EVOLUTIONARY PSYCHOLOGY THEORY

Can I ever let go of my past?

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1 Background

1.1 Human psychological mechanisms explained through evolutionary psychology

Owing the theoretical foundation to Darwin's theory of evolution, evolutionary psychology (EP) is a theory or approach in psychology that attempts to explain human behaviours with innate psychological drivers based on the evolutionary perspective. Evolutionary psychologists attribute the current human psychological traits to evolved adaptations for natural selection. According to EP, current human behaviours are due to psychological adaptations acquired to survive and reproduce in the ancestral environment (Confer et al., 2010). The EP theory is influenced by many other disciplines, including evolutionary biology, cognitive psychology, behavioural ecology, ethology, and anthropology, and is most substantially influenced by socio-biology and ethology (Schacter & Addis, 2007; Griffiths, 2008).

While EP is not free of criticisms, the theory of EP shows merits when explaining human innate psychological mechanisms deeply rooted in human nature behind certain common behaviours such as environmental preferences that have consistently exhibited in multiple studies. Due to these merits, the EP theory and research findings have influenced various disciplines such as environment, management, health, economics, law, and politics (Dunbar & Barret, 2007). They have also contributed to the development of specific theories in psychology related to perception and cognitive biases, including auditory looming bias, visual descent illusion, and error management theory (Buss, 2009). While topics in EP encompass various subjects related to survival and reproduction, this chapter mainly discusses a set of topics in survival most relevant and applicable to the workplace. These EP topics include attachment and territoriality, cognitive and perceptive biases, biophilia and cognitive restoration, prospect and refuge, complexity and mystery, and spatial biases. The following explains each topic in further detail.

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1.2 Topics of EP related to workplace

1.2.1 Attachment and territoriality

Attachment explains the emotional attachment and proximity-seeking behaviours of children towards caregivers such as parents for survival (Bowlby, 2005). Children feel safe and secure when in a close proximity with such caregiving attachment figures. In separation from them, children develop negative psychologies such as separation anxiety. This tendency continuously exhibits in an attachment to places. Similar to interpersonal attachments, place attachment also shows similar proximity-seeking behaviours to a place of security and safety (Scannell & Gifford, 2010). In many cases, these places are related to or reminiscent of childhood memories of familiar, safe places such as home, neighbourhood, and landscape, where children are protected with personal care and develop a social bond with caregiving attachment figures. In separation from such a place, people develop negative psychologies such as homesickness. This is an adaptive behaviour observed in many species attached to their own habitats. This behaviour is developed to maintain their innate lifestyle to protect them from threats, secure food, and create a safe breeding territory (see also Chapter 16 Place Attachment). Territory, meaning a defended area within a boundary, is in general associated with attachment and exclusiveness (Gold, 1982).

1.2.2 Cognitive and perceptive biases

EP uses the term ‘modularity’ to refer to functionally specialised human organ systems and brain mechanisms that play a specific role for the purpose of natural selection instead of a general role (Fodor, 1983). For instance, the role of human visual or auditory systems is not to simply deliver arbitrary visual scenes or sounds around us, but to specifically analyse information to generate the percept to solve adaptive problems related to survival and reproduction such as identifying threats, avoiding predators, and finding food and shelter. According to the error management theory, human cognitive and perceptive mechanisms rather favour adaptive biases under uncertain circumstances where judging a situation as a false negative (e.g. deciding something as not a threat while it is a threat) will yield a greater loss than a false positive (e.g. deciding something as a threat while it is not a threat) in evolutionary history (Buss, 2019). Due to this reason, humans exhibit cognitive and sensory biases (see also Chapter 18 Behavioural Economics Theory) such as looming sound bias where our brain processes looming sounds louder and closer than they actually are for a better chance of escaping from dangers (Neuhoff, 2016). Furthermore, our peripheral visual system is tuned to detecting movement and low light in the dark for protection from threats. The auditory system also shows evidence of evolutionary adaptation by being preferably tuned to acoustic frequencies of not only airborne sounds for threat detection but also sounds of conspecific calls to communicate within the same species to sound an alarm to the presence of threats and danger among themselves (Schrode & Bee, 2015).

1.2.3 Biophilia and cognitive restoration

Biophilia refers to an intrinsic human psychological bond with nature (see also Chapter 15 The Biophilia Hypothesis). Our psychological orientation towards nature is due to an adaptive behaviour evolved from living in the ancestral environment of savannahs where our ancestors found food, water, and shelters (Wilson, 1984). The impact of natural elements

on elevated mood, reduced stress and anxiety, physical healing, and cognitive restoration is well documented (Yin, Zhua, MacNaughtona, Allen, & Spengler, 2018; Yin et al., 2019). It is evident that natural elements, such as air and water, are necessities for physical survival of humans from the evolutionary biological perspective. Beyond biological needs, humans' psychological orientation towards natural elements, such as desires for greenery, daylight, and the sound of nature, can be further explained by EP. People have shown a propensity of preferring natural landscape over urban/built hardscape (Kaplan & Kaplan, 1989; Ulrich, 1983). Various preferential elements of nature comprise many sensory-stimulating elements such as visual presence of natural elements (e.g. vegetation or body of water), sounds of nature (e.g. bird songs or spring water sound), smell of nature (e.g. forest smell or flower scent), natural light, views to nature, and fresh air movement. In addition to the physical elements of nature, abstracted properties of natural elements are also preferred since these are perceived as representations of nature, including shapes and patterns, materials, and colours associated with natural elements. Many studies have highlighted benefits of these natural elements on emotional and cognitive functions. Stress recovery theory (Ulrich, 1983) and attention restoration theory (Kaplan & Kaplan, 1989) explain these two types of restorative experiences associated with natural elements. People feel psychologically relaxed, restore from negative emotions fast, and recover from mental fatigue easily when being in nature due to their adaptive EP towards nature.

1.2.4 Prospect and refuge

Prospect and refuge theory is one of the most well-known environmental preference theories that explain humans' adaptive behaviours favouring certain landscapes reminiscent of ancestral savannah-like habitats. Originated from Darwin's habitat theory (Darwin, 1958), prospect and refuge theory explains that people feel safe and secure in places that provide an open view for outlook in the front (prospect) to be able to easily observe danger and, simultaneously, an enclosure from the back (refuge) to protect themselves from any intrusions (Appleton, 1975). Prospect spaces are related to a sense of openness for obtaining visual information about sources of danger and other relevant information for survival. Refuge spaces are related to a sense of hiding for enhanced privacy and safety for protection. This concept of being able to see around us without being seen by others is commonly observed in predators' hunting as well as shelter-seeking behaviours in many species.

1.2.5 Complexity and mystery

Investigatory or exploratory behaviour is another common adaptive behaviour frequently observed in animals, including humans. This behaviour is to find optimal conditions for better survival by understanding environments (Appleton, 1975). Investigatory/exploratory behaviour offers the foundation of complexity and mystery theory. Complexity refers to various environmental elements in a view (Berlyne, 1971) and mystery, a view cuing surprisingly pleasant elements hidden in the next view (Kaplan & Kaplan, 1989). When a view is associated with a higher level of complexity, people tend to feel more aesthetically pleased from the view. And they feel more curious to further explore beyond the current viewpoint when the view presents mystery exhibiting environmental cues for more interesting components awaiting. Both complexity and mystery have shown to be the predictors of preferred environments in natural environments, while mystery has shown more consistent results in both indoor and outdoor environments (Kaplan & Kaplan, 1989).

1.2.6 Spatial biases

People exercise controls over spaces between theirs and others, especially when they are with others in the same space. They exhibit behaviours, often non-verbal communicative cues, to express their discomfort when these invisible boundaries are violated by others. According to proxemics, a theory proposed by Hall (1966), people have an innate urge to regulate spatial distances between themselves and others. This is an adaptive behaviour intended to protect one's own habitat by setting up a distance to separate between kin and non-kin (Hediger, 1955). While related to the concept of territoriality, proxemics further argues that this behaviour is also derived from an intent for co-survival within the same group by maintaining a certain social distance between them while protecting oneself in a private shelter. This is to be able to easily both communicate vital information and regulate density for the distribution of resources such as food and a better chance of survival in case of danger and threats. Since regulating density was for the purpose of better survival, people exhibit negative psychologies related to high density and overcrowding in a space. High density and overcrowding have been associated with a feeling of unease from lack of controllability and availability of fewer resources (Stokols, 1978), and even cognitive overload in the brain function (Esser, 1973).

The social brain hypothesis argues that the evolution of human cognition is rather a response to surviving and reproducing in a social context (Dunbar, 1998). Dunbar suggests a close relationship between human cognitive capacity and the number of social relationships, attributing the limited number in a social group to the neocortex size in the brain. According to Dunbar's circles of acquaintanceship, humans have several layers of social relationships from highly intimate (close tie) to fairly casual (weak tie): support clique (3–5 most intimate people), sympathy group (12–20 close friends), bands (30–50 friends), and clan (150 casual friends) (Dunbar, 1993). The hierarchical order of circles indicates that the strength of bond in relationships with others decreases as the circles get bigger. The support clique circle is referred to the size of kin, sympathy group to people with special ties, bands to overnight hunting and gathering groups, and clan to traditional small societies (Dunbar, 2014).

The next section explains how these behaviours occur in the workplace, offering insights on psychological mechanisms underlying certain behaviours related to the workplace. This is to take advantage of the perspective of EP to understand and explain why we see certain behaviours in the workplace when these behaviours can be explained by EP the most. However, the ultimate goal of examining the EP theory for the application to the workplace in this chapter is neither to simply understand 'why' nor to explain the entire workplace human psychology based on EP. It is to offer insights for potential design and management solutions to reinforce positive behaviours and transform inadequate behaviours into adequate ones in more effective, systematic ways by better understanding human innate psychological nature.

2 Application to workplace behaviours

The application of EP to the workplace is in its infancy. However, there has been a growing interest in certain topics of EP, especially those aforementioned, in explaining particular behaviours persistently observed in the workplace. Some behaviours seem harmless common natural inclinations among people, but other behaviours may cause conflicts between people or violations within the rules and boundaries of the workplace. The contemporary work environment is significantly different from the ancestral environment of hunter-gatherers. It is mostly climate-controlled indoors; has different purposes of functions and types of tasks; is established within further systematically organised networks of people; and uses different types of tools and

devices to accomplish tasks. The predominant contemporary open-plan offices, especially, have a particular configuration that may not accommodate human innate psychological mechanisms that were adapted and acquired since hunter-gatherer societies. In open-plan offices, people with certain personality traits may adapt faster and more easily to the environment of no personal boundaries (Lindberg, Tran, & Banasiak, 2016). However, others may feel too uncomfortable to cope with the open environment that does not support their innate psychological programmes.

The greatest benefit of looking into the workplace behaviours through the lenses of EP is that it allows us to understand workplace behaviours based on a scientific framework; thus, to more easily identify issues and come up with solutions in a more systematic way. Some of the topics discussed here may have a common ground with other known discoveries such as in the environmental preference theory. Using the psycho-evolutionary model, environmental psychologists attribute particular environmental preferences commonly observed across various groups to human intrinsic psychology to protect and survive (Ulrich et al., 1991). Or, these topics may be frequently observed human behaviours but considered rather individual issues, such as territoriality or noise perception, than a human innate psychology across people that needs to be addressed in a more systematic way in the workplace.

2.1 Attachment and territoriality

The tendency of place attachment is often shown in the behaviours of personalisation within the personal spaces and boundaries at work. Furthermore, in activity-based working offices where people do not have assigned seats, people have shown a propensity of persistently preferring the same spots despite various seating options available (see Figure 17.1). Oftentimes, they feel uncomfortable or uneasy when other people take their usual spots. As place attachment is associated with a concept of exclusive boundary, this behaviour is related to territoriality. Territoriality is often observed in the workplace. Since workplace territoriality was recognised as an organisational behavioural issue in early 2000s, its research has expanded to cover human spatial behaviours derived from the psychology of territoriality. As territoriality is related to a feeling of ownership and attachment, an individual feeling of territoriality for one's own work has shown a link to positive attitudes and higher commitments to the organisation (Brown, Crossley, & Robinson, 2014).

However, from a social relationship viewpoint among co-workers, a feeling of territoriality of individuals can lead to conflicts with others and non-cooperative conduct as a team member if it elevates to a higher level of exclusiveness, protectiveness, and confrontation against sharing and accessing one's work, office items, and spaces. Territorial behaviours at work can occur as either a claiming behaviour for the territory, marking physical boundaries of one's own, or an anticipatory defence behaviour, locking the drawers and hiding items and information related to jobs (Brown et al., 2014). While personalisation and controllability of individual workspaces should be provided to individuals to a certain level to increase positive attitudes, personal comfort, and productivity, undesirable territorial behaviours ought to be immediately mediated to maintain healthy organisational cultures and interpersonal dynamics for cooperative collegiality.

2.2 Cognitive and perceptive biases

While human visual and auditory systems are evolved to fit the ancestral environment, our current workplace environments are vastly different from such an environment. This

Figure 17.1 Attachment behaviour in an activity-based working office with no assigned seats in London

creates a mismatch between the way that our visual and auditory systems are tuned to the environment and the way that the contemporary work environments stimulate our visual and auditory systems. Most complaints in open-plan offices are associated with visual and auditory distractions (see also Chapter 6 Privacy-Regulation Theory). Human peripheral vision is sensitive to detecting speedy motions and flickering conditions (McKee & Nakayama, 1984). Thus, people in open-plan offices are frequently distracted by various movements and activities of other people as well as by blinking lights from diverse office and personal devices. The main sources of noises in the workplace are known to be people: co-workers talking nearby and talking on the phone (Lee & Guerin, 2009). As we are tuned to the voices of our own kind and our auditory system predominantly filters human voices over other sounds, we tend to be more distracted by voices of other people in the workplace.

In addition, our cognitive mechanisms are built to decipher whether these external visual and auditory stimuli are threats or not. Thus, these distractions constantly consume our cognitive resources and interfere with knowledge work tasks that require the same cognitive resources. To reduce visual and auditory distractions in the workplace, the following strategies can be useful: breaking down a large open space into smaller clusters, turning the desk orientation from face-to-face to face away, staggering desks, using plants for visual and acoustic privacy, providing small enclosed spaces for phone calls and conversations away from major individual workspaces, reinforcing noise-mitigating materials and construction details, and implementing workplace etiquette policy (Lee, 2020a, 2020b).

2.3 Biophilia and cognitive restoration

Biophilic elements of nature have many benefits in workplace culture, behaviours, and productivity by contributing to reducing stress and anxiety, encouraging desirable behaviours, and improving cognitive restoration and function (Söderlund & Newman, 2017). As most contemporary knowledge workplaces require cognitive tasks, integrating natural elements into the workplace can help with faster mental restoration and lower stress for employee health and well-being. Among various elements of nature, two most wanted elements at work are daylight and plants (Cooper, 2015; Lee, 2020c). Daylight, particularly, has shown a link to not only individual health and wellbeing but also organisational human analytics metrics such as job satisfaction and loyalty to the organisation (Lee, 2020c).

Biophilic elements applicable to the workplace can include sensory elements of nature (e.g. plants, water, sounds and smells of nature, views to outdoors, and daylight) as well as representations of nature (e.g. 2D/3D artwork depicting natural elements) or representative elements of nature applied to interior spaces or materials (e.g. shapes, forms, patterns, materials, and colours of nature) (Lee, 2019). When applying these elements in the workplace, one must be cognisant of the complex impact of biophilic elements on human psychology and cognitive performance in both short and long terms. While the benefits of biophilic elements may be clearer with regard to individual health and wellbeing, it may not be the same case for various cognitive tasks in the workplace. For instance, biophilic elements such as plants and natural views outside windows may contribute to decreasing stress and increasing creative thinking but also distract from attention (Yin et al., 2019). Thus, careful planning is necessary to determine the purpose of biophilic elements and which elements to apply where among various spaces of the workplace.

2.4 Prospect and refuge

Prospect and refuge behaviours, derived from outdoor living, can also be easily observed in seating preferences in the workplace. People tend to gravitate to heavy and large physical structures, preferring to sit next to walls or columns. This is to afford an open view to the main central space of action from a corner of the room, making sure that no threats emerge from the back or side. Research in the prospect and refuge theory has mainly examined either psychological aspects (preferential or perceptual attributes) or spatial aspects (geometric attributes) of views. Known attributes related to prospect include either preferential/perceptual attributes of outlook, depth of view, spaciousness, and openness or geometric attributes of isovist area and maximum radial line length in views. Attributes related to refuge include either preferential/perceptual attributes of enclosure and safety or geometric attributes of occlusion and minimum radial line length (Dosen & Oswald, 2016). However, a caution needs to be exercised when implementing the prospect and refuge theory to the workplace, as contemporary workplaces are far more complex than ancestral outdoor living environments. In indoor work environments, people have shown relatively consistent seating/spatial preferences for open spaces in prospect-requiring circumstances, but less-consistent preferences in refuge-requiring circumstances (Dosen & Oswald, 2016; Keszei, Halász, Losonczy, & Dúll, 2019).

This may be because the perceived sense of safety in the indoor environment of the contemporary workplace relaxes pursuits for safer and more secure private spaces that were once essential in the savannah-like environment. In addition, the complexity of the current workplace, such as various environmental settings (e.g. window seat vs. corner seat), relationships (e.g. seat next to favourite co-worker vs. boss), work modes (e.g. focused vs. collaborative), and activities

(individual work vs. interactive work) can also contribute to less consistent seating/spatial preferences for refuge-requiring circumstances. Refuge-requiring environments may be more important to certain personality traits (see also Chapter 10 Temperament Theory). There are many anecdotal stories on introverts disadvantaged in open-plan offices due to their tendency to turn inwards when responding to external stimuli. Thus, they tend to prefer less stimulation, fewer social interactions, and being in their own spaces. In order to provide more refuge-like spaces in open-plan offices for introverts, offering adjustable translucent (for visual privacy) or acoustic screens (for acoustic privacy) and implementing designated quiet or retreat spaces (Figure 17.2) may be helpful in addition to the strategies previously discussed to reduce visual and auditory distractions.

2.5 Complexity and mystery

Often examined together with prospect and refuge attributes of views, complexity and mystery are considered two other attributes that influence environmental preferences of the indoors. In research, the attributes associated with complexity are the amount of information presented, the

Figure 17.2 Various quiet and retreat spaces provided along the corners in an open-plan office of a real estate company in London

level of jaggedness, and the number of occluding edges (vertices). The mystery attributes linked to complexity include the levels of luminosity and occlusivity between spaces (Dosen & Oswald, 2016). Studies in general show that people prefer a view with a certain level of complexity. However, preferences for complexity in indoor environments are not as consistent as those in outdoor environments (Dosen & Oswald, 2016). This may be due to the literal interpretation and application of the complexity and mystery theory prevalent in the natural environment to the indoor environment. As complexity and mystery are related to a human desire to further understand and explore their environments beyond the immediate surroundings, the components of complexity and mystery in contemporary workplaces may be more suitable in the areas where people are willing to further invest time and effort to learn more about the environmental elements. For instance, these components may be more appreciated when integrated to places where these elements do not interfere with the efficiency of performing job functions and tasks for the most urgent survival instinct. These places include lounges, rest areas, hangout spaces, cafeterias, or dining spaces. The strategies promoting complexity and mystery can also be implemented to encourage more physical movement for workplace health and wellbeing. These comprise providing options for various types of spaces, using curvilinear paths rather than straight paths, partial views in circulation paths, and small windows to other spaces with interesting components (Lee, 2019).

2.6 Spatial biases: control and crowding

People's behaviours related to space control in the workplace have been discussed as part of communication issues, especially non-verbal communications. As humans express over 90% of meanings via non-verbal communication channels (Bhardwaj, Sharma, & Deepshikha, 2017), behaviours of proxemics that regulate interpersonal spaces become important for the effective communications within organisations. A clear expectation for interpersonal spaces needs to be established in the workplace since an encroachment of interpersonal spaces can be perceived as such unintended conduct as intimidation, attention, or threat (Bonaccio, O'Reilly, O'Sullivan, & Chiocchio, 2016). Another topic of interest related to proxemics in organisations is social interactions in groups within particular spaces. As non-verbal cues of expression, people employ spatial positions and orientations for space control in interactions with others. This is called socio-spatial formation, known as Kendon's facing formation (F-formation), where people tend to jointly form a transactional space of a round shape (O-shape) (Setti, Russell, Bassetti, & Cristani, 2015). This transactional space is constantly modified normally in forms of circular shapes, when the number in the group fluctuates, to maintain the direction and equal access to other people. Examining spatial patterns based on F-formations and behaviours of space control can offer valuable information to assist spatial design and planning for better communications in organisations. Furthermore, flexible furniture design and configurations can be developed to enable better interactions in groups by integrating such behavioural patterns.

Despite these natural human behaviours to regulate spaces per distance and intimacy, the contemporary workplace practice has pushed the personal boundaries to smaller sizes. Increased social density contributes to crowding which is associated with such negative feelings as frustration, lack of controllability, helplessness, and low motivation (Veitch, 2011). Increased social density and spatial density can make the work environment not only physically and psychologically uncomfortable but also vulnerable to easy transmission of contagious diseases, as shown in the incident of the deadly spread of COVID-19 in 2020 (Lee, 2020b). With human spatial behaviours and underlying psychologies in mind, some of the strategies mentioned earlier can

also help to address this issue, including breaking down a large open space into smaller clusters, employing a face-away orientation of desks, staggering desks, and placing plants or physical screens along the clusters or major aisles. In addition, integration of the concept of flexible offices such as working from home and virtual office can also alleviate issues of crowding and density in the workplace.

3 Methodology/research approach

As EP is a theory or approach in psychology, it shares similar research methods used in other divisions of psychology or broadly in social science. These include subjective methods, objective methods, and a combination of these two. Subjective methods can include surveys or interviews. Objective methods comprise observations, experiments (both laboratory and field), and simulations. Due to the advancement of technology, recent studies have employed various medical devices and equipment, including devices examining biomarkers such as blood pressure, body temperature, and skin conductance, as well as devices looking into the brain activities such as functional magnetic resonance imaging (fMRI). A combination of subjective and objective methods, instead of relying on only a single type of method, is often recommended as a comprehensive approach to better understanding of the outcomes.

Particular methods can be utilised for specific environmental attributes of EP topics. Computational methods such as space syntax can be used when analysing geometries and spatial configurations in prospect and refuge, complexity and mystery, and proxemics (see also Chapter 21 Space Syntax). Space syntax, possible with either manual or computer-aided methods, analyses visibility and accessibility within the layout of spaces, which allows examinations of social interactions and spatial uses of users (Hillier, 1996). Space syntax can be employed to understand environmental preferences either via an observation of actual spaces (Psathiti & Sailer, 2017) or virtual reality (VR) spaces (Keszei et al., 2019). VR is also often utilised in biophilic studies examining the impact of natural elements to control variables in the spaces (Yin et al., 2019). When conducting observations of interactions or spatial uses in groups, camera surveillance can be incorporated to more accurately record the incidences. However, the issue with privacy invasion should carefully be reviewed in such a case.

Currently, inexpensive innovative wearable technologies are becoming available at the medical grade. These technologies integrate biomarker sensors, including electroencephalography (EEG) and electrodermal activity (EDA), to simpler and more practical devices. Implementing these devices can allow researchers to collect more accurate physiological reactions to a specific external stimulus that can be further interpreted as cognitive or emotional states. Thus, it is a good idea to integrate these sensors as a complementary method to traditional psychometric measures and other subjective measures to better explain human responses towards either environmental stimuli or interactions with others in EP. For instance, EDA/EEG sensors can be used in conjunction with cognitive tests/experiments and/or subjective surveys/interviews to understand the comprehensive impact on emotional states or cognitive functions by natural sound (see Figure 17.3) (Lee, Nelson, Flynn, & Jackman, 2020) or natural views (Yin, Zhua, MacNaughtona, Allen, & Spenglera, 2018). In conjunction with inexpensive innovative wearable technologies available for research in behavioural science, further advanced technologies in environmental sensors and data collection are also becoming available in building science research. It is recommended to take a methodologically comprehensive approach to examine human behaviours in EP by further integrating building data, such as temperature, indoor air quality, acoustics, and daylight to name a few, with physiological data and psychometric data.

Figure 17.3 Integrating EDA (left) and EEG (right) devices to environmental stimuli experiments

4 Limitations

As mentioned earlier, EP is not free of criticisms. Since it applies behavioural patterns observed in animals to humans, and attributes human behaviours to natural adaptedness, it may promote biological determinism believing that human behaviours are simply determined by genes and biological traits. It may also promote panadaptationism that all human behaviours and physiological evolution such as brain size are attributed to the human need for survival. These ideas may lead to discrediting other aspects of complex human development affected by the physical environment, social context, cultural progression, and human autonomy. If solely relying on EP for explanations for human behaviours, it may be easy to dismiss potentially better-suited explanations and theories. Furthermore, it may use human adaptation as a defence or justification for undesirable human behaviours in the modern human society such as domination, sexism, hierarchy, and territorialism. Thus, one must be aware that some behaviours but not all are better explained by EP when applying it to the workplace. More importantly, even if certain behaviours may be better explained by EP, moral and ethical judgments must be exercised to evaluate those behaviours. The topics discussed in this chapter are the ones that may be better explained by EP. While presented in separate topics, some behaviours are related to each other. Thus, it may be best to address them simultaneously in the real workplace. Design and facility management strategies provided in this chapter can be used to steer people towards positive behaviours and away from inadequate behaviours to better fit the current functions and lifestyles to create healthy workplaces.

5 Theory relevance to practice

This chapter discussed six topics in EP as they are commonly observed behaviours in the workplace: attachment and territoriality, cognitive and perceptive biases, biophilia and cognitive restoration, prospect and refuge, complexity and mystery, and spatial biases. These behaviours are considered hard-wired adaptive behaviours driven from the innate survival instinct in the ancestral environment. These behaviours are exhibited in forms of preferences desiring certain features for comfort, modifications altering the environment to fit their needs, or complaints in the absence of these components. By understanding human innate psychological mechanisms,

workplace practitioners can provide an environment that better accommodates these hard-wired needs and resolves interpersonal conflicts by considering these behaviours as collective behaviours instead of individual behaviours. When implementing specific solutions for various topics aforementioned, one must be aware of the dynamics among these topics. Even if solutions for a specific topic are sought, it is best to examine it with relevant topics together to afford better solutions by understanding potential synergic benefits and trade-offs. Spatial regulation issues need to be examined together, including personal/interpersonal space, proxemics, territoriality, and crowding. Environmental preference issues also need to be looked at together, including prospect and refuge, complexity and mystery, and biophilia.

Finding solutions between certain topics may be complicated in practice due to their conflicting natures, such as personal spaces for individuals and social interactions for groups. Differences in gender, generations, and cultures must be considered in seeking appropriate spatial distances and socially accepted intimacy. Many of the theoretical components discussed in this chapter are based on Western cultures. Thus, it is necessary to understand these behaviours under the certain cultural context that is being examined. Lastly, it is important to understand that each workplace is unique. It may not be effective to simply adopt research findings from experiments or other organisations without considering specific spaces, people, organisational cultures, and leadership styles of a particular workplace. While general evidence of these behaviours exist, there is a vast discrepancy in research findings in terms of consistency and replicability, especially in spatial and architectural attributes (Dosen & Oswald, 2016). The best approach to applying these EP topics to the workplace would be balancing out among the various issues such as personal space, visual privacy, acoustical comfort, social interaction, open vs. enclosed spaces, certain spatial features of complexity and mystery, and biophilic elements for the overall wellbeing of people.

6 Further reading

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