can *put themselves in the image*.

> Feelings of calm, as a focal point on natural scenes and distract from the daily grind of prison life. I really enjoy the images and find myself *picturing being in that place*, mountain, seaside etc.

> I feel at ease when I see them and it helps seeing nice pictures *makes me feel like I'm outside*… a lot of people look at them and you can see they *get mesmerised* and look like they're in a happy and calm place.

Frequent references to putting oneself in the image, feeling like being outside, and picturing being in the place depicted suggest that this fascination enables being away, even when confined. Although for some 'away' was a 'happy and calm place', for others it had a bittersweet quality. One put it this way: 'It's a focal point that takes me away [and] makes me think of things that I'm missing'. Another:

> They are simple but yet effective. They make you feel like someone else. They also remind you of what you are missing out on which is sad but also inspiring in a way. These images hardly makes you happy but they definitely make you think.

By 'making you think', nature images offered sufficient physical or conceptual content and structure to occupy the mind, and enable exploration. Many described 'going into' or 'imagining themselves within' the images, suggesting that they had sufficient conceptual extent to evoke the feeling of being connected to something beyond the prison.

> On [named] unit, the image is of [local landscape feature] and I quite often look at it and get lost in thought. It's good to daydream about the picture - from the rushing water to the non-rushing traffic due to a slow vehicle going up the hill. Awesome to look - like others I have seen in communal areas and stairways etc.

Another described a vivid, multisensory experience combining all the restorative properties of ART:

> These images make a difference, because every time I look at them I don't just think "Oh that looks nice" - I can feel the wind flapping my jacket. I can hear my dog barking. I can smell the fresh air. I can feel the grass on my feet. It makes me imagine and dream. It gets me out of jail for however long. Every time I look at it I notice something that I couldn't see before.

This respondent thus 'escaped' prison, and the feel of the wind and the grass, the smell of the air and the sound of the dog together formed a whole other world that he was able to vicariously experience; with 'extent' also evident in his description of seeing something new every time he looked. Clearly a source of soft fascination, the nature image enabled him to 'imagine and dream', and in helping recall and relive experiences that he valued outside, it also delivered compatibility. The same respondent noted that nature images triggered conversations between prisoners, enabling collectively beneficial experience:

> I've had numerous conversations with people sitting on the landings talking about these images. The question I always ask is "If you was there now, what would you be doing?" Everyone I spoke to have all got good imaginations and it brings good happy emotions. It's a break from the usual prison politics.

The properties of nature images meant that they started to take on particular meanings; 'I know of people being upset when asked to move [to another accommodation unit] simply because they feel so connected to an image on their wing. Men hate to admit these things, but yes they have an impact'.

Conclusion

By adapting Hartig et al.'s (1997) Perceived Restorativeness Scale (PRS) for a custodial context, this paper used the principles of attention restoration theory (ART) to frame understandings of effects of nature contact on incarcerated populations. Based on a survey at one facility, for which the response rate was typically low, results should be viewed as indicative rather than conclusive.

Useful lessons can be learned from this deployment of ART, and specifically from this adaptation of the PRS. Given the challenges of conducting research in prison via a staff-administered questionnaire (i.e. with no possibility for in-person explanation or discussion from a research team), it was considered necessary to adapt some elements of the PRS to ensure clarity of understanding in this context, and hence to enable a reasonable response rate. This is by no means the first adaptation of the PRS, but in trying to rephrase questions about compatibility to account for the prison context, it may be argued that the survey deviated too far from the PRS in its original form. An alternative strategy might have been to explain in the questionnaire that some questions may appear peculiar in a custodial context, but should be answered as well as possible nonetheless. As this was an exploratory study, future surveys, especially if conducted with researchers present, could more successfully deploy this approach. An administered questionnaire would have been more beneficial, and additional qualitative interviews still more informative. Walked interviews of the kind innovatively deployed by Moran and Turner (2018) may have generated particularly rich data. The insights obtained from the free-text

comments provided by respondents in this study suggest that any future work using focus groups or interviews alongside a PRS-based survey is likely to produce fascinating and valuable results. In particular, future research could probe respondents' *previous* contact with nature. In interpreting this dataset, it was suggested that familiarity with various forms of nature could have influenced responses to questions about 'normality' and similarity to conditions outside, and these questions would bear further investigation.

This adaptation and application is novel, and useful methodological insights are derived from the research process, but the fundamental purpose of this paper and the study it reports is to consider the ways in which nature contact in prisons might reduce levels of mental fatigue and thus encourage 'reasonableness' (Sullivan, 2015). This is essential, because in prisons mental fatigue probably contributes to poorly controlled impulses, hasty responses and disrespectful interactions which in turn bring about tension and violence, hindering rehabilitation and making daily life extremely tough for those residing and working within them. It would be naïve to suggest that enhancing nature contact could resolve the deep-seated and systemic problems plaguing contemporary prison systems, but this preliminary study adds to a growing body of work suggesting that it *can* deliver benefits which may support broader policy initiatives aimed at addressing these challenges.

As this analysis has shown, considering nature contact in prison via the lens of ART reveals the complex interplay between properties of being away, extent, fascination and compatibility for incarcerated individuals, and moves closer to an understanding of *how* nature contact delivers benefits in this setting. The specific nature of the transaction (Basu et al. 2018) between an imprisoned individual, and their carceral environment, is critical.

The present study corroborates previous findings (Nadkarni et al. 2017 and Moran and Turner, 2018), that nature contact engenders feelings of calm and wellbeing. The additional insights offered by ART demonstrate that two different kinds of nature contact - via green spaces, and via nature images – *both* enabled being away, extent and fascination, albeit in different ways. The critical factor in the overall effect of each, though, was in the interplay *between* these three properties and compatibility - perhaps the most challenging notion in this context. Mindful of the drawbacks of the present methodology in exploring this construct, it seems that key to delivering compatibility seems to be the opportunity for immersion. Largely absent in green spaces experienced transiently *en route* from place to place in accordance with enforced schedules, the deeper and more self-directed engagement with nature images located on accommodation units seems to have enabled a sense of compatibility that enhanced the effects of the other restorative properties. Further research testing the validity of these tentative findings through mixed-method study design of the type suggested above could interrogate the interrelationship between restorative properties, and the critical role of compatibility. The financial and practical challenges of introducing vegetated green areas to prisons (noted by Moran and Turner

2018), coupled with the positive effects of nature images, may lead some to conclude that more straightforward, (and cheaper), nature contact via imagery is an adequate replacement for green spaces. Although both types of nature contact are beneficial, since green spaces are widely regarded to deliver the greatest benefits (e.g. Zaradic and Pergams 2007), this study does not support that conclusion. The 'lesson' to be drawn for prisons seeking to offer nature contact is therefore that green spaces are restorative, but they need careful management if benefits are not to be outweighed by frustrations of limited access. Having green spaces *en route* certainly brings their benefits to the greatest number of people, but ideally these or other green spaces would also be available for more sustained engagement, if desired. Nature contact via images is, as Nadkarni et al. (2017) suggest, effective in otherwise nature-deprived settings, or as in this study, as an additional form of nature contact. For both green spaces and nature images, then, attention must be paid to *enabling* nature contact to deliver its benefits. This means that incarcerated individuals must be able to 'enter', and linger, to allow restorative properties to take effect.

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