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HUMAN-ENVIRONMENT INTERACTIONS

THE APPEAL OF COTTAGECORE | ECOLOGICAL LOSS IN SINGAPORE | SUSTAINABLE MENTAL HEALTH | HEALING EFFECTS OF NATURE | WALKING THE GREEN TALK | HUMAN FACTORS IN THE WORKSPACE | DESIGNING REHABILITATION | AND MANY MORE

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HUMAN-ENVIRONMENT INTERACTIONS

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EDITORS' NOTE

What a pleasure and privilege it is to introduce you to the field of environmental psychology – the study of people-place interactions. When the matter of psychology is raised, the most common tendency is to think of the brain and mental disorder, and to think of psychologists as clinicians and counsellors. And we might also think that for psychologists the focus is first and foremost on the person. Psychologists seek understanding about universal principles of cognition, emotion and behaviour and, in so doing, we also recognize the multitudes of individual differences and their influences on how we think, feel and act.

So what is different about environmental psychology? Through the study of people-place transactions, environmental psychologists acknowledge that humans alter our environments to suit ourselves, but while doing so we are ourselves affected by our surroundings. This broader focus extends environmental psychology into an interdisciplinary field.

Human transactions with our environments include the various benefits we gain from contact with nature but also the costs derived from our own human-centred activities including air and water pollution, heat and noise stress, and reduced connectedness to nature.

In this issue our writers explore topics such as place attachment and consequences of displacement, ecological grief and solastalgia stemming from the loss of natural environments, the benefits of nature on mental health and general psychological wellbeing, the psychology behind design for prisoner rehabilitation, motivations/barriers to proenvironmental behaviour, environmental "nudges" in both physical and online environments, human factors in workplace environments, and more.

Dr Denise Dillon Editor-in-Chief



Environmental psychology sounds like a paradox at first glance. If psychology is about the internal workings of our mind and environment is our external surroundings, how do we make sense of this unique field?

Perhaps we do so by first acknowledging that human cognition and behavior do not exist in a vacuum. Studying them devoid of external, environmental factors runs the risk of it being too theoretical without context.

Being in the midst of the COVID-19 pandemic is one such case in point. Our social landscape has changed drastically with the many restrictions and arrangements put in place, e.g., working from home and home-based learning. To keep safe, we took it upon ourselves to change the way we live. We put on a mask and avoided crowded environments in favour of outings in open spaces and in nature (sometimes even in cyberspace). We now live primarily in the digital world, a new normal that carries its own benefits and potential repercussions that may only be realized much later (e.g., "zoom fatigue"). We adapt to the changes in our environment and, sometimes, even modify it to suit our psychological needs. At the same time, we yearn to go back to the way things were and this loss may impact our psychological health.

Even the psychology profession, once touted as the most people-centric and a job that requires the most face-to-face interactions, must now change. Will the efficacy of the profession be affected if therapies are now conducted entirely online? Will clients be more comfortable seeking help in the safety of their own homes? We may never fully know in these early years, especially when the environment keeps on changing. Yet what we can be sure of is our own human motivation and humanity's resilience to change, environmental or otherwise.

how

Mok Kai Chuen Vice President (Outreach)

FarmVille Dreams: The Appeal of Cottagecore

By Jessy Yong

"My spouse and I reside in a quaint and unnamed town. In a small cosy cabin, we spend most of our time watching the clouds gently roll across the sky. Our mornings are greeted by the sight of our beloved labrador, the faint sounds of clucking chickens, and the earthy scent of fresh tubers that are ready for harvest."

Is this above depiction a life you dream of? If it is, you may be familiar with the cottagecore phenomenon; a movement that romanticises pastoral settings, and places emphasis on modest ways of living and being in harmony with nature. This movement has grown significantly in the past few years, with YouTubers such as Li Ziqi garnering more than 2 billion YouTube views just by showcasing her seemingly ordinary yet idyllic days living in the countryside. The phenomenon is also increasingly popular among teenagers, with the hashtag #cottagecore amounting to a massive 6.1 billion views on TikTok.

While this movement is mostly portrayed in soothing and pleasant imagery, journalists and academics have also described cottagecore as a form of escapism. But this leads to the question — what exactly are people escaping from?

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Escaping the Concrete Jungle

The urban built environment is complex. There are a million and one elements: people, traffic, noise, pollution, high-rise buildings, and telecommunications, all changing and developing at different paces. This sheer urban multitude has introduced relentless burdens on the individual, making them irritable, inattentive, and mentally fatigued (Sullivan & Chang, 2011). It is a familiar state for city dwellers who lead busy lives, not only in terms of competitive work, but also the daily toll of living in a concrete jungle. Especially with the current COVID-19 pandemic, many have had the chance to reassess whether their city lifestyles are worth keeping (Gallagher, 2020). It is no longer a surprise, then, that many do escape the city. Hence, rather than just a fleeting desire, individuals are actually moving away. For instance, due to the pandemic, almost double the number of London buyers are purchasing homes away from the capital (Booth, 2020).

But what happens to those who are tied to the city? It is not an easy decision to simply abandon city life given the loss of the social ties, safety, and convenience of city living (Guimarães et al., 2016). Despite this, many find ways to escape urban life whilst still being tied to a city, and this is where the cottagecore phenomenon comes in.

The Virtual Countryside

Although physical greenery is a core part of the cottagecore movement, it is often created more from imagination than from tangible reality. What this means is that green spaces are often more widely experienced through a computer or phone screen. This is why #cottagecore videos on TikTok can gain billions of views, and agricultural games such as Stardew Valley have sold over 10 million copies. While it seems like the virtual countryside cannot compare to real green spaces,





Sutherland (2020) has pointed out that farming games provide a first-person engagement as the person can shape their own environments through their own actions (e.g. chop down trees, build barns), thereby giving them a sense of agency. Furthermore, she illustrates how farming game advertisements can create specific affect, such as urging players to "create the farm of your dreams", giving players the impression of self-actualisation. Hence, the cottagecore phenomenon is able to go beyond built environments and can exist even in the virtual space.

Is Cottagecore a Realistic Environment?

While the cottagecore experience seems to promote escapism and relief from urban anxieties, it merely presents a critique of the urban environment — this does not necessitate that the rural idyll is better. In fact, those who live in the countryside may have access to all the beautiful greenery, but abandoned or dilapidated houses and environmental disasters still contribute to a poor perceived environment (Jedwab et al., 2017). This is why many rural dwellers experience the converse, and are attracted to the bright lights of a city. If the grass is always greener on the other side, this paralysing comparison between one's current and imagined environment may not be as ideal as we thought. But that is not to say that steps are not taken to create genuine urban cottagecore experiences (that are not merely an unrealistic rural idyll).



For instance, Singapore's Green Plan 2030 (Tan, 2021) aims to make the Singaporean way of life greener. One of the initiatives includes a more than 50% increase in nature park land for individuals to go bird watching or hiking. The government is also aiming to cloak the city's infrastructure in green for "nature [to] meander its way into the heartland" (Tan, 2021). Hence, purposeful urban planning can bring the concrete jungle closer to that of a "jungle" rather than a crowded land swamped with high-rise flats.



Furthermore, individuals are also active agents who find alternative ways to create their own urban cottagecore environment. We have seen this during Singapore's COVID-19 Circuit Breaker; when people were cooped up in their homes and faced their concrete walls, many turned to home-based plant parenting to detox from their working lives and made the best out of a stressful pandemic (Lee, 2020). Hence, while the cottagecore represents one's urban anxieties, it is also an aesthetic that can eventually be assimilated into the urban environment. After all, the very essence of cottagecore is not simply existing in a countryside, but to embody and surround oneself with a peaceful and stress-free lifestyle which a green environment offers.



Nature Without a Name Noticing Nature in Singapore

If I ask you to name five types of tree that are native to Singapore, how quickly are you able to do so? Without relying on anything but your own knowledge base and memory store. How about birds, or insects?

By Dr Denise Dillon

Scott Atran, an anthropologist, and Doug Medin, a psychologist, reported that "our growing concern over protecting the environment is accompanied by a diminishing sense of human contact with nature. Many people have little commonsense knowledge about nature — are unable, for example, to identify local plants and trees or describe how these plants and animals interact" (2010). A consequence of the loss of knowledge about the natural world is cognitive decline in aspects of categorization, reasoning, and decision making (Atran & Medin, 2010). This hint towards cognitive decline is oddly similar to one provided by a team who had studied the effects of cognitive decline on language through text analysis on the works of renowned authors, including Irish-British novelist Iris Murdoch. At the age of 77, Murdoch was diagnosed with Alzheimer's disease.

Peter Garrard, a consultant neurologist, and his team studied Murdoch's writing over time and found "deficits characteristic of the condition [as] she displayed scant knowledge of current events, showed extreme difficulty committing lists of objects to memory, and was unable to call to mind the names of familiar objects and animals when presented with line drawings (for example when shown a picture of a kangaroo she called it 'a beautiful creature that jumps')" (Garrard, 2008).

Recently, sociologist Hui Zheng examined trends and mechanisms in cognitive functioning (CF) in the USA "across 7 decades of birth cohorts from the Greatest Generation to Baby Boomers" (2020) and reported a decline in CF amongst Baby Boomers. This raises concerns about a potential increase in dementia amongst this generation as they age. Zheng's findings indicate a reversal in what had previously appeared to be national-level declines in the prevalence of dementia in several countries. and indicate instead "a clear and alarming cohort pattern in CF". Zheng speculates that attributing factors to this trend could include lower household wealth, lower likelihood of marriage, higher levels of loneliness, greater prevalence of depression and psychiatric problems, and more cardiovascular risk factors (e.g., obesity, physical inactivity, hypertension, stroke, diabetes, and heart disease). I wonder if we should be considering connections to nature as well, given the aforementioned findings on the relationship between cognitive decline and the waning of knowledge about nature.



In *Landmarks*, Robert McFarlane (2015) similarly writes about the power of language in shaping human-nature interactions and our sense of place. He also notes a culling of words from modern dictionaries; in particular, the *Oxford Junior Dictionary*. Culled words include fern, heron, kingfisher, otter and pasture, amongst others. I grew up in Australia under the influence of English children's writers like Enid Blyton, who often incorporated elements of the British countryside in her stories. Words like hedgerow, brook, spinney and copse, and creatures like the badger, fox and rabbit fascinated me in the way of magical landscapes and beings – all of them foreign to the landscapes of tropical North Queensland in which I was immersed. I can't help but wonder if I might have seen my own landscape differently if I'd had the words to provide sense and order; if the psychological meanings of my landscape might have developed differently. What will future generations of children make of landscapes devoid of names to nourish their knowing? Of course our environments exist whether or not we're able to name the elements within them, but language helps to make our world intelligible and to some extent helps us to sense and perceive.



"Not a single bird knows it's a bird, of course, not one tree. No dodo cared to be a dodo. Likewise, no landmark needs its name. Gaping gill couldn't give a toss. But without a name made in our mouths, an animal or a place struggles to find any purchase in our minds or our hearts."

Tim Dee, Naming Names (25 June, 2014)



Peter Kahn, Director of the Human Interaction With Nature and Technological Systems (HINTS) Lab at the University of Washington in Seattle, works with his teams to identify human-nature interaction patterns as constituents of a nature language. According to Kahn et al. (2010), "We as a species are losing rich and diverse forms of interaction with nature: the awe, for example, of encountering an animal in the wild or a slug underfoot, of sleeping under the night sky, or of even seeing the night sky in our urban settings. The loss is happening quickly (in terms of decades) and potentially impoverishing us as a species, physically and psychologically". More recently, Kahn et al. (2018) also cautioned that a focus on "saving" nature will not be enough if people are not interacting with nature.

With that in mind, findings from a national-level study in the UK conducted by the National Trust in collaboration with the University of Derby's Nature Connectedness Research Group indicate that "simple engagements with nature are strongly linked to conservation action and personal wellbeing" (2020). Miles Richardson, head of the University of Derby group, emphasized that "the kind of connection that makes the difference involves more than simply spending time outdoors. Instead it's about actively tuning in to nature, regularly spending simple, bite-size moments relating to nature around you. Every bit of connection makes a difference. If we're to tackle the nature crisis, then a closer connection and new relationship with nature is needed across the majority of the population" (University of Derby, 2020).



So what might we take away from all of this? There are many benefits to be gained from noticing and making closer connections with nature. Here in Singapore, we have many opportunities to get out and about in green spaces. If you're stuck for ideas about what to do once outdoors, there are some useful guides available to help get you started on your own nature immersion adventure.

- The Ministry of Social and Family Development (MSF) provides provides guides for parents to encourage children to notice nature and some tips on reading about nature. https://www.babybonus.msf.gov.sg/ parentingresources/
- The UK National Trust guide to noticing nature provides a 9-week series of daily activity suggestions that range in durations from as brief as 20 seconds and up to 20 minutes. All of these can be done here in Singapore also. https://nt.global.ssl.fastly.net/docum ents/national-trust-noticing-natureweek-by-week-guide.pdf
- You can also check out a number of local environment-related NGOs and non-profits with an aim to connect with one or more of them.

http://www.greenfuture.sg/singapor e-green-landscape-2020/ngos-andnon-profits/

Urban Tears for Natural Spaces: Situating Eco–Loss in Metropolitan Singapore

By Paul Victor Patinadan



Like so many Singaporeans during the Circuit-Breaker period, I often found myself listlessly staring out the window of my home, longing for something other than the trepidation of an uncertain future. As the days wore on, I began to notice curious happenings outside. Freed from their strict trimming appointments, the grasses began to mature; little purple and white-hatted flowers rising in unison from the increasingly verdant growth. In response, the butterfly-bushes lining the walkways burst into colour, as all manner of insects and birds flitted, zipped and buzzed in busy orchestration. Even the beloved neighbourhood cats were observed gamboling in the foliage. One morning, however, I woke up to what I had been dreading and knew as inevitable; the mechanical whir of a mowing blade. I watched as the process was reset, perhaps never to advance again. I remember feeling such a confusing gamut of emotions; loss, anger, sadness, frustration and helplessness, not unreminiscent of grief.

"Renaturalization" is the term posited by experts for this spontaneous growth in human-made spaces; locally, the matter of such spontaneous growth remains an issue of contention (Hwang & Ichioka, 2020; Lehmann, 2021).

Other than (subjective) beautification, the renaturalisation process also supports resilient urban ecosystems and offers a myriad of benefits, including heat control and flooding prevention (Hwang et al., 2019). Government agencies are quick to cite safety issues with unchecked growth as well, such as increases in pests and potential fire hazards (Hwang & Ichioka, 2020). Being privy to this information, however, does little in explaining the conflicting emotions myself and many other Singaporeans felt for the weeks of ephemeral blooming and subsequent "maintenance". In a similar vein, general outrage and emotional outpouring by the public was observed following the erroneous clearing of 4.5 hectares of woodlands at Kranji from December 2020 to January 2021, a green space many were not even aware of before the incident (Low, 2021; Tan, 2021).

As a Thanatologist, I am cognizant of the experience of non-death related losses in the term's clinical sense; losses that do not involve the death of a close human or nonhuman animal counterpart. These share similar psychological and affective profiles with death-loss (the passing of a familiar companion) events, and often pertain to disenfranchisement; that is, lacking larger social recognition and support (Cohen, 1996). Harris (2020) expounds that typical grief forms accompany the loss of deeply personal and significantly meaningful experiences to the individuals. Herein lies the conundrum, an overgrown sidewalk can hardly be construed to have any profound personal meaning to most urbanites and perhaps, by extension, any swathe of natural space we minimally interact with. In their commentary, Kong and Yeoh (1996) considered most of modern Singapore's nature as "constructed",







yet providing "a scientific sanctuary for observing and contemplating nature, a landscape for health, aesthetics and recreation, and an economic resource". However, with palpable grief affectations, I am stuck considering this: has something latent been made manifest through this act of simple destruction, even to what was "constructed"? What is the nature (pardon the pun) of this particular grief experience?

Academic discourse remains nebulous on emotionality at eco-loss, though the majority consensus is that the Anthropocene epoch (the unofficial unit of geologic time where human activities began to significantly affect the planet's natural order) is one of stress and chronic uncertainty (Clark, 2020; Crutzen, 2006; Cunsolo & Ellis, 2018).

"'Ecological grief' is a response to experienced or anticipated ecological losses due to acute or chronic environmental change."

Cunsolo and Ellis (2018) suggested that "ecological grief" is a response to experienced or anticipated ecological losses due to acute or chronic environmental change. They classify their grief definition into three categories based on the type of losses; physical (species, ecosystems, and meaningful landscapes), disruptions to environmental knowledge and loss of identity (unexpected changes to how the land and relationship to it is understood), and anticipated future losses (of place, land, and culture). However, a primary caveat of their research in situating grief responses is that their data were gleaned from the lived experiences of Nunatsiavut Inuits and farmers from the Australian Wheatbelt; two populations with intimate living and working relationships within their relevant landscapes. Environmental changes drastically affect the livelihood and cultures of these people, giving premise to Harris's (2020) variable of significantly meaningful losses presiding over grief responses.



The common local form of our ecointeractions is not as inextricably coalescent with our daily experiences to warrant such a working definition; eco-loss may only be relevant for natives at risk of displacement from their non-urban settings. In 2013, residents of rural Pulau Ubin were informed of possible resettlement due to development plans by the government (Poon, 2013). Although the issue was resolved as government bodies concluded that residents need not be resettled, for the 100 or so inhabitants (some of whom depended on farming and fishing to survive) it was doubtless an experience of anticipatory ecological grief.

A more directed phenomenon is argued for by way of "solastalgia", a term coined by esteemed environmental scholar Albrecht (2005), which places emphasis on loss of place. A portmanteau of the words "solace" and "nostalgia", solastalgia is defined as an "intense desire for the place where one is a resident to be maintained in a state that continues to give comfort or solace,"



with distress experienced at the inability to derive said environmental solace due to change and loss (Albrecht, 2005; Albrecht et al., 2007). Were the multi-faceted solastalgia to be defined along a pathological spectrum, it is close to a holistic demarcation of what Singaporean urbanites might face with regards to eco-losses within their perceived sense of place. Albrecht (2005) further contends that with an increasingly connected world through media, "directed experience" and "home" are now imprecise constructs. The destruction of endemic place identity anywhere in the world, as such, can cause distress as any environmental destruction affects our "Earthly" home. This broadly encompassing notion goes some way to explaining local emotions and empathic responses at the Kranji woodlands clearing and Ubin resettlement incidents. However, this thread of reasoning by Albrecht (2005) remains conjecture as the qualitative work by the author parallels that of Cunsolo and Ellis (2018), focusing on samples with similar close relationships to their environments; in this case farming communities and those affected by natural (drought) and human (mining) changes. Though it may be that some aspect of solastalgia is present in the Singaporean psyche, there is a wistful sentimentality to the term that opaques the greater visceral expressions being discussed.

Clark (2020) proposes the more vivid "Anthropocene horror" as humanity's current affliction, a "social malaise" of sorts. His description is reminiscent of Albrecht (2005): "a sense of horror about the changing environment globally, usually as mediated by news reports and expert predictions, giving a sense of threat that need not be anchored to any particular place, but which are both everywhere and anywhere." This pervasiveness is a key theme of the conceptualization, and especially affects people surrounded by "developed" infrastructure. Urbanites face the horror of living in "latent environmental violence and feeling personally trapped in its wrongdoings...(that) human impacts have crossed over from the normal to the destructive." Observing social media comments directed at online news articles about development efforts that require the clearing of green spaces, this commonplace horror is easily witnessed through the public language of anger, frustration and questioning. Though Anthropocene horror seems to be the most fitting definition for the local metropolitan experience of ecoloss, Clark (2020) agrees the term is conceptually elusive. Moreover, he argues that continued powerlessness is an outlining feature of the concept, through a shared responsibility we have as people in relation to detrimental human-caused environmental issues. Singapore, however, has witnessed successful disruptions of power in favour of sustaining natural places. The intertidal zone of Chek Jawa remains a prime example of local activism as a bulwark for a little-known area with great ecological significance (Teh & Raju, 2010). Earmarked for reclamation in 1992, the zone at the eastern tip of Pulau Ubin was observed by conservationist Joseph Lai as containing a myriad of rich marine life, including anemones, seahorses, octopi and even dugong.

An impassioned community movement arose with media discourse, formal appeals and even public rejection on an early biodiversity study of the area. The traction gained by the *Friends of Chek Jawa* campaign eventually moved government bodies towards the deferment of any reclamation projects in the area, achieving both conservation and educational goals (Teh & Raju, 2010).

"Urbanites face the horror of living in 'latent environmental violence feeling personally trapped in its wrongdoings...(that) human impacts have crossed over from the normal to the destructive.""



Singaporean experiences of and expressions towards eco-loss are, at best, partially defined and understood even less. Though we may lack deep intimacy and sense of place with our "constructed" nature, we exhibit responsibility enough to move towards action at its threat and grieve in measure at any senseless destruction. As the Anthropocene and climate change effects continue to be discussed in louder voices across the world, future direction in

psychological research of our own uniquely Singaporean constitution of grief towards ecological losses is timely. Understanding our place and interactions with the natural world, especially as we traipse around an urban jungle, is the penultimate step to being its proper caretakers.

Coping With the Experience of Ecological Loss

By Dr Denise Dillon



How do you deal with loss or change in your life? Coping with change can be traumatic as it often affects every part of our lives. Sometimes, change even affects us unconsciously and we become traumatised without realising it. When this trauma leads to grief resolution, it seems that there is a "sweet spot" between too much and too little conscious focus, which relates to too much morbid rumination or the extremes of avoidance or denial (Patoine, 2018). One such change can come in the form of "transformation or destruction of the physical environment (home) by forces that undermine a personal and community sense of identity and control."



Solstalgia, a term coined by environmental philosopher Glenn Albrecht (2005), originates from the concepts of "solace" and "desolation": "literally, solastalgia is the pain or sickness caused by the loss or lack of solace and the sense of isolation connected to the present state of one's home and territory." Such a powerful feeling must surely come from a deep attachment to, or connection with, our home environment. Recent responses to the clearing of trees at the Kranji Woodland reflected a range of perspectives from economic pragmatism to environmental activism. Each of these perspectives might be said to be in some way motivated by a response to change and a way of dealing with change and loss of this home environment. Indeed, the Kranji clearing sparked (or enflamed) other discussions about other small pockets of forest that have also been targeted for development. Petitions to preserve Dover and Clementi forests received strong support, and the thought of future loss triggered a flurry of new visitors to these erstwhile "wild" places that had previously received few human visitors. In her essay on the ecology of grief, ecologist Phyllis Windle (1992) wrote about some benefits of grieving, while also emphasising the challenges that are consequent to change:

Times of transition are times of opportunity and any confrontation with an unfamiliar world is both an opportunity for autonomous mastery and a threat to one's established adjustment to life.... But there are some life changes which, because of their magnitude or because of a particular characteristic, carry a special risk of producing, not maturation, but dislocation. She also highlighted the effectiveness of ritual in the work of grief and mourning, even for ecologists like herself. Giving as an example American environmentalist Aldo Leopold's monument to the passenger pigeon (extinct since September, 1899), Windle reports that scientists, too, can come to draw on rituals to mourn the loss of species and places. A more recent example is the world's first memorial service for a glacier, which was held in August, 2019 (Howe & Boyer, 2020). The outstanding component of this event was that no ritual existed to draw from because the death of a glacier has not occurred before in human recognition. We have said goodbye to many things but never before to a glacier.





Mourning rituals, whether newly invented or embedded in cultural memory, can indeed provide a structure and recognisable pattern of activities in times of bewilderment and disorientation (Menning, 2017). They can also help reorient people who seek to retain a connection with what is lost, even in its absence. A ritual or rite of passage might also help people experiencing ecological loss reorient or reinhabit their own sense of personal identity in the face of their uniquely experienced loss.

Ecological grief is reportedly affecting many scientists whose work has them at the forefront of the experience of environmental change (Vince, 2020). Similarly, indigenous communities with strong links to land and place report anticipatory grief with respect to what conditions will be like for future generations. In such cases, environmental change affects one's identity through loss of identification with place. Some of the coping strategies employed amongst these disparate groups include support groups, art/creativity, and even through leadership to regain a sense of agency.

Environmental change affects one's identity through loss of identification with place. For other groups or individuals, the coping strategy could involve the reduction of cognitive dissonance, which is a mental discomfort that arises from a conflict between two beliefs, values or attitudes. Reducing cognitive dissonance as a coping strategy involves understanding existing beliefs so as to introduce new ways of acting according to these beliefs. There are several ways to reduce cognitive dissonance.

1.

Firstly, an attitudinal change can be brought about by transforming an existing cognition. For example, my initial attitude might have been that the Kranji Woodland was highly valuable as an integral part of the Rail Corridor and the clearing was a tragedy. However, after hearing that the cleared trees were mainly a non-native "scrubland" species, my transformed attitude might be that the clearing was not so bad after all.

2.

Secondly, a behavioural change might be managed by focussing on consistent cognitions. For example, to justify or rationalize a decision to support the clearing of existing forests for a new eco-development, I might pay more attention to the proposed benefits of the new development and tend to ignore information that documents the various types of wildlife habitat that will be lost through the clearing. Of course, this could go either way, with a focus on benefits of conserving forests leading to conservation behaviours.

3.

Thirdly, I might aim to reduce dissonance by reducing the importance of the inconsistency between my past and current beliefs by trivialising the difference. For example, I might begin to claim that I wasn't even such a strong supporter of wildlife in the first place. Again, reduction of dissonance could go either way and I might instead trivialise my justification for land development in favour of stronger support for wildlife.



However, to end on a lighter note, Windle (1992) also suggested some mourning rituals for ecologists that we might all use with some adaptations. These include practical but positive suggestions that involve a willingness to move through the work of grief so that it becomes successfully resolved:



Hold a wake for a precious piece of land – gathering to tell stories of what that place provided.

Create a family album, filled with the recollections of our grandparents, writing about the natural areas they have loved and lost in their lifetimes.

Create a special memorial fund toinvest meaning in our losses.

5

Note the remaining beauty of the earth, the birth of new species or subspecies, and the grand rhythms of the biogeochemical cycles.



Celebrate and affirm our faith in the processes of ecology and evolution.



Sustainable Mental Health and Deforestation

By Michael Thong

Over eight hectares of forested land or the equivalent of 33 football fields were erroneously cleared since March 2020 in Singapore (Ang, 2021). This issue triggered an uproar among the public and prompted followup investigations among the various governmental agencies on how this mistake was even possible (Tan & Ang, 2021). Singapore has always placed significant importance on greenery, since gardens have played a pivotal role in the city's development. Singapore's "garden city" branding had its humble beginnings in 1963, led by then-Prime Minister Mr Lee Kuan Yew, and officially became a national campaign in 1967 (Singapore Botanic Gardens, 2020). With such a history, it is little wonder why the accidental deforestation triggered such massive negative uproar among local communities. However, despite the agitation, many have overlooked a critical function that greenery plays for people on this island that extends beyond biodiversity, image, economy, and environmental factors.





Typically, when society talks about sustainable environment, we generally refer to eco-friendly initiatives, saving the planet, offsetting greenhouse gases, bio-degradable products, biodiversity, reforestation, green business sustainability, and protecting natural habitats of plants (Eltayeb & Zailani, 2009; Heley et al., 2021; Wantu, Mahdi et al., 2021). However, the influence of greenery, plants, and environment far exceed the visible issues we face today. Greenery and the natural environment also have a significant impact on an individual's mental health — something that is often ignored, forgotten, or perceived as less important today. Despite the growing acceptance towards mental health needs and shunning of mental health stigmas, there is still a need for greater awareness of the importance of mental health and factors that would influence the mental wellbeing of a person.



It is rare to hear of people getting concerned about mental health when greenery is being compromised. Much less when mental health is being prioritized as a critical element when greenery is being disrupted. The truth, however, is that greenery and the overall natural environment have a significant impact on an individual's mental health. Research by Jiang et al. (2020) revealed that natural plants or even artificial ornamental plants have a strong relaxing effect on the psychological and physiological wellbeing of the user. Additionally, the study also found that people who are surrounded by green plants are better able to manage stress and perform better overall in coping with life obligations.





An earlier review by Howard Frumkin (2001), a physician, suggested that the natural environment has a positive influence on a person's social, emotional, and physical wellbeing. Specifically, to "detox" or to destress from the daily unpleasant experiences that the person may encounter. A simple walk in the park or being around plants has a significant positive impact on the wellbeing of an individual. Frumkin's review found that people generally feel good around plants, and office employees reported that having plants in their workplace helps them to feel calmer and more relaxed. Additionally, the application of horticultural therapy in the form of gardening has strong efficacy among various populations spanning from the community to prisons to special education programs. In short, plants have significant impact on our mental health.



The impact of the deforestation on people residing in Singapore is notable. Compounding the lack of awareness on the detriment of deforestation on the mental health of individuals, most concerning is the probability that such accidental deforestation would set a precedent for future deforestation initiatives in Singapore. Already, Singapore is developing rapidly at a pace where many forested areas have to be removed permanently to make way for buildings and other concrete structures.

According to a Cigna 360 Well-Being Survey conducted in 2019, a shocking 92% of working Singaporeans and residents in Singapore feel stressed by their commitments and responsibilities in life (Human Resource Online, 2019). This is 8% higher than the global average of 84%. Among the indices used to measure wellbeing; (1) family, (2) finances, (3) physical, (4) work, and (5) social; work and finances were found to be the leading causes of stressors faced by people on this island. The stress is further exacerbated by the excessive focus on "productivity" to enhance the country's sustainability (Lee, 2017; Koh, 2015) which typically translates to longer working hours, overworked employees, and poor work-life balance (Tan R. , 2016; Today, 2019). The pandemic and work from home arrangement have done little to relieve the immense stress that most workers on the island experience; instead, they add to the already rough work experience, and financial stress. A National University Health System survey found that individuals working from home experienced more stress and burnout than individuals who do not work from home (Awang, 2020). Approximately 61% of responders who worked from home reported feeling stress and burnout as opposed to 53% of those who did not work from home.





With mounting evidence demonstrating that plants have natural anti-anxiety and calming effects, continued deforestation will yield undesirable consequences on the mental wellbeing of the population (Tierney, 2018). Loss of biodiversity, specifically of the plants and ecosystems, have a serious implication towards human health from managing viruses, infections, and mental health concerns (McNeely, 2021). This loss of forestry is especially troubling as it is also happening amidst a pandemic where biodiversity could potentially be influential in helping to manage the current physical and mental health related issues.

It does not take a genius to know that with this amount of stress and without effective coping skills, it is unlikely that the population's mental health will remain sufficient and well-managed. It is inevitable that the toxicity of the stress and harsh working expectations will result in a major public health issue when it comes to mental health. A study found that Singapore spends about \$3.1 billion or 18% of its healthcare expenditure annually on stress-related illnesses (Goh, 2019). This is a significant expenditure considering that it could have been better spent to improve the lives of the populace and help them to cope better with mounting stressors.









During the COVID-19 pandemic, many travel-starved Singaporeans have been seeking refuge in nature. It was reported in the local news that many nature-lovers visited the Rail Corridor during the Good Friday long weekend. The invitations of nature — those gentle rays of the sun, the smell of the crisp and fresh air, and the beautiful birdsongs — would have left many feeling refreshed and rejuvenated.

Human Relationship With Nature

Have you ever wondered why people are attracted to explore and seek out nature and green spaces? There are a few explanations for this. According to the Biophilia hypothesis (Wilson, 1984), humans possess an innate tendency to seek connections with nature, as our self-concept and personal fulfilment are related to this relationship with nature. The Attention Restoration Theory (Kaplan, 1989) suggests that spending time in nature restores our concentration through the practice of effortless attention. When we take a walk in nature, we are also staying away from other distractions that take up our cognitive efforts and cause fatigue.

In addition, the Stress Reduction Theory (Ulrich et al., 1991) posits that being in a safe and calm natural environment reduces stress and improves bodily functions such as blood pressure and heart rate. Overall, it appears that our affinity towards nature is deeply rooted in evolution and genetics.

Nature Improves Our Wellbeing

The World Health Organization (1948) defines health as a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity. Singaporeans have good reasons to be up and about in parks and nature reserves, given the positive impacts that nature can have on our health and well-being. Studies have shown that spending time in nature, or bringing nature into our daily lives, are associated with benefits such as:



- 1. Improvement in sleep
- 2. Improvement of general well-being
- 3. Reduced symptoms of depression, anxiety, stress, and anger
- Improvement in immunity, through an increased production of natural killer cells that help to fight tumors and infections
- Improvement in relaxation of the body, through increased activity in our parasympathetic nervous system
- Reduction of stress in the body, through decreased activity in our sympathetic nervous system, and lowering production of the stress hormone cortisol

The emerging fields of Ecopsychology and Ecotherapy continue to seek a better understanding on how our relationship with nature can help to enhance our identity, physical and mental health, and well-being. For example, Ecopsychologists may conduct research to find out about how nature connectedness may affect one's identity, or how gardening might be related to one's emotional resilience. In Ecotherapy, which is the applied field of Ecopsychology, practitioners of psychotherapy are informed by the systems perspective and would consider an individual's relationship with nature as part of the recovery process. They might integrate activities such as the use of gardening, companion animals, or meditating in nature into their psychotherapy practice.

Nature Ideas We Can Try

There are many different ways to experience nature and the positive effects that it can bring us. We can start small by choosing something that interests us, and think about how we can individualize and integrate them into our lives.

Bring Nature Inside

We can develop photographs of beautiful landscapes that we enjoy, decorate our rooms with them, and notice with curiosity the feelings of joy and calmness that they elicit from deep within us. We can also buy some potted houseplants and fresh flowers to add to the life and greenery in our rooms.





Use our Five Senses

We can go outside, notice the sun's gentle beams at dawn or dusk, feel the cooling breeze brushing against our skin, listen to the calls of the birds and cicadas, smell the crispness and freshness of the air, and taste the morning dew that forms at first light.



Get to Know a Tree

We can find a tree near us, smell the freshness of its leaves, notice the different shades of green against the light, and feel the grooves of its bark against our hand. We can even do some research to understand the ecological and cultural importance of this tree to our region.



Join a Forest Bathing Session

We can search for a local nature and forest therapy guide to bring us on a forest bathing journey. This is a healing practice originating from Japan (also known there as *shinrin-yoku*) that encourages people to immerse their senses in nature while connecting deeply with it.

Give Back to Nature

We can join a local conservation group, volunteer as a nature guide, or donate to a fund that supports the conservation of nature. We can also reduce our

> carbon footprint by reducing our plastic consumption.



Stand still. The trees ahead and bushes beside you Are not lost. Wherever you are is called Here, And you must treat it as a powerful stranger, Must ask permission to know it and be known. The forest breathes. Listen. It answers, I have made this place around you. If you leave it, you may come back again, saying Here. No two trees are the same to Raven. No two branches are the same to Wren. If what a tree or a bush does is lost on you, You are surely lost. Stand still. The forest knows Where you are. You must let it find you.

David Wagoner

Shinrin-Yoku: Leveraging Nature as a Therapeutic Medium

By Xavier Lim



The harmonious relationship between humans and nature is often considered one of the core characteristics of Japanese culture. This is evident in the many seasonal festivals unique to Japan that centre around the appreciation of nature, including Hanami (Cherry Blossom Viewing), Tsukimi (Autumn Moon Viewing) and Sapporo Yuki Matsuri (Snow Festival). Traditionally, the architectural designs in Japan have emphasised the harmonisation of infrastructure with natural surroundings (Saito, 1985). This philosophy of biophilic design – to foster connection with the natural environment – adopted by the Japanese culture subsequently contributed to the pioneering of shinrin-yoku (literally, taking in or bathing in the forest atmosphere) as a mode of nature therapy. Considering the novelty of shinrin-yoku as a therapeutic medium, this article consolidates and critiques contemporary clinical research on shinrin-yoku, and raises its potential benefits on physiological and psychological wellbeing.

Shinrin-Yoku: A Primer

The term shinrin-yoku was coined in 1982 by the Ministry of Agriculture, Forestry and Fisheries of Japan (Miyazaki, 2018). It is a traditional Japanese restorative technique that aims to foster physiological and psychological health, which entails mindful presence in the here-and-now and immersion in the forest environment (Miyazaki, 2018). Tapping on the five senses, shinrin-yoku emphasises harmonisation with nature and often involves programmes aimed at producing relaxation effects, such as yoga, meditation, and walking while appreciating the natural environment.



As shinrin-yoku incorporates the natural environment as a therapeutic medium, it can be considered a form of nature therapy. According to a conceptualisation by Song et al. (2016), nature therapy is a set of approaches that leverages on natural stimuli to enhance physiological relaxation and immune functions, subsequently boosting preventive medical pathology. The practice of shinrin-yoku, along with other nature engagement techniques, has been supported by various biophilia-based hypotheses including Ulrich's stress reduction theory (SRT; Ulrich et al., 1991). The SRT is a psycho-evolutionary theory which proposes that natural environments promote stress reduction and physiological recuperation processes, while urban environments hinder these restorative processes (Ulrich et al., 1991). In contrast to urban environments, nature is less cognitively laden with complex perceptual stimuli and consequently demands lower cognitive resources from the perceiver. This taxing cognitive processing demand unique to the urban environment has been suggested to obstruct stress reduction (Cohen, 1978).
Benefits to Health and Well-Being

The complementary modality of preventive medical pathology, which integrates shinrin-yoku with pharmacological interventions, is a state-of-the-art in the clinical and medical field (Hansen et al., 2017). To examine the effects of this nonpharmacological approach on health and well-being, I provide an exploratory review on the clinical benefits of shinrin-yoku.

Kotera et al. (2020) conducted a systematic review and metaanalysis investigating the effects of shinrin-yoku intervention on mental health. This group of researchers consolidated all empirical articles that satisfy four eligibility criteria: (1) published in a peer-reviewed academic journal; (2) intervention involved core elements of shinrin-yoku, delivered in a forest environment; (3) employed a randomised-control trial or preand post-intervention design; and (4) used mental health quantitative measures to capture depression, anxiety, stress, or anger. Twenty studies published between 2007-2017 were included in their review after comprehensive screening, with a total of 2257 independent participants (age range 18–79 years old). Their overall findings concluded that across studies, in both clinical and non-clinical samples, shinrin-yoku intervention appears to be most effective in the reduction of anxiety, as compared to depression and anger. Moreover, shinrin-yoku was effective in reducing stress, lending further support to Ulrich's stress reduction theory (Ulrich et al., 1991).



Another systematic review conducted by Wen et al. (2019) expanded beyond the mental health domain to investigate the holistic benefits of shinrin-yoku. The eligibility criteria for their review were as follows: (1) articles published in a peer-reviewed academic journal; (2) intervention involved core elements of shinrin-yoku, delivered in a forest environment; and (3) the number of interventions received by participants must be less than or equal to 3. Twenty-eight studies published between 2015–2019 were included in their review. Overall, shinrin-yoku also appears to be a significant contributor to the promotion of both physiological and psychological health. Some of the positive physiological effects found were improvements in cardiovascular function, metabolism, and immune and inflammatory functions. Meanwhile, the psychological benefits include reduced levels of stress. These researchers summarised their findings by supporting the therapeutic delivery of shinrin-yoku and its restorative effects in improving holistic health.

Limitations and Future Directions

Insights from the systematic reviews revealed various positive benefits and restorative effects of shinrin-yoku. However, these findings must be interpreted with various methodological constraints. Firstly, even though some intervention studies employing shinrin-yoku have been published in Western cultures, including the United States (McCaffrey et al., 2010) and United Kingdom (Markwell & Gladwin, 2020), most evidence originates from the Asian context, especially Japan and China (Hansen et al., 2017; Song et al., 2016; Wen et al., 2019). To date, limited studies exploring the restorative benefits of shinrin-yoku in Singapore have been published, in part due to limited rural forest environments for therapeutic engagement (refer to Lim et al., 2020, for a local investigation of nature immersion on psychological and physiological health). Additionally, in the therapeutic context, little to none of the studies examined these effects in comparison to other major therapeutic approaches, such as cognitive behavioural therapy. Lastly, most of the therapeutic benefits of shinrinyoku were assessed on time points confined within the period of the intervention and immediately after; the longitudinal benefits of shinrin-yoku are still relatively unknown due to the lack of follow-up assessments (Kotera et al., 2020). As such, more research needs to be conducted to fully establish the cross-cultural relevance and clinical significance of shinrin-yoku interventions.





Shinrin-Yoku From a Local Perspective

For us urban dwellers, our contact with nature is often constrained by occupational, familial, or educational demands. Having discussed the restorative effects of contact with nature, it is highly recommended for members of the public to occasionally keep in touch with biodiversity. Did you know that Singapore continually attempts to integrate nature into our architectural designs? Adopting the philosophy of biophilic urbanism, Singapore has established a variety of places of interest that amalgamate infrastructure with the beauty of nature. One prominent example is "Gardens by the Bay", a S\$1 billion project to regenerate a reclaimed foreshore. A more recent example in Singapore is Jewel Changi Airport, known for the incorporation of a waterfall and verdant gardens, specifically the Shiseido Forest Valley, in an indoor environment. Designed by Israeli Canadian architect Moshe Safdie, Jewel Changi Airport was a \$1.7 billion project aimed at underscoring Singapore's title as a nature-infused city a city in the garden.

Conclusion

The philosophy of biophilic design holds the assumption that we are naturally affiliated with nature. With burgeoning evidence highlighting the restorative benefits of shinrin-yoku in both the clinical and non-clinical populations, health practitioners have been increasingly prescribing nature-based health interventions (i.e., green prescribing) to individuals with noncommunicable diseases (Robinson et al., 2020). As shinrin-yoku and the theories (e.g., Ulrich's stress reduction theory) that explain its therapeutic effectiveness receive greater recognition in the scientific community, its practices may perhaps be streamlined in the not-too-distant future as a non-pharmacological treatment which complements traditional biomedical approaches of promoting health in Singapore.

Plant Your Happy Pill!

By Chen Yeh Tan

Monstera, Alcosia, Begonia, Fiddle leaf fig... My vocabulary of houseplant names expanded exponentially during this COVID-19 period, with the collection of plants sprucing every corner of my house. I get excited at the tiniest leaf unfurling, and often grab my camera in anticipation, hoping to immortalize the moment when there is the slightest hint of fruiting. Sounds all too familiar? You are not alone.

Plant enthusiasts who pride themselves as plant parents and avid urban farmers are sharing their tips, rare collections and "fruits of labour" with one another, forming communities and interest groups both offline and online. Biophilic architectural designs and nature-related health interventions also seem to be trending now, with the Government seeking to create more green spaces to allow people to connect with nature. So, why the rising trend of home gardening and green spaces amongst Singaporeans? First, let us go to the fundamental premise – that humans have a natural affiliation towards nature.



First introduced by German philosopher and psychologist Eric Fromm and popularised by Edward O. Wilson (1984), biophilia is defined as the innate human tendency to be attracted to life forms and life-like processes. Based on this evolutionary point of view, humans have an inherent inclination towards natural elements, respond well to natural content and characteristics of landscapes that are favourable to well-being (Kaplan & Kaplan, 1989; Ulrich, 1983). A study by Orians (1986) suggests that positive responses (such as enhanced mood), are elicited by specific characteristics of environments that were most favourable to pre-modern humans from the standpoint of basic survival - yielding food and water. This biophilia hypothesis thus explains why, universally, we are very likely to be drawn to a picture or setting resembling a natural water feature and lush greenery.

Evolution aside, there are many benefits associated with having greenery in your spaces. These benefits have catalysed the botany boom during COVID-19. You may think that you have to be actively involved in gardening to reap the benefits, but the truth is that passive forms of plant exposure will also allow you to feel both psychologically and physically energised too. While not exhaustive, here are the commonly cited benefits of dedicating a space at home or in your office for plants, as they:

Relax your mind.

COVID-19 has brought about a state of uncertainty and readjustment, amplifying any stress and anxiety that we may already have. It is hence no wonder that people turn to plants for a quick antidote to their stress. Almost unanimously, studies have shown that plant exposure helps to reduce stress. A research study showed that brief exposure to the natural environment, defined as ten minutes for two to three days a week, reduced stress as lower cortisol levels were found in the participants' saliva (Farr, 2016). You do not have to necessarily participate in a nature walk though. Individuals seated in a room with views of trees experienced more rapid declines in diastolic blood pressure, indicating greater stress reduction, than when sitting in a viewless room (Hartig et al., 2003). Just observing images of nature has also shown to improve mood and reduce stress (Brown et al., 2013), which is definitely a win for those who cannot leave home during the lockdown. One can still find solace in recreating elements of nature at home such as introducing potted plants and life-like ornaments.



Restore physical health.

You may think that only regular nature walks or working under the sun with heavy gardening tools can improve one's physical health. While exercising regularly, especially in a natural setting, definitely promotes physical health in a more enjoyable manner, the restorative benefit to human health is not just confined to active interaction with nature. Passive enjoyment of nature (e.g., admiring your plants at home) can potentially help you to improve your physical health too. For example, a study on blood donors saw lower pulse rates and blood pressure when a nature videotape was shown, compared to when other videos were presented (Ulrich et al., 1991). While having greenery around you cannot guarantee you the perfect physique that you have dreamt of, it can nevertheless help to promote a more restful state, which is vital for healing and a physically healthier body.



Enhance cognitive ability.

Nature exposure is often linked to various cognitive enhancements, such as creativity and focus. For example, contact with natural settings was found to have an effect on sustained attention, as participants were able to perform better at attention-demanding tasks (e.g., proofreading) after nature exposure (Hartig et al., 1991). Nieuwenhuis, Knight, Postmes and Haslam (2014) also found that offices with green spaces effectively promote concentration and productivity. Such cognitive enhancement may be a result of nature's ability to restore mental fatigue. In contrast to the hustle and bustle experienced in a typical urban setting, which draws directed attention and may result in mental fatigue quickly, the alluring beauty of natural environments is able to elicit "soft fascination". Such fascination holds one's attention effortlessly (think about those times you visited a garden and admired all the colours and patterns created by nature), thereby providing us the space to restore cognitive capacity in the process (Kaplan & Kaplan, 1989).



Give you meaning.

Being able to nurture plants cultivates a sense of purpose and agency. This is especially valuable amidst the uncertainty and potential sense of helplessness during the lockdown periods, where people feel restrained or bored at home. Moreover, home gardening fulfils the need to feel connected; a common desire during this period where people are not allowed to huddle and socialise in proximity. It gives people an opportunity to connect through this interest, with plant trading and exchanging of gardening tips being popular topics both in the real and virtual world. My own activities associated with gardening have fostered a sense of belonging to a larger community "out there", something that I had particularly craved for during this period of isolation.

But I do not have green fingers...so how?

While cultivating your own green space can bring about a lot of joy and health benefits, it may not necessarily be the case for all. Some may feel compelled to buy and grow more than what their spaces or budget allows for, which may cause unnecessary stress. Others may feel anxious over not being able to adequately care for their pet plants. The good news is that there are very fuss-free houseplants and terrariums out there for those who are beginner plant parents, and you do not have to have a jungle at home to reap the benefits. Moreover, some studies seem to suggest that artificial plants and pictures of nature may very well do the trick, as long as it is life-like and attractive to you. So go ahead and spruce up your space with some visually appealing greenery, and get ready to bring your desired nature close to you!





Walking the Green Talk: What is Stopping Us From Being Pro-Environmental?

By Koh Ghee Kian

You may have noticed a recent influx of climate change news and activism, day after day. In fact, it is hard not to be exposed to environment-related information in some form. This is not something new; we have all learnt of these decade-long issues — of environmental degradation due to human activities — from our early years of formal education. You may then wonder, "Why have we not done enough to stop the relentless environmental damage before things became worse? How much of this is my responsibility? What can or should I even do about it?" In order to bring about significant improvements to our impact on the environment, pro-environmental behaviours (PEBs) are more important now than ever, as environmental sustainability garners an increasingly urgent focus among businesses and policymakers. Major publishers have even jointly decided to use the term "climate emergency" to reflect the gravity of our situation (Fischetti, 2021). Nevertheless, to be actually pro-environmental, we first need an understanding of what are PEBs, what influences PEBs, and what stops us from doing them.



What Motivates PEBs?

Behavioural models have been commonly applied to understand the determinants of PEB as well. Early models assumed that environmental knowledge would lead to pro-environmental attitudes, which would then result in performing PEBs (Kollmuss & Agyeman, 2002). Later, a more sophisticated Theory of Planned Behaviour (TPB), which was traditionally utilised in understanding health behaviours, was applied to the pro-environmental context as well. The TPB recognises that the intention for a behaviour is determined by a combination of factors, namely subjective norms, attitude, and perceived behavioural control (Ajzen, 1991; Okumah et al., 2020). Subjective norms refer to the individual's perception of whether others significant to them think they should or should not perform a behaviour (Okumah et al., 2020). Attitudes can be understood as a persistent set of beliefs shaped by experience, which directs one's response towards relevant objects and situations, be it positively or negatively (Tarfaoui & Zkim, 2017). Perceived behavioural control is one's assessment of their ability to perform the behaviour (Ajzen, 1991). Taken together, PEB intention — and by extension, PEB — is determined by one's attitude towards PEBs, subjective norms regarding PEBs, and perceived ability to perform PEBs.





What are PEBs?

PEBs, as the term suggests, are both behaviours that are performed for the benefit of the environment and behaviours performed to minimise negative effects on the environment (Kollmuss & Agyeman, 2002; Lange & Dewitte, 2019). Common examples that come to mind are water and energy conservation, recycling, buying products from responsible sources, reducing single-use plastic usage, and even reducing beef consumption. In Singapore, you may also opt for a green energy retailer to allow renewable energy to contribute a small portion of your energy supply. These are individual-level PEBs that pertain mainly to our consumption choices — sustainable consumption thus forms a key category of PEB (Terlau & Hirsch, 2015). On the other hand, the more social or "public" types of PEB would include supporting green policies and volunteering with pro-environmental groups.



People may also act pro-environmentally due to cognitive dissonance. Festinger (1985, as cited in Bamdad, 2019) posits that a dissonance, or contrast, between one's attitude and behaviour results in psychological discomfort which the individual seeks to reduce. Reducing dissonance can be achieved either by modifying one's attitude, belief, or behaviour, or by minimising the importance of dissonance-inducing thoughts, or through a combination of all these methods (Bamdad, 2019). As such, people with strong pro-environmental attitudes would act pro-environmentally to mitigate this cognitive dissonance.



The Attitude-Behaviour Gap

A pro-environmental attitude is considered a main predictor of PEB. But in reality, even people who possess pro-environmental attitudes and understand that acting pro-environmentally is the socially responsible thing to do, do not always act in proenvironmental ways. A consumer survey found that while 30% to 50% of consumers stated their intention to purchase sustainable products, sustainable goods do not even make up 5% of the total sales (Terlau & Hirsch, 2015). The attitude-behaviour gap is understood as the contrast between one's stated intention and eventual actions (Tarfaoui & Zkim, 2017). Due to the pro-sociality of PEB, the relationship between attitude and PEB is further complicated by considerations of personal cost and availability of external support for such beneficial actions. External support in the context of sustainable consumption may include social ones such as having friends and family who prioritise the purchase of sustainable goods, or structural ones like the placement of sustainable products on supermarket shelves at the eyelevel, with a simple message to encourage purchase of products labelled as "sustainably sourced".





Internal Conflicts

One of the main issues that plague the application of the TPB in studying PEBs is the lack of specificity in the pro-environmental attitude measured for a certain PEB (Tarfaoui & Zkim, 2017; van Trijp & Fischer, 2011). In using general and abstract proenvironmental attitudes to determine an individual's behaviour, numerous situational and contextual factors that can affect one's decision-making are overlooked (Tarfaoui & Zkim, 2017; van Trijp & Fischer, 2011). As explained by the social dilemma theory, the attitude-behaviour gap for PEB is often a result of conflict in the social and temporal aspects within the attitude-behaviour relationship (van Trijp & Fischer, 2011). The social conflict refers to the dilemma between the desire to fulfil personal needs that may not benefit society as a whole (e.g., having a negative environmental impact), and pro-social acts that may not benefit the individual. For example, one may personally enjoy a meat-heavy diet that predominantly consists of beef or lamb, but excessive meat consumption has a high carbon footprint due to vastly more land and food resources required to produce them. On the other hand, switching to a plant-based diet will significantly reduce the carbon footprint from one's diet, but may seem like a personal sacrifice that renders their meals less enjoyable.



The temporal conflict is recognising that short-term satisfaction can have a negative impact in the long term, and what is beneficial for the future may mean sacrificing immediate desires (van Trijp & Fischer, 2011). Research has suggested that people tend to undervalue future costs when making PEB-related choices, due to the brain's mesolimbic pathway or "reward system" being geared towards impatience, which competes with the brain region for analysing long-term consequences (van Trijp & Fischer, 2011). This is akin to the familiar depiction of an "angel" and "demon" self, sitting on opposite shoulders, only that the demon is more influential when it concerns socially desirable behaviours such as PEBs, where the stronger yearning to meet immediate needs (demon) overwhelms the rational consideration for adverse effects in the long run (angel). This disparity between the characteristics of attitude (serving a greater good and considering long-term impacts) and behaviour (wanting immediate self-satisfaction) thereby constitutes the weak attitude-behaviour relationship in the PEB context.



External Barriers

Researchers from as far back as the 1980s have tried to address the complexity of the attitude-behaviour gap. Rajecki (1982) suggested that this gap between measured attitude and behaviours in research is mainly due to four causes:

- Direct versus indirect experience: Indirect learning of bad environmental behaviours leads to less willingness to perform PEBs as compared to direct experience of environmental damage. Personally being in the presence of a bed of dull and lifeless corals as a result of ocean acidification, due to increased atmospheric carbon dioxide, is much more poignant than learning about coral bleaching in school or through news reports. Similarly, witnessing birds choking and suffocating on plastic waste is more impactful than learning of their plight through internet articles.
- Normative influences: Presence of family, social and cultural norms that shape pro-environmental attitudes and habits, thereby reducing the attitude-behaviour gap.
- Temporal discrepancy: People's attitude towards environmental protection may be stronger immediately following news of environmental disaster, but this strong pro-environmental attitude wanes and changes over time.

 Attitude-behaviour measurement: Similar to what was discussed in the preceding segment, the attitude-behaviour gap often stems from attitudes being measured on a much broader scope (e.g., "Do you think climate change is an urgent issue?") as compared to the particular behaviours assessed (e.g., "How often do you consume beef").

These barriers were also further condensed by Blake (1999) into three scopes, namely individuality, responsibility, and practicality. Individual barriers are, as discussed before, the internal conflicts experienced where even strong environmental concerns can be overwhelmed by stronger personal fulfilment and needs (Blake, 1999). People may be aware of the high carbon footprint of air travel, but many still choose to travel year after year. This may be further fuelled by strong habits, which require significant cognitive effort to overcome (Tarfaoui & Zkim, 2017). Next, the barrier of responsibility refers to the individually perceived ability to bring about positive effects if they performed PEBs, and a lack of trust in governments and institutions to act pro-environmentally would prevent them from engaging in PEBs (Blake, 1999). The third barrier of practicality includes social restrictions such as the lack of time, money, or ample information to act on PEBs (Blake, 1999). When viewed holistically, these illustrations of internal and external barriers provide a glimpse of the complex interweaving of various influences and obstacles when addressing the gap between attitude and behaviour.



When We Try Our Best, But Do Not Succeed

Cognitive dissonance may be a process by which pro-environmental attitudes translate into PEB, in an effort to reduce psychological discomfort, but the types of seemingly pro-environmental actions may instead do more harm than good for the environment. There is a psychological tendency for "quick fixes" to reduce dissonance as soon and simply as possible that may instead be counter-productive in their impact on the environment (Sörqvist & Langeborg, 2019). Individuals may choose to recycle more or have certain "meat-free" days to cope with the guilt of air travel, but the environmental cost of air travel cannot be duly compensated by these small acts of PEB. People may also consume large amounts of food products that are labelled as "environmentally responsible", when it is best to just consume less overall. Such acts of compensation may also provide these individuals with a "moral license" to continue acting in ways that harm the environment (Sörqvist & Langeborg, 2019).



Conclusion

Being aware of the myriad factors and influences involved in our decision-making process is the first important step in addressing our own gap between attitude and behaviour. While the government and various corporations have a duty to facilitate PEBs on a societal scale, each of us should also discern between acts of unequal compensation and actual environmentally-beneficial choices in our daily lives, so that our limited efforts will not go to waste or be undone by other less sustainable choices. To make even small steps count, they need to be deliberated upon and encouraged by institutions, by our community, and by people important to us, lest we fall back to our old, unsustainable behaviours.



Missing Pieces in Sustained Sustainability – Where do the Behavioural Gaps Lie?

By Dr Goh Yong Wah, Dr Lohsnah Jeevanandam, and Dr Nanthinee Jevanandam EARTHYS Sustainability



The Problem

Engaging in environmental responsibility is about leaving old behaviours and creating new ones that reduce resource use and support a circular economy; e.g. Reduce, Reuse and Recycle (3Rs). We often find ourselves wanting to practice the 3Rs, but never quite translate them into actions. For example, we want to reduce food waste, but find it troublesome to plan our meals and purchase groceries accordingly. Put simply, our desire to be green (Value) and our behaviours (Action), do not align (Gap) with each other.

While external factors (e.g., installing recycling points) play a role, internal factors play a more important role, as having the right attitude can override challenges in our external environment. Despite numerous campaigns by government agencies and interest groups, Singapore's domestic recycling rates only went up by 1% from 2017 to 2018 (NEA Waste Statistics). This meagre increase in recycling rate may be attributed to an integral part not being emphasised enough: i.e., the internal factors that shape pro-environmental behaviour. Campaigns are by nature short-lived and do not substantially impact internal factors. Therefore, individuals may utilise the recycling bin or try re-using, but in the long-term revert to old habits because the motivation to be sustainable is not intrinsically driven. In contrast, intrinsically driven behaviour would ensure that individuals plan and structure their activities differently in order to support environmental responsibility.

Creating Sustainable Sustainability

Sustainable sustainability requires *a process perspective*. This means not only looking at the personal factors of Value, Attitude, Confidence and Intention to act, but also examining how they *interact with each other* to influence behaviour.

For example, to engage in recycling we need strong pro-recycling Values. These Values motivate us to acquire relevant experience, knowledge and skills, which bolster our Attitudes and subsequently our Confidence in recycling. Our Intention to recycle will then be strengthened by positive thoughts as opposed to negative thoughts.

The view that our Values fail to translate themselves into actions due to deficits in our Attitude, Confidence and Intention, has essentially missed a critical element: **"interaction"**. Interactions are intricate threads that weave the above-mentioned personal factors into a cohesive and balanced system. It prevents our sustainability behaviour from deteriorating.

For instance, Avic is a youth who believes in the moral responsibility of safeguarding the environment (strong Values). He spends time understanding recycling and sees it as an important way to protect the environment (strong Attitude). But whenever he visits his community recycling bin to deposit recyclables, he sees contaminated recyclables. Hence, he thinks his community actively disregards recycling and becomes sceptical about recycling (low Confidence). These in turn adversely impact his motivation to recycle (low Intention).

From a *process perspective*, there is a disconnect between Avic's personal factors. Avic initially has Confidence in engaging recycling behaviours because his Values towards environmental responsibility have motivated him to educate himself and develop a pro-recycling Attitude. Essentially there is a specific sequence of interactions; i.e. Values -> Attitude -> Confidence. When he sees recyclables contaminated, his Confidence is compromised, and he begins doubting his recycling effort (e.g., "Why do I bother? My effort is undermined by others", "My neighbours think I am wasting time taking recycling so seriously"). Consequently, Avic's reduced confidence weakens his intention to recycle, because the sequence of interactions between his personal factors has been interrupted.





Root Cause

Research has found these personal factors to influence behaviour:

- Our Values
 - What are my community or cultural values about sustainability?
- Our Attitudes
 - What are my views and feelings about sustainability?
- Our Confidence
 - What is my level of ability and freedom to engage in sustainability?
 - Will my engagement in sustainability be worthwhile or impactful?
- Our Intention to act
 - What are my thoughts when I am about to engage in sustainability?

The gap between values and actions are often attributed to weaknesses in the above mentioned personal factors. Strategies are recommended to improve them and close the gap between values and actions. However, most of them assume that we need constant external assistance and initiatives to bring about environmental responsibility. But aren't we independent and self-directed individuals capable of forging our own behaviours with or without external assistance? Wouldn't this be a more sustainable form of sustainability?







Overcoming the Interruptions in Avic's Recycling Behaviour?

The process perspective recommends a three pronged solution.

1) Improve Avic's view of his community's engagement in recycling. This will rejuvenate Avic's Confidence in his recycling efforts, strengthen his faith in his community and reduce those negative thoughts that hamper his Intention to recycle. The links between his Confidence, Attitudes and Intention to recycle will be reconnected.

2) Reinforce existing links between Avic's personal factors, specifically from Attitude to Intention. Despite his diminished Confidence, the negative thoughts that impede his recycling intention may be countered by boosting his Attitudes on recycling. In doing so, his Intention to recycle will remain strong from new supporting thoughts generated from his invigorated Attitudes.

3) Create new reinforcing linkages between personal factors to strengthen his recycling behaviour. Avic's Intention to recycle — with supporting thoughts — may be reinforced by linking it to his Values about being a custodian of the environment such that recycling becomes a mark of his self-identity.



Transactional Relationship Between Person and Environment

While there are several person-related factors pivotal in understanding sustainable behaviour, the role of the environment in promoting such behaviour cannot be minimised. In environments where there are active education, resources, infrastructure, policies and incentives that are prosustainability, the influence on the person's Values, Attitudes, and Intention is likely to increase positive behaviour proportionately. Likewise, individuals with more pro-sustainable behaviour will further influence their environment accordingly. This transactional relationship between person and environment clearly illustrates that sustainability needs to be approached at both the micro and macro levels, and also with many key stakeholders. For example, countries like Japan, Taiwan and Germany enforce/institute recycling at the domestic level. This being a way of life on a daily basis naturally creates an environment that nudges people's behaviour in the direction of recycling beyond the home. In the case of Japan in particular, its citizens' prosustainability behaviours are frequently on display overseas and inspire many, such as Japanese soccer fans cleaning and taking their trash out of the stadium after watching a 2018 World Cup match in Russia.

Conclusion

Our intention to act is often plagued by competing thoughts against or for a specific action, particularly in an environment where supports for sustainability are weak. It is our strongly aligned pro-sustainability Values, Attitudes, Confidence, and Intentions that will afford us the fortitude to behave appropriately, without being swayed by opposing thoughts and consistently regardless of where we may be. We need to cultivate a coherent network of personal factors and reinforce the linkages between them via multiple layers and different avenues. Efforts at the national, community and organizational levels must mirror each other correctly and consistently. For instance, driving community messaging that supports reducing while having community events that distribute freebies freely is counterproductive and causes a disconnect between personal factors. Therefore, shaping pro-environmental behaviour in Singapore has to go much deeper and wider with a focus on consistency, correctness and connectedness.











Human x Nature Exhibition: A Reflection Piece By Andrea Ong

"Its soil yielding to none in fertility, its climate not exceeded by any in uniformity, mildness and salubrity. It abounds in an endless variety of plants equally interesting to the botanist, the agriculturist and the gardener, with unrivalled facilities and opportunities of disseminating these treasures and exchanging with others."

Dr Nathaniel Wallich,
 Superintendent of the Calcutta Botanic
 Garden in 1822, on establishing a Botanic
 Garden in Singapore (Bastin, 1981, p.35).

From Discovery to Rapid Consumption



At the beginning of the "Human x Nature: Environmental Histories of Singapore" exhibition at the National Library Board (NLB), I was in awe of how much Singapore seemed to offer its colonialists in the 19th century. If cultivated well, Singapore's terrain presented perfectly untouched and diverse vegetation, with huge potential for commercial gain. The cash crops (gambier and pepper to name a few) were the main assets of the island and made Singapore a colonial fascination (Kong & Yeoh, 1996). Unfortunately, these agricultural resources quickly became the central factor contributing to mass deforestation. It seemed like there was no turning back at that moment — not merely for Singapore's natural landscape, but for her occupants, and how they would interact with their rapidly changing environment.

Reconstructing Nature – Where Are We Now and Where Are We Headed?

The silver lining in the historical revelations in the exhibition seemed to be the efforts of all colonial hegemonies to subdue "primitive" nature for financial benefits, leading to the preservation of flora distinct to Singapore. The Botanic Gardens, for example, has a long history of being an "experimental sanctuary" where nature could be cordoned off and studied under the auspices of research, as a consequence of scientific hunger for biodiversity-related knowledge (Kong & Yeoh, 1996). It only came to mind then, how far Singapore has come since its discovery, to be coined a "Garden City", then recoined in the past few decades as a "City in a Garden", to help remodel her image as an urban community encased in a nest of green. Personally, this imagery of progression — smartly aided by posters arranged in chronological order - made it the most memorable part of the exhibition. Although there is still much I would like to share with regards to the Human x Nature exhibition, I would highly recommend soaking in the enriching and enlightening experience in person (the exhibition concludes on 26 September 2021).

Indeed, the leaders from Singapore's independence until today have taken considerable efforts to balance its current economic standing while simultaneously enriching green spaces. Some examples include establishing tree planting programs (e.g. annual Tree-Planting Day, since November 1971), creating dedicated green spaces, and forming regulatory authorities like the National Parks Board (NParks) in 1990. Comparatively subtler decisions include strategic shrubs planted along highways, creepers lined lengthwise onto pedestrian bridges, and parks intentionally planted with foliage. For sure, we may not enjoy the previously lush tropical forests, but I am thankful for the environmental efforts that have come to pass, and hopeful that future generations will place greater importance on protecting our environment by engineering more sustainable solutions.



Framing Perceptions of Nature

Given all that I have written thus far, it may or may not come as a surprise that Singaporeans seem to be increasingly attached to nature in urban Singapore (Oh et al., 2020). One widely accepted concept to describe this attachment to our physical environment is 'place identity'. The most broadly acknowledged definition of 'place identity' suggests that individuals subconsciously incorporate feelings, values, preferences (and more) into their personal identity, consequently creating an instinctive attachment to a place (Peng et al., 2020). Perhaps Singapore's "place identity"-making policies have instilled public mindsets and consequent social norms that help push for the message that integration of nature into daily living is crucial. However, evidence also suggests that this increased connectedness with nature may pose as a double-edge sword for all humans.





A great deal of evidence reports positive associations between social connectedness and subjective wellbeing. Cartwright, White, and Clitherow (2018) showed that nearby nature (i.e. greenspace around the home area) acts as a buffer for when social connectedness is poor. They also revealed that having high levels of nearby nature is associated with reduced levels of depression, highlighting the role nature plays in improving subjective wellbeing, especially in seasons of social isolation. Other researchers suggest that health benefits of green spaces could be context-dependent (Amano et al., 2018). For example, in richer cities (such as Singapore, Osaka and Hong Kong), green spaces were correlated with increased public health, whereas in poorer cities, green spaces seemed negatively correlated to public health. In the study, they attribute this difference to the quality of the green spaces (aesthetic appeal, perceptions of safety, availability of facilities and organised recreation, etc.). Even so, an increased connection between human and nature can also result in what researchers term 'ecological grief' – painful feelings relating to the environment, and 'solastagia' - distress resulting from dilapidation of one's own home landscape (Chawla & Rachelle, 2020; Cunsolo & Ellis, 2018; Galway et al., 2019).

All in all, relationships are complex, including this inseparable, multifaceted relationship we all have between human and nature. As with all relationships, this particular one has and will continue to evolve. I'm nervous yet excited to see how everyone begins (or continues) to take ownership of their own environmental footprint, and to engage in continuous learning in this dynamic field. If there is one main takeaway I would like to share from this exhibition, it is this:



"We may think we are nurturing our garden, but of course, it's our garden that is really nurturing us."

- Jenny Uglow (2018)



Experiential Environmentalism

To help understand some of the local efforts to encourage learning about our homegrown landscapes and their nonhuman residents, Dr Denise Dillon spoke with Mr Balakrishnan Machap, a representative of Cicada Tree Eco-place (CTEP). Registered as a non-profit, nongovernmental organization, the society was formed "in urgent response to the alarming climate change crisis and its impact on wildlife and humans. It advocates for the protection of our precious natural heritage and seeks to educate the youth and communities about eco-living to combat global warming" (CTEP, n.d.).

DD: According to your website, CTEP programmes are "centred on the twin pillars of experiential environmentalism and local culture." I had not come across the term "experiential environmentalism" before so I was interested to learn about this.

In the mainstream media, there appears to be some understanding of experiential environmentalism as a form of protest and even social and ecological revolution with school-aged protesters at the helm (Kaaronen, 2019). From a different perspective, in his work on encounters between political theory and ethnography, Anotoli Ignatov (2017) proposes an ethic of experiential environmentalism that "treats ecological threats as lived risks and shared experiences with a lively and communicating 'environment." He goes on to say:

Ethnography as a technique of thinking enables us to take part in a
web of ongoing intersections between humans and nonhumans by using one's body as other species do.

It is a way of trying on more-thanhuman perspectives and identities, and of displacing anthropocentric habits of perception. It allows us to adopt a view from in-between, reducible neither to one's own perspective nor to those of others.

Tell us about experiential environmentalism as enacted through the society's activities and in the context of local culture.

Bala: CTEP sits in the middle of these perspectives. We take groups of individuals of any age into nature so they can experience natural environments first hand. We offer different types of experiences depending on members' specialized knowledge and skills; some give information sessions (e.g., biology, botany, cultural history), others use movement inspired by nature (e.g. animal movement, yoga) or storytelling. The general aim is to make the connection that we are part of a chain (but not asking people to engage in this so deeply). In many of our activities we offer people time to be rather than an expectation to do, but we also have various events that involve activities such as tree planting. CTEP members share a common goal that binds us together, but our members have different fortes in terms of engagement.

DD: Congratulations on reaching out to thousands of individuals from ages across the lifespan (5–85 years) in the years since establishment in 2007. In your own experience, what are the major motivating factors for people to reach out to societies like CTEP? And what are the major benefits of doing so?

Bala: Many of our connections are with younger school-growing children, and we're able to help them understand their science assignments at school through environmental education, but at the same time we also help them understand interconnectedness (e.g., habitats, pollination, etc.). Another aspect of our outreach involves natureculture integration. For instance, many of our older-generation visitors who follow our tours reminisce about the kampong days, and their personalized stories can be relived by the group as well as being passed along to younger people. Through these bonds and shared histories, their stories live on.

We often notice a resignation of the reality that things will be gone, but through these shared histories we can find ourselves slowing down our own pace and relishing the memories.

DD: Part of the CTEP mission is to "demonstrate and encourage adoption of an eco-lifestyle by individuals and organisations." How do your members demonstrate this? Do you have some examples of how the society might encourage our local community of psychology practitioners and academics?

Bala: I personally carry a metal fork, spoon, straw, tote bag and a water bottle everywhere I go (my Eco-pack!). I try my best to reduce my carbon footprint in every aspect of my life. I've been an ethical vegan

"We are part of a chain"

since the mid-90s. Veganism started in 1944 as a response to the atrocities of World War 2. Although it is now being promoted largely as a dietary consideration, or a means to reduce one's environmental impact, the

founders of veganism were looking at the entire spectrum of violence on our planet. Unless we interrogate the many systems of oppression/violence in society, and question the ideologies behind them, and truly understand the intersectionality of it all, lasting change will not happen. I meditate on the concept of "InterBeing", for self-care, and hope for the best.

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CTEP as a society advocates for nature to people of all ages on various platforms, both physical and online. While it often seems like our impact may be limited, everyone doing their part would help the world at large to avoid the bystander effect when it comes to a "tragedy of the commons problem" like climate change.

By simply articulating an alternative means of living and appreciating nature, we are playing our part in ushering in a new consciousness in society — one where humans live together with rather than in opposition to other humans and the natural world. Here are some of our suggestions as practiced by CTEP members.



The Human Factors to Better Work From Home

By Tey Beng Huan

The COVID-19 pandemic has changed the world of work. Literally, for many of us that world has changed from the office to a space at home, for the past year and for the foreseeable future. Attempts to go back to the pre-lockdown work environment have been foiled by the pandemic and, to some extent, by our realisation that work is not merely confined to the conventional workplace. If the workplace is to become part of our home environment, it would probably be worth considering how the human factors applied to the work environment can affect our performance working from home.





Human Sense and the Work Environment



Tasks performed at work can be equally managed from the home environment, thanks to advancements in technology. Menial and repetitive tasks replaced by automation means that the human worker has been elevated to more cognitively demanding tasks. Our cognitive capacities related to information processing in day-to-day tasks are important in understanding our strengths and limitations, and how effective we can be in performing them. Information processing is an interaction of the internal and external world and can be understood through the external stimuli processed by our various sensory functions.

Our inner ear provides space orientation and is something of which we are not fully aware until it is disturbed in some way (i.e., quick movements, changing orientation). The visual sense is most dominant and complex but is also subject to limitations like fatigue and injury. Lighting and reflection can affect the ability of the visual senses in information input. The hearing senses are also dominant and, while we are limited in terms of frequency received, we are susceptible to auditory sources from all angles. Our ability to single out a particular source or to be distracted by numerous sources can affect our efficiency in information input as well. Our tactile functions help us seek optimal levels of comfort in the physical environment. In temperature-regulated modern work environments, the right temperature that supports optimal comfort and effective work is also a key to performance.

All the above aspects of our perceptual system are closely linked to our decision-making cognitive system, and this complex system of retaining the right information from multiple sources, processing the levels of importance, processing them from storage, planning and selection for action, can all be impeded or facilitated by the individual human's perceptual reactions to the physical environment.

Sense and the Workspace

Lighting provision in a work space affects the visual senses and it may vary according to occupancy and the nature of the tasks performed in the space. The home space may utilise general illuminance for general home activities but specific tasks for work purposes may require greater illuminance. The concern is that individuals with tasks requiring specific lighting conditions may not have control over their light source at home, or may not be able to make changes to them without causing inconvenience to other occupants. In addition, other uncontrollable, individualised light sources (television, computers, personal devices) may create another factor which affects the visual senses — reflectance. Agreeing on a general moderate light source for the entire shared environment may help to control distracting or unhealthy reflection on work surfaces or screens, but the proliferation of screens and other backlit devices by different individuals at home (some for school and work as well) may lead to counterproductive effects on visual acuity.





With our wide sensitivity to sound, considerations for hearing in the work environment are concerned mainly with the appropriate level of sounds that are conducive to work tasks, such as messages, auditory alarms, conversations, and the potential background noises that affect them. Even in a controlled work environment, these problems can emerge in varying frequencies and intensities. The human ear can take up to 140 decibels in terms of pain threshold; these levels may not be present in the workplace (even in an open plan office) lest the individual chooses to introduce them via headphones in order to isolate themselves from background noises. Working from home, that level of sound disturbance may be created by the activity of younger children or factors outside of the residence (renovations, traffic, etc.).

Subtle background noises can vary from 50 to 70 decibels, depending on their source; fans and air-conditioning, background conversations, music or television playing in a different room. While these do not create major disturbances, they are sources of annoyance and disturbance when it comes to work, as they possess various characteristics as summarised in the table:



Temporal Variability

Noises go on or off, or change levels in relation to background sound (e.g. phones ringing elsewhere or sounds of traffic).



Signal/Noise Ratio

Some sounds stand out more than others from the level of background noise.



Intelligible speech is more distracting than unintelligible background conversations.



Controllability

Individuals are more annoyed by sounds they have no control over.



Individuals are more annoyed by sounds they cannot predict.



Attitude to the Noise and Noise Source

Individual attitudes vary towards source and nature of sounds (e.g. is it harmful to me?).



Functionality

Sounds vary according to whether they have any value or function in this context.



Reduceability

Individuals are more annoyed if they feel the sound can be controlled by the authority in question.



Experienced Sound Quality

Individuals are more annoyed by high pitched or deep tones.

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Besides the effects of annoying sounds on distractibility, the presence of noise can be a disruption to cognitive functions, such as memory, reaction time, signal detection and choice of strategy. Noise also results in more effort needed for tasks and depleting resources for other aspects of performance.

Other Environmental Factors

The body regulates its temperature between 36.1 to 37.2 degrees centigrade. In many offices and workplaces, while temperature settings are moderated and fairly constant throughout the year, the individual may not have the choice to regulate the temperature to individual comfort levels. While the cold of the airconditioned workplace is unlikely to be disruptive to performance, the discomfort may still lead to frustration for the individual. At home, airconditioning incurs a personal cost and hence may be used more sparingly. The alternative, however, will be the unbearable heat and humidity of the local climate. This might be the biggest challenge of all for home-based work.





Creating a Conducive Work Environment at Home

It is recommended that we create dedicated workspace at home, separate from home activity. This not only helps us create a sense of routine and discipline when we have a demarcated area for work, but also sends a signal to the rest of the family that it is a space that should be undisturbed, just as your conventional workplace away from home was.

Based on the considerations discussed in this article, this dedicated workspace should be designed to account for the human factors that affect your performance in work tasks. Here are some points to note: Position your work station in a well-lit location but be mindful of light sources that may create visual disturbance (i.e., sunlit windows, television, others' computer screens).





Be mindful of the ambient temperature and its impact on your attention and performance. Keep the workspace ventilated and dress light if working in a non-air-conditioned space.

Working from home allows for flexibility, and if you have such flexibility, consider setting your working hours at times when the environment is more conducive for you (e.g., avoiding the hotter mid-day, or working when fewer people are at home).

If you are working in airconditioning, do also be mindful of keeping the temperature moderate (25-27 degrees Celsius), not only to maintain an optimal temperature for comfort but also to keep the utility bills more manageable.

Use bright overhead lighting that illuminates the entire work area.



If possible, dedicate a room with a closed door as your 'home office' and remind other members at home to minimise noise levels during working hours. If that is not possible, you may minimise sound distractions with noise-cancelling headphones.





Designing Rehabilitation

By Gan Kai Qi

When we think of a prison, bars are among the most stereotypical things that come to mind. Yet, at Halden prison in Norway, there are no bars. Prisoners are housed in their own cell, each with a bed, flat-screen TV, fridge, desk, and even an en suite shower and toilet. Light shines in from a large window, conspicuously devoid of bars. If you didn't know any better, you would think that you were in a dorm room – or even a hotel. The only physical reminder that Halden is actually a prison is the 20-foot concrete wall circling the perimeter. Even then, it is still somewhat obscured by the trees dotting the prison complex. And before you think that perhaps only individuals who have committed minor crimes are incarcerated within Halden, let me clarify: Halden is a maximum-security prison, housing prisoners who have committed violent crimes like rape, assault, or even murder. It is unsurprising, then, that Halden prison has been heralded as the world's most humane prison.

Prisons function in a number of ways, and two of its main aims are that of punishment and rehabilitation. Essentially, this means that while prisons are supposed to punish the offender for their wrongdoings, the need for rehabilitation also means that prisons are expected to reduce crime rates and reoffending. The extent to which these two goals are attained are due, in part to, the prison's architecture. In the 1970s, there was a push towards the use of more punitive measures, as it was believed that nothing works to rehabilitate offenders (Lipsey & Cullen, 2007). However, this was shown not to be the case (e.g., Smith et al., 2009), and since then, the goal of rehabilitation has been gradually gaining ground.

Halden's "luxurious" environment was thus designed with the key goal of rehabilitation in mind, as opposed to punishment. In other words, the goal of reforming prisoners to reduce crime rates comes before the need for criminals to get their just desserts. Consequently, Norway's correctional system is of the view that even prisoners should be allowed to lead as normal a life as possible. To that end, Halden was designed to mimic a life of normalcy as far as possible. Prisoners have their own cell — or rather, room — and are only locked up for 11 hours each day. Thus, this begs the question as to how the prison environment facilitates the rehabilitation of prisoners.
Prison Layout

To answer this question, we can first examine the layouts of prisons. There are many types of prison layouts, each employing different mechanisms to achieve various goals. For instance, supermax prisons emphasise safety through imposing high levels of security and control, where prisoners are isolated for up to 23 hours a day in cells that hold only the basic necessities. Another example would be prison layouts inspired from Bentham's panopticon, which focused on two key goals of safety and control. In this layout, cells are arranged in a ring around a single central tower and prison guards resided, where the constant surveillance of prisoners was intended as a form of motivation for these prisoners to behave at all times.

However, the need for rehabilitation takes a backseat in these two aforementioned prison layouts. In prisons where the goal of rehabilitation comes first, more open prison layouts tend to prevail. For instance, Halden utilises a campus layout which consists of free-standing buildings within the prison complex. Each building consists of a communal living space shared among a number of prisoners and there are fewer barriers to movement. Such an open layout is believed to encourage a culture of rehabilitation, where prisoners are supported in their path to attain the skills and behaviours required to re-enter society (Karthaus et al., 2019; St. John et al., 2019).

In addition, the campus layout encourages prison officers to interact with the prisoners as these officers are not purposely segregated from the prison population. As a result, this fosters better staff-prisoner relationships (Beijersbergen et al., 2016), which is considered as crucial for the rehabilitation process (Molleman & van Ginneken, 2015). After all, prison officers are the people with whom prisoners have the most contact, and thus they have the greatest ability to influence prisoners - for better or worse (Meško & Hacin, 2019; Molleman & van Ginneken, 2015). As a testament to the power of prison officers, interviewed prisoners articulated that prison staff were responsible for more positive changes within them (Blagden et al., 2016). The prison essentially functions as a microcosm of society, where prisoners can learn more adaptive ways of living, and thus lower their chances of reoffending.

Access to Nature

Meanwhile, access to nature should also be considered when discussing the role of prison environments in the rehabilitation of prisoners. Exposure to nature and greenery have been commonly linked to better physical and mental health (Twohig-Bennett & Jones, 2018; Zhang et al., 2020). For instance, access to nature has been associated with reduced stress and less depressive symptoms. These benefits of nature have been recognised and are commonly incorporated into healthcare facilities to support the restoration and coping of individuals. Yet, nature and greenery are often lacking within prison environments. Prisons are generally plain and austere, and are retrofitted with concrete and hard finishes.

Having either visual or virtual access to green spaces would surely provide some form of distraction for prisoners. Moreover, they may even be of therapeutic significance, especially when prisoners are experiencing emotional distress. In fact, studies (Moore, 1981; Moran & Turner, 2019; Söderlund & Newman, 2017) have found that the presence of environmental elements within prisons provides calming and restorative effects, just as they do within healthcare facilities. Furthermore, given that prisoners tend to have poorer mental health along with an increased risk of violence and victimisation, the use of nature and greenery within prisons may very well assist in the rehabilitation of prisoners.

Cell Design

At the same time, in most prisons worldwide, prisoners have little to no control over their immediate surroundings. They are locked up for hours on end, facing only their cellmates and the bare walls of their cells. In terms of their cell, they also have no control over the lighting, nor can they do anything if there are noises that disturb them. As much as people may believe that this is simply part of the punishment for criminals, it may actually result in worse outcomes.

Prison acoustics can be used as an example here, as it is often highlighted as a major issue for prisoners (Karthaus et al., 2019). If other prisoners started to howl and scream, prisoners would be unable to do anything but tolerate it. Such noises disrupt one's rest and sleep, and would keep these prisoners constantly aware and alert. This puts them in a fight-or-flight mode. As a result, unwanted and harsh noises could actually contribute towards increased stress, which is undesirable when one of the main goals of prisons is rehabilitation. Furthermore, providing prisoners with more agency could give rise to positive behavioural changes instead. If prisoners had a say in various aspects of their cells like light and sound levels, or maybe even had the ability to choose how they would furnish their cells, they could establish a sense of control. By providing these prisoners with more agency, they may consequently be able to take more responsibility for themselves, their behaviours and their surroundings. As such, this could help to inspire behavioural changes in prisoners, which is yet another crucial goal of rehabilitation.

Are these prison designs really necessary for rehabilitation?

Admittedly, not many experimental studies have been specifically conducted in prisons to determine the efficacy of such designs. However, in Norway — where Halden and other similar humane prisons are located — the recidivism rate currently sits below 20% (Fazel & Wolf, 2015) and the incarceration rate is approximately 54 per 100,000 of the national population (World Prison Brief, n.d.). In comparison with recidivism rates of 60-70% in the United States (Alper et al., 2018), it seems that Norway is definitely doing something right.

However, Norway is not the only country with such low recidivism rates. If we look closer to home, Singapore's recidivism rate hit a new low of 22.1% for the 2018 cohort too. Yet, Singapore's prisons are commonly described as claustrophobic and bleak, and adhere to what many think prisons are and should be like. While Halden's prisoners each get their own room and are allowed out of their room for 11 hours a day, prisoners in Singapore commonly share cells, and are locked up for up to 22 hours a day. Even with such different prison designs, the eventual ideal of a low recidivism rate is still attained in both countries.

Going back to the question of whether prison designs such as those at Halden are truly necessary for rehabilitation, there is, unfortunately, no clear answer. Perhaps then, whether these designs will work may depend on the context of the country. Countries cannot copy a prison design wholesale and expect it to work in a completely different context.

Regardless, when Halden opened in 2010, many were uncomfortable with the fact that prisoners are being housed in such comfortable surroundings, especially when some of them have committed such horrific crimes. One American prison warden who visited Halden even said, "I don't think you can go any more liberal – other than giving inmates the keys." If we are so uncomfortable with providing some normalcy to prisoners, perhaps the question we have to ask ourselves is whether the main aim of prisons is punishment, or rehabilitation.

Choice Architecture, Nudging and the Influence of the Environment on Human Behaviour

By Dr Tan Wah Pheow

Imagine that you are queuing up for cai png (economic rice) for lunch at a food court. As you wait, you start to scroll through social media and chance upon a post about a tragic accident: a drunk driver driving a sports car had run over and killed a food delivery rider. The post mentions how the rider leaves behind a wife and young daughter, and that an online crowdfunding has been started for them. Feeling slight outrage, you tap on the embedded donation link in the post and donate \$20 using your digital mobile wallet.

Just as you finish donating, the stall server asks what you would like. Looking up, you realise a scoop of brown rice is already on the plate and the server is waiting with a ladle in hand. Though you prefer white rice, you thought that asking the server for it might draw the ire of other queuing customers. You silently concede to having the brown rice and proceed to look over to the food in the metal containers and point to two vegetables that you like. As you move down the line, you also point to the stir-fried meat and steamed egg that come into view, and all these are promptly scooped onto your plate. As you reach the cashier at the end of the line, you realize there's also fried chicken wings and salted eggs. Much as you like them, you decide against ordering them, as this would bust your lunch budget (and also your waistline). As you prepare to pay, you see a sign encouraging cashless payment due to hygiene reasons. The cashier points to the big QR code that is used to activate digital mobile wallets and asks if you are paying cashless. You nod, scan the QR code with your mobile phone to activate your digital mobile wallet app, and proceed to pay for lunch.

For most Singaporeans, we will probably encounter the above scenario from time to time in our lives, and it usually plays out over the span of a few minutes. But within these few minutes, there will be multiple decisions that we have to make — and each decision will determine our behaviours at that moment in time. Unbeknownst to most people, the stimuli and information from our environment have an influence on our decisions and behaviours, even though we might not be conscious of them. In fact, in some cases, the presentation order and type of information or stimuli might have even been carefully designed to tap into your "System 1" thinking (i.e., the brain's automatic, intuitive and unconscious thinking mode) to increase the probability that you will engage in certain behaviours (Kahneman, 2011).

The above scenario encapsulates the concept of nudging, conceptualized by Richard Thaler and Cass Sunstein's (2008) book, *Nudge: Improving Decisions about Health, Wealth, and Happiness.* In the book, Thaler and Sunstein also proposed the concept of a "choice architect", which refers to an individual with the responsibility to organize the contexts or environments in which people make decisions. According to them, our choices are always influenced by the information that we receive from the environment, and there is no such thing as a "neutral choice", as small and seemingly insignificant details within our environment can have major impacts on our behaviours. By carefully designing the different ways in which choices can be presented to an individual (i.e., the choice architecture), choice architects will be able to influence individuals to make better decisions and behave in a manner that would benefit themselves over the long term.

Within the context of choice architecture, Thaler and Sunstein further defined a nudge as any aspect of the choice architecture that alters individuals' behaviour in predictable ways without forbidding any options or significantly changing their economic incentives. In other words, nudges are not laws or mandates that restrict or impose how individuals should behave, but light touches that suggest how individuals should behave. While there are many ways in which choice architecture can be designed and nudges implemented, the common principle guiding the different nudges involves designing the decision environment so that it aligns better with how humans commonly make decisions. This, in turn, increases the probability that individuals will be nudged towards a desired behaviour. This guiding principle of designing the environment to align with how people think in order to engineer behaviours has its roots in Kurt Lewin's (1936) equation of B = f(P, E) (i.e., Behaviour = function (Person, Environment)). Under this equation, one's behaviour in any given context is influenced by the interaction between "person" and "environment". At the same time, this concept has also been further expanded upon by contemporary social psychologists who sought to dispel the myth that it is one's personality that plays a major role in determining how one will behave in a situation (Ross & Nisbett, 1991). In their book titled The Person and the Situation, Lee Ross and Richard Nisbett argued that it is an individual's construal of the stimuli and information in the environment that will largely affect and determine how one decides and behaves in a situation. According to Dan Ariely (2011), The Person and the Situation clearly articulates the importance of the environment on our decision making process and behaviours — a point that was similarly espoused by Thaler and Sunstein nearly two decades later.

There were many studies in the past decades that demonstrate how making subtle and seemingly insignificant changes to the environment can influence how individuals choose and behave. Perhaps one of the most famous examples is the "fly in the urinal" (see Figure 1 for a similar example employed locally) initiative at Amsterdam's Schiphol Airport in the 1990s. Notably, the act of etching small photorealistic images of flies near the drains of the urinals in the men's restroom had resulted in an 80% reduction in urinal spillage and an overall 8% reduction in total restroom cleaning costs (Evans-Pritchard, 2013). Another famous example would be the "Ballot Bins" (see Figure 2) developed by environmental organization Hubbub (Common Works, 2021; Robinson, 2021). In this initiative, cigarette butt bins were redesigned as voting bins and requested smokers to vote on interesting topics that are customisable using their cigarette butts. These "Ballot Bins" have since been deployed in various cities in Europe and the United States, and have been demonstrated to reduce cigarette litter between 46%-74% across different locations. Recently, my own Centre adapted this concept for "Sticker Boards" (see Figure 3) that are used to capture temperature stickers along the exits of Temasek Polytechnic, and we have found a 56% increase in the number of temperature stickers collected and a 49% reduction in temperature sticker litter.



Figure 1. *Fly in the urinal* (used with permission from Mr Amos Law)



Figure 2. *Ballot Bins* by Hubbub, (https://www.hubbub.org.uk/what-we-do)



Figure 3. *Sticker Boards* at Temasek Polytechnic (Author's Own Photo)

In recent years, there are increasing interests and practices in adopting the choice architecture concept within Singapore to nudge individuals. One notable example is the incorporation of behavioural sciences into the environmental design of Khoo Teck Puat Hospital (KTPH), summarized in the book *The Five Pillars of Health* published by KTPH in 2017. KTPH designed the hospital environment to influence numerous health-related behaviours such as getting people to choose and eat healthier food within the hospital, getting their staff to exercise regularly or to practice good personal hygiene. In fact, the example at the start of this article was extracted from an actual environment design of the food court within KTPH — can you tell how the choice architecture was designed and what kinds of nudges were used?

The Centre for Applied Behavioural & Social Sciences at Temasek Polytechnic has also been involved in numerous internal projects since 2016, where behavioural sciences and the concept of choice architecture were applied to influence student and staff behaviours within the campus. For example, when Temasek Polytechnic's library underwent a renovation, we worked with colleagues from the library team to generate ideas on redesigning certain environmental aspects of the library. Some of these ideas included renaming different zones in the library to better communicate desirable behaviours, and moving furniture from certain areas because they facilitate undesirable behaviours. Overall, the redesigned library environment led to a reduction in eating behaviours and noise level within the library. Another notable project involved increasing the rate of student bursary applications by 12% for eligible students by redesigning the online environment in which students made their bursary applications to reduce the friction of bursary application. More recently, given the surge of online learning due to the COVID-19 pandemic, my team has also been running different studies aimed at nudging students to learn better in the online environment to achieve better academic outcomes. While these studies are ongoing, preliminary data suggests that simple redesigns to the online learning environment may have an impact on students' learning outcomes.



In the past, the design of physical environments and spaces has largely fallen on the shoulders of architects or urban planners, while that of online environments has been largely the responsibility of web-designers. However, given numerous demonstrations in the past decade on the impact of choice architecture in influencing human behaviour, there is a growing recognition that the discipline of behavioural sciences can likewise contribute to designing the environment to drive certain behaviours (Klotz et al., 2019). While the examples cited in this article involve the behavioural scientist making ad-hoc changes to the environment to influence behaviour (i.e., the built environment already exists and "redesigns" to the environment are made based on existing parameters and constraints), my opinion is that in the near future, we will find more behavioural scientists working together with urban planners and architects or web designers at the planning and conceptualization phase to design both physical and online environments with choice architectures in mind.





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