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Cognitive Restoration Design: A Psychological Intervention for Stress Mitigation in Neighbourhood Park

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Abstract: Numerous research studies have revealed the landscape's positive effects on human health and well-being. While prior research underscores landscapes' positive impact on well-being, a gap still needs to be in comprehending their influence on psychological and cognitive aspects. This research focuses on how landscape attributes, specifically those seen in neighbourhood parks, may serve as a stress-relieving cognitive stimulus. In this study, we utilised qualitative research design by employing an in-depth expert interview method to explore what causes stress in urban communities and how specific landscape attributes can improve mental health and well-being. A total of 12 experts consisting of clinical psychologists, counsellors, neuropsychologists, therapists, landscape professionals and academia have consented to participate in this interview. The results illuminate a conceptual framework illustrating how psychological and cognitive landscape attributes can effectively promote cognitive restoration. The findings indicate that the design must be human centred as people are born with innate sense, intuition, and preference, all of which should be considered while designing for their psychological needs. Particularly to stimulate the cognitive part, providing landscape design elements that could inspire enthusiasm is important. This could encourage people to go to the park and interact with various stress-relieving landscape stimuli. Hence, designing for user comfort, safety, social interaction, and pleasurable experiences is critical for achieving cognitive restoration goals.

Keywords: Cognitive restoration, stress mitigation, psychological intervention, landscape attributes, neighbourhood park

1. Introduction

Superior infrastructure, social and commercial activity, healthcare facilities, and a vibrant culture all contribute to a contemporary urban centre's good quality of life. However, one of the numerous problems urban residents experiences is an increased risk of stress due to their hectic lifestyle and exposure to urban stressors. The World Health Organization (WHO) has recognised the Healthy Cities movement as a precursor to urban development and transformation, emphasizing its positive effects on people's physical and mental health and the urban quality of life. For years, scholars have debated the impact of urban life on stress (Beil & Hanes, 2013; Alcock et al., 2014; Knöll et

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al., 2017). Overcrowding, poor environmental quality, traffic and transportation issues, and work-life imbalance are all detrimental to people's health, particularly mental well-being (Lederbogen et al., 2013).

Humans' cognitive and emotional responses in many ways to their surroundings (Pykett et al., 2020). Interdisciplinary scholars are interested in delving deeper into the intricate relationship between the urban environment and human cognition. Thus, new fields such as neurourbanism and related psychophysiological research are emerging to investigate how the brain, urban landscapes, and architectural forms affect happiness and well-being (Pykett et al., 2020). Numerous empirical studies have also demonstrated that outdoor activities reduce stress and enhance mental health (Beil & Hanes, 2013; Berto, 2014; Twedt et al., 2016; Corazon et al., 2019; Hartig, 2021). Empirical findings from various experimental research also indicate that spending time in natural settings provides both perceived and actual benefits, such as reduced cognitive or mental fatigue and improved mood (Twedt et al., 2016). According to the Attention Restoration Theory (Kaplan, 1995) and the Stress Reduction Theory (Ulrich, 1991), psychological restoration is the capacity of natural environments to replenish cognitive resources depleted by daily activities, which is referred to as the ability of natural surroundings to provide psychological restoration. Nevertheless, a significant challenge concerning neighbourhood parks nowadays pertains to their ability to effectively alleviate stress and promote cognitive restoration despite their inherent potential to enhance mental well-being. Twedt et al. (2016) emphasize a disconnect between their potential and actual outcomes, hindering their intended role as serene spaces for rejuvenation. Therefore, this study aims to explore whether landscape design elements, particularly those present in neighbourhood parks, could facilitate in cognitive restoration and stress reduction.

2. Literature Review

2.1 Characteristics of a Restorative Environment

The environment shapes the individual's behavioural characteristics and acts as a boundary within which human behavioural possibilities exist (Berto, 2014). Some environmental characteristics have the potential to give a positive impact on individuals' psychological well-being. Twedt et al. (2016) observed that specific environmental characteristics could provide people with positive outdoor experiences. Their research highlighted that spending time in a natural environment is psychologically restorative and positively impacts on an individual's emotional capacity to reflect on life problems. The existence of urban green spaces can improve physical and mental health. Health professionals have long recognised the significance of outdoor interaction, where trees, parks, and greenery play an essential social role in lowering stress and enhancing mental health (Beil & Hanes, 2013; Alcock et al., 2014; Thompson et al., 2016). Green spaces are often used for structured therapeutic interventions for vulnerable groups such as people with mental illness, depression, dementia, and at-risk youth (Lederbogen et al., 2013; Corazon et al., 2019). Alcock et al. (2014) discovered that people who live in greener urban areas have better mental health than those who live in less green areas. Blue spaces are another factor that contributes to better psychological health. Some studies have found that water elements can improve moods and mental health. Water elements provide a meditation response to brain activity, aiding in relieving mental fatigue (Berto, 2014; Hartig, 2021).

2.2 The Role of Landscape Design in Inducing Cognitive Restoration

Various emotional and neurological disorders are related to neural activity (Pykett et al., 2020). Previous studies have demonstrated a relationship between cognitive and mental processes, mindfulness, and positive external stimuli. Our environment's physical characteristics significantly influence how our brain responds to the environment (Hartig, 2021). Previous research has shown that certain landscape elements can induce alpha and theta brainwaves associated with mindfulness and mental recuperation (Olszewska-Guizzo et al., 2022). Tall trees and narrow, shady paths generate a meditative state and increase mental concentration. The water's reflection and the landscape's view promote eye-movement coordination, providing an involuntary focus for mental recovery. Landscape elements of various shapes, sizes, colours, and textures offer sensory stimulation for the brain, which aids in spatial reasoning. This knowledge could assist landscape professionals in exploring the healing potential of outdoor spaces. It will contribute to a better understanding whether landscape design aesthetics are scientifically valuable and to what extent they can stimulate positive brain functioning for cognitive restoration. Research by van Oordt et al. (2022) found that observing nature enhances cognitive restoration after tasks in academic settings. Their field experiment with 72 students confirms nature's benefit for improving cognitive function and restoring working memory. Another study by Jimenez et al. (2022) observed that green space can decelerate cognitive decline by supporting physical activity, psychological restoration, or reducing exposure to air pollution. Their study indicates that having more green space around homes could slightly improve cognition in middle-aged women.

The challenge of cognitive restoration through landscapes is pertinent in Malaysia and internationally. In Malaysia, rapid urbanization raises concern about mental well-being due to urban stress (Nath et al., 2018). Urban dwellers face city life's pressures, causing higher stress and declining cognitive function. This pattern resonates globally, as cities worldwide struggle with stress and mental fatigue amidst modern living. Landscape architects can carefully consider layout, aesthetics, and sensory experiences to create environments that invite relaxation, boost cognitive function, and foster community engagement. By integrating elements such as serene pathways, lush greenery, and calming water

features, landscape architects can create pockets of tranquillity within bustling urban environments (Syed et al., 2023). The role of landscape architects extends beyond aesthetics to encompass mental well-being. By addressing the challenge of cognitive restoration through thoughtful design, they can contribute to a healthier, happier, and more resilient urban landscape.

3. Research Methodology

The study employs a qualitative research design, using in-depth expert interviews. This approach facilitates a thorough exploration of the less-explored field of landscape design for cognitive restoration. Experts from clinical psychology, neuropsychology, and landscape architecture contribute diverse perspectives, enabling a comprehensive understanding of cognitive restoration strategies in urban contexts. Landscape design focusing on cognitive restoration is still a relatively unexplored field. According to Neuman (2014), qualitative approach is best suited when investigating the "little-understood phenomenon" or real-life behaviours and experiences. A purposive sampling technique is employed to select participants with practical knowledge and expertise in the relevant fields (Creswell & Creswell, 2018). This method allows for targeted inclusion of individuals who can provide valuable insights into cognitive restoration strategies in urban settings. Semi-structured interviews are conducted, allowing for flexibility and depth in exploring participants' viewpoints. Thematic analysis is employed to analyse the interview data. By combining purposive sampling, semi-structured interviews, and thematic analysis, the study aims to comprehensively understand the landscape design attributes that contribute to cognitive restoration. The insights derived from the experts' perspectives will contribute to the existing knowledge in this evolving area and provide valuable recommendations for designing urban spaces that promote cognitive well-being.

3.1 In-Depth Expert Interview

For the data collection, semi-structured in-depth interviews were utilised. This method of investigation is appropriate for studying a specific phenomenon and collecting in-depth and detailed data (Creswell & Creswell, 2018). Semi-structured interviews were used to elicit psychological experts' and landscape professionals' perspectives on the factors that contribute to stress in urban communities, the mechanism of cognitive function in stress rehabilitation, and design recommendations for restorative environments. The purposive sampling method was used to select interviewees. It allows researchers to meet their objectives while also utilising and controlling the level of variation among interviewees.

For sampling criteria, some scholars suggested selecting respondents from the three types of informants (typical expert, key expert, and theoretical expert) to conduct a successful expert interview (Libakova & Sertakova, 2015). A typical expert has practical experience and explicit expertise in the field being studied. During the interview, a key expert establishes critical thinking and provides factual details. Although theoretical experts are not a direct carrier of the studied practise, their professional activities are similar and may share exciting perspectives on a given subject. The experts are selected from various educational and practical backgrounds ranging from clinical psychologists, neuropsychologists, counsellors, therapists, landscape professionals, and academia.

A total of 12 experts have agreed to participate in this interview. Six interviewees were psychological experts (clinical psychologists, counsellors, neuropsychologists, and therapists), four were landscape professionals, and the other two were from landscape academia. The study employs 12 participants to explore diverse expert viewpoints. While not a large sample, qualitative research focuses on depth rather than quantity (Creswell & Creswell, 2018). According to Creswell and Poth (2018) and Patton (2015), qualitative inquiry typically focuses on relatively small samples, even single cases (n=1), that are carefully selected. Given the study's detailed exploration of each participant's perspective and the diversity of experts, the 12-participant size is well-suited for achieving saturation and deriving comprehensive insights. Experts were chosen over park users to delve deeply into the complex relationship between landscape attributes and cognitive restoration in stress recovery. Their expertise in psychology, psychotherapy, and landscape design offers specialized insights. While park users provide experiential insights, experts' specialized knowledge ensures a thorough analysis, uncovering the potential of landscapes to enhance mental well-being in urban outdoor settings. Before beginning the data collection, this study obtained ethical approval from the Universiti Malaya Research Ethics Committee (UMREC). The anonymity, safety, and confidentiality of the respondents were all guaranteed. During the transcription and manuscript authoring processes, pseudonyms were utilised to maintain confidentiality.

3.2 Procedure of Data Collection

The interviews were conducted from April to August of 2021. All interviews were conducted online through virtual meetings (Google Meet) or by email because the Movement Control Order was in effect during the COVID-19 pandemic. According to Adhabi and Anozie (2017), semi-structured interviews can be conducted using various techniques (e.g., face-to-face, telephone, text/email, individual, group, brief, or in-depth), each of which has advantages and disadvantages. Nine interviewees were interviewed via Google Meet, while the remaining three responded via email. Due to their busy schedules, it took a lot of work for the three participants to participate in the virtual meeting or

phone interview. Hence, they recommend responding to the interview questions via email so they can do so at their convenience. Each and every interview was conducted either in English or Malay. For virtual meetings, each interview session lasted between 30 and 60 minutes. Each interview conducted via Google Meet was recorded. For data analysis, both the recorded and email interviews were transcribed into English.

Interviewees were given a copy of an interview protocol (questions) developed based on relevant literature before the interviews. The interview protocol has been validated by five experts, comprising two academicians, one clinical psychologist, and two landscape professionals. In the case of the email interview, questions were emailed to the participants, who could review them and ask the researchers if any questions needed clarification. This increases the depth of the responses and ensures the quality of data acquisition. Participants were also asked to return the completed interview questions at the time agreed upon by both sides. The questions were divided into protocols for psychological specialists and landscape professionals. Four main sections are based on the topics pertinent to their respective areas of expertise. For psychological specialists, the protocol consists of four major components: (1) professional background and work experience; (2) an overview of mental health issues; (3) stress issues in the context of the urban living environment; and (4) significant aspects of stress rehabilitation. The protocol also consists of four major sections for landscape professionals: (1) professional background and work experience, (2) common practise in designing neighbourhood parks, (3) restorative environment, and (4) recommendations on restorative landscape design for mental health. Various probing questions were posed to elicit specific information from these experts.

3.3 Data Analysis

Using Atlas.Ti 9 software, each interview transcript was thematically analysed. The thematic analysis looks for patterns of meaning that repeat across a data set, such as a series of interviews, focus groups, or a collection of texts (Campbell et al., 2021). This procedure enabled data synthesis by incorporating the identified concept from the primary studies into a higher-order theoretical structure (Soilemezi & Linceviciute, 2018). Identification of themes and sub-themes, and the analysis includes coding, categorising, and constant comparison. The first stage was open coding, also known as in-vivo coding, which entailed coding every line of data that might be important or relevant to the study. Every significant line addressing the question topic during this stage was coded. Similar codes with similar ideas or concerns were grouped in the second coding stage. It entails categorising related ideas. These concepts were then organised into higher-order categories, from which themes emerged. The last stage was selective coding, which required constant comparison. During this stage, the codes, categories, and themes were revisited and compared in search of thematic patterns and relationships. Using Atlas.Ti 9 software, the Code-Document Table and Co-Occurrence Table functions were used to generate the main themes and patterns. This facilitates the visualisation of the cross-tabulation of dominant factors or common attributes. Thus, it aids researchers in reclassifying or redefinition of themes and identification of subthemes.

4. Results and Discussions

In-depth expert interviews suggest a link between the human psyche and its surroundings. From the perspectives of psychology and landscape design, both disciplines complement each other in providing intervention and a supportive setting for mental health restoration. Table 1 summarises the main themes and sub-themes derived from the interviews.

Table 1 - The main categories, themes and sub-themes excerpt from in-depth expert interviews

Categories	Themes	Sub-themes
Stress	Situation	Life situation (miserable)
	Symptom of stress	Cognition (negative thinking)
		Emotion (agitated feelings)
		Response (ineffective behaviour)
	Factors and sources of stress	Internal (biological and psychological factors)
		External (environmental factors)
	Demography	Age (anyone)
		Gender (most vulnerable: female)
		Location (urban)
		Socio-economy (low-income community)
Therapy	Psychological Intervention	Psychotherapy (Cognitive Behaviour Therapy)
		Coping mechanism
		Stress rehabilitation
	Neuropsychology	Cognitive (brain) stimulation
Restorative	Natural attributes	Nature, natural setting, native vegetation

Landscape Design	Sense of control	Safety and security Spatial flexibility Accessibility Visibility
	Solace	Well-functioned facilities Exclusive and inclusive design
	Sensory	Art and sensory design elements
	Happiness and joy	Exploration and discovery Fun and excitement Social support
Limitation	Practice and design challenges	Knowledge and expertise (ignorance and misconception) Project management (operational) Policy and guidelines
Future recommendations	Interdisciplinary approach	Evidence-based design (research inform design)

(Source: Author, 2021)

The following is an expanded discussion of the main findings:

4.1 Stress and Psychological Intervention

The challenges of urban living and mental health are interconnected, multifaceted problems. During the interview, psychological experts stated that stress is a common psychological issue everyone faces. It is not a mental illness and occurs infrequently over a shorter span. However, stress could be severe if it happens for a longer duration, is more intense, and negative emotions begin to interfere with daily life. Interviewees acknowledged that certain aspects of our living environment can cause stress. Cities have been shown to alter brain biology in ways that may increase or decrease the prevalence of mental disorders (Gruebner et al., 2017). The rapid urban lifestyle causes a stronger brain response to stress and cognitive impairment. In contrast, under stress, the amygdala (a brain area that regulates emotions such as anxiety and fear) was more activated in healthy urban people than in their rural counterparts (Stenfors et al., 2019).

...stress can be because of people, like relationship issues and the environment around you. Various situations, including work environments, urban lifestyles, and crowded, noisy areas, can cause stress (Interviewee 4).

...unconducive living environment (pollution, noises, chaotic, dull, disorganised, tiny spaces) could negatively affect human cognition and emotion (Interviewee 6).

Interviewees believed that stress can be reduced if a person is aware of appropriate coping strategies. Deep breathing techniques, mindfulness, Cognitive Behavioural Therapy (CBT), and psychodynamics are all forms of psychotherapy. CBT is the most widely used therapy for depression, anxiety, and extreme stress or emotional burnout. CBT is a type of mind training in which we attempt to shift negative thinking into positive behaviour. Unless there is a medical condition, CBT can treat any psychological issue, including stress (Lloyd et al., 2013).

The key intervention in CBT is identifying distorted or self-defeating patterns, and learning to respond to them with more balanced, reality-based thinking. This then results in fewer emotional problems and more successful behavioural patterns. This process is known as cognitive restructuring. For the behavioural part, problems are analysed, and problematic behaviours are identified. The main mechanism of change in behavioural therapy is facilitating the learning and implementation of effective behaviours to replace ineffective behaviours (Interviewee 6).

... increasing physical activities such as yoga, meditation, breathing exercises, owning a pet, and praying, is the behavioural component of coping with stress. For the cognitive part, we need to think how to challenge the negative thoughts and unhelpful thinking, where we need to restructure negative cognitive thoughts (Interviewee 1).

This raised the question of how CBT is utilised in landscape architecture. And how could the neighbourhood park be utilised for stress relief? According to the interviewees, people tend to change their behaviour from negative to positive when they believe there is hope for betterment and that they will overcome the most challenging situation. This is demonstrated in the study by Pouyanfard et al. (2020), who observed a group of multiple sclerosis (MS) patients who

completed a mindfulness-integrated cognitive behavioural therapy (MICBT). Since MS is a disease with an uncertain future, most patients deal with various stresses related to their condition and daily life. It has caused them to be sad, hopeless, depressed, and resentful. MICBT patients learn to accept their illness and make behavioural changes for better self-care. This is because they believe that if they adhere to the stringent treatment, they will be able to control the severity of the disease. Fig. 1 depicts how CBT changes people's mindsets toward positive behaviour.

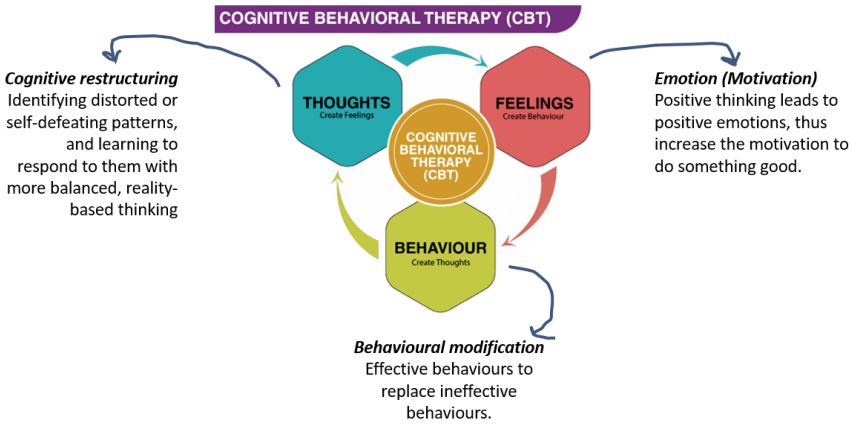

Fig. 1 - The mechanism of CBT approach for psychotherapy

4.2 Designing for Cognitive Restorative Landscape

a) User's Comfort

Several interviewees emphasised the importance of user comfort in restorative design. This can be accomplished if the park's layout and facilities are adapted to local needs and preferences. According to interviewees, this is an exclusive design intended to serve the local community and honour their local culture. The landscape design elements should emphasise the needs of the local community, what they want to see in the park, and what types of activities they will enjoy the most when visiting the park.

The brain stimulation will rely on the individual's response to psychotherapy (treatment) and other factors, such as emotion and thought. Therefore, designers should consider people's preferences when designing a park. What elements and activities do the majority of parkgoers enjoy? The park's features must be able to entice individuals to visit. As a result, it may motivate someone to visit a park, use the space, and seek natural therapy for stress relief (Interviewee 6).

Comfort could also be defined as providing well-functioning facilities. Interviewees agreed that the facilities must be accessible to all people, including those with disabilities.

…for healing or therapeutic spaces, the design details are the most important aspects and must cater to all groups, including the well-being of people with disabilities. As designers, we must put ourselves (and the design) in users' shoes (Interviewee 7).

A study by Cobos et al. (2014) identifies two important aspects of designing open spaces to accommodate local culture and inclusive design. The first aspect is the design of urban furniture. It can address concerns like the users' maximum capacity and physical abilities. A good design of urban furniture can strengthen social connections and help create a healthy environment that treats everyone equally, regardless of gender or ability. The second feature is co-design, which is an excellent way to create a more humane, holistic plan for open spaces by considering users' and local councils' opinions, participation, and sentiments. This will ensure that various elements, such as artistic, cultural, social, and economic aspects, are incorporated into the design.

b) Safety and Security

Researchers emphasize the importance of feeling safe and secure regarding the built environment in relation to mental health (Gruebner et al., 2017). Thompson and Kent (2013) discovered safety and security to be essential in designing open spaces and neighbourhood streets where it can stimulate healthy human interaction and empower the community (Thompson & Kent, 2013). Interviewees agreed that people feel safe in outdoor spaces when they have

control over their surroundings. According to landscape experts, visibility is one of the crucial parts when designing neighbourhood parks. Good visibility ensures a user's sense of security in a park and reduces their fear of perceived crime.

…visibility is a must in designing a park. Provide safety by planting trees with a clear tree trunk, avoid bushes and sense of surprises, poisonous tree species or harmful elements in the park (Interviewee 9).

According to a study conducted by Dugrusoy and Zengel (2017) on the perception of safety in Büyükpark and Hasanaga Park in Izmir, Turkey, the majority of park visitors believe that the park's safety and security should be effectively maintained. Users of Büyükpark (with good wayfinding and environmental design) are more satisfied with the park's safety than users of Hasanaga Park. Another significant finding of their research is that parks in urban core areas are safer if they are relatively small, easy to manage, well-maintained, and offer a variety of activities.

c) Social Opportunities

Interviewees agreed that green spaces are good places for social interaction. It is an excellent social space to foster person-to-person connection and person-to-place bonding.

Social support means we can be alone, or we can be with family or friends. The facilities in the park should be provided to support the social system (Interviewee 2).

Ng et al. (2021) found that horticultural therapies significantly reduced physiological stress in older adults. Their research supports eco-psychological perspectives on human-nature engagement, hypothesised to enhance feelings and interpersonal relationships. Thompson et al. (2016) observed that neighbourhoods that are less socially cohesive and more socially disordered exhibited severe anxiety symptoms, while deprived areas with a lack of physical comfort exacerbate anxiety. In urban areas, a lack of green spaces as a social connector may lead to feelings of isolation or belonging (Alcock et al., 2014; Thompson et al., 2016). This may reduce pleasant emotions and a sense of belonging for residents to socialise in their neighbourhood, resulting in an insensible place attachment to the community.

d) Pleasurable Experience

Parks enhance the quality of life in a community by providing space for sports, recreational, and leisure activities. Spaces and design elements are crucial in ensuring the quality of a neighbourhood park design (Malek et al., 2012; Paydar & Kamani. 2021). Aside from people's preferences, the designer should understand the behavioural design aspects of how people use parks and how the spatial design will provide a pleasurable experience to the users. According to interviewees, the designer must understand how people interpret their leisure and outdoor recreational activities in neighbourhood parks.

…in term of applying the cognitive aspect into landscape design, I believe it is by providing a suitable setting or environment. Designers can 'convince' people that the park is fun, that there are so many exciting activities to do, that the green spaces are attractive, and that the elements are promising. The ambience invites people to go outside and do leisure activities (Interviewee 4).

…if you are talking about restorative, it is not about how many green spaces or elements are provided, but about how they enjoy the spaces. The main aspect of being considered is leisure. How do the spaces bring leisure to the users? It's not merely recreation. So, what is the difference between leisure and recreation? Leisure gives you more relaxation and a quiet atmosphere. In comparison, recreation is like doing physical activities like jogging, playing and so on (Interviewee 9).

Implementing landscape design principles is crucial for creating a pleasurable neighbourhood park. This is supported by research into the psychological impact of landscape design at Lahore's Safari Villa Park (Farooq, 2020). The landscape principles of unity, balance, harmony, repetition, and others are used in Safari Vilas Park. Most people agree that incorporating these principles contributes to creating a scenic view as a visual stimulus to the park. There are also enough plants and benches for them to enjoy the sights while also interacting socially. Children and older people visit the park to meet new people, exercise, and relax, which benefits their mental health.

In conclusion, green spaces can reduce stress and prevent cognitive decline by providing physiological and psychological comfort, scenic views, a sense of safety, opportunities for fun activities, and social support. Fig.2 depicts the essential components correlating the mechanism of stress coping through psychological and cognitive intervention, as well as how the discipline of landscape architecture could be applied to aid in mental health restoration.

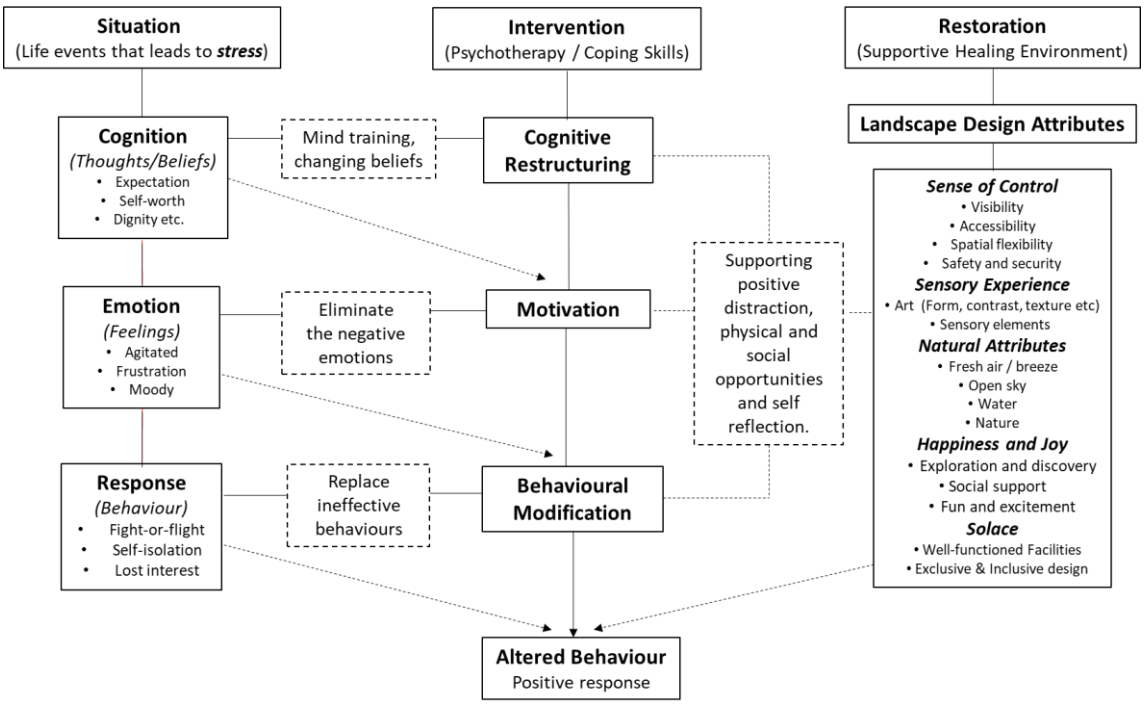

Fig. 2 - Summary of the psychological and cognitive intervention and how landscape design could promote mental health restoration

5. Conclusion

There is a connection between human psychology and their surroundings. Both practises are interrelated, according to both psychological and landscape design perspectives. Psychological approaches provide intervention by emphasising internal factors (genetics, personality, mindset, etc.). On the other hand, landscape practises focus on external factors, such as providing a good design setting for mental health restoration and how parks or gardens can be used as a healing element for relieving stress. This study offers a new perspective on instilling optimism in the design of neighbourhood parks by creating a restorative and stimulating environment, particularly for mental well-being. The design must provide users with comfort, a sense of control (privacy and safety), the option to engage in social activities (alone or in groups), and a pleasurable experience (recreational and entertaining spaces). The impact of landscape attributes on cognitive restoration is notable in various ways. Diverse shapes, sizes, colours, and textures of landscape elements stimulate the brain, fostering spatial reasoning. This informs landscape experts to use outdoor spaces for therapy, emphasizing aesthetics' positive impact on cognitive restoration. It adds to our grasp of design's role in enhancing mental well-being by interacting with the brain for positive effects. Landscape design attributes must conform to people's preferences and meet users' needs. According to psychological science, people feel attached to their surroundings when they can feel safe, comfortable and enjoy engaging in activities without fear of being threatened. People would feel more connected to their surroundings with these aspects and elements, making it easier to express their emotions. This allows a person to release stress, which promotes positive individual psychological responses.

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References

Adhabi, E. A. R., & Anozie, C. B. L. (2017). Literature Review for the Type of Interview in Qualitative Research. *International Journal of Education*, 9(3), 86.

Alcock, I., White, M. P., Wheeler, B. W., Fleming, L. E., & Depledge, M. H. (2014). Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas. *Environmental Science & Technology*, 48(2), 1247-1255.

Beil, K., & Hanes, D. (2013). The Influence of Urban Natural and Built Environments on Physiological and Psychological Measures of Stress— A Pilot Study. I*nternational Journal of Environmental Research and Public Health*, 10 (4), 1250-1267.

Berto, R. (2014). The Role of Nature in Coping with Psycho-Physiological Stress: A Literature Review on Restorativeness. *Behavioral Sciences*, 4(4), 394-409.

Campbell, K. A., Orr, E., Durepos, P., Nguyen, L., Li, L., Whitmore, C., Gehrke, P., Graham, L., & Jack, S. M. (2021). Reflexive Thematic Analysis for Applied Qualitative Health Research. *The Qualitative Report*, 26(6), 2011-2028.

Corazon, S. S., Sidenius, U., Poulsen, D. V., Gramkow, M. C., & Stigsdotter, U. K. (2019). Psycho-Physiological Stress Recovery in Outdoor Nature-Based Interventions: A Systematic Review of the Past Eight Years of Research. *International Journal of Environmental Research and Public Health*, 16(10), 1711.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and Mixed Methods Approaches* (5th ed.). SAGE Publications.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. SAGE publications.

Farooq, S. (2020). Psychological impact of landscape principles on human beings: A case study of Safari Villas Park Bahria Town, Lahore, Pakistan. *Pure and Applied Biology*, 9(3), 1820-1830.

Gruebner, O., Rapp, M. A., Adli, M., Kluge, U., Galea, S., & Heinz, A. (2017). Cities and Mental Health. *Deutsches Aerzteblatt Online*, 114(8). https://doi.org/10.3238/arztebl.2017.0121

Hartig, T. (2021). Restoration in Nature: Beyond the Conventional Narrative. *Nebraska Symposium on Motivation*, 89-151.

Jimenez, M. P., Elliott, E. G., DeVille, N. V., Laden, F., Hart, J. E., Weuve, J., Grodstein, F., & James, P. (2022). Residential Green Space and Cognitive Function in a Large Cohort of Middle-Aged Women. *JAMA Network Open*, 5(4), e229306.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15(3), 169-182.

Knöll, M., Neuheuser, K., Cleff, T., & Rudolph-Cleff, A. (2017). A tool to predict perceived urban stress in open public spaces. Environment and Planning B: *Urban Analytics and City Science*, 45(4), 797-813.

Libakova, N. M., & Sertakova, E. A. (2015). The Method of Expert Interview as an Effective Research Procedure of Studying the Indigenous Peoples of the North. *Journal of Siberian Federal University. Humanities & Social Sciences*, 114-129.

Lederbogen, F., Haddad, L., & Meyer-Lindenberg, A. (2013). Urban social stress - Risk factor for mental disorders. The case of schizophrenia. *Environmental Pollution*, 183, 2-6.

Lederbogen, F., Kirsch, P., Haddad, L., Streit, F., Tost, H., Schuch, P., Wüst, S., Pruessner, J. C., Rietschel, M., Deuschle, M., & Meyer-Lindenberg, A. (2011). City living and urban upbringing affect neural social stress processing in humans. *Nature*, 474 (7352), 498-501.

Lloyd, J., Bond, F. W., & Flaxman, P. E. (2013). The value of psychological flexibility: Examining psychological mechanisms underpinning a cognitive behavioural therapy intervention for burnout. *Work & Stress*, 27(2), 181-199.

Malek, N. A., Mariapan, M., & Shariff, M. K. M. (2012). The Making of a Quality Neighbourhood Park: A Path Model Approach. *Procedia - Social and Behavioral Sciences*, 49, 202-214.

Nath, T. K., Zhe Han, S. S., & Lechner, A. M. (2018). Urban green space and well-being in Kuala Lumpur, Malaysia. *Urban Forestry & Urban Greening*, 36, 34-41.

Neuman, W. L. (2014). Social research methods: Qualitative and quantitative approaches (7th ed.). Pearson.

Ng, T. K. S., Gan, D. R. Y., Mahendran, R., Kua, E. H., & Ho, R. C. M. (2021). Social connectedness as a mediator for horticultural therapy's biological effect on community-dwelling older adults: Secondary analyses of a randomized controlled trial. *Social Science and Medicine*, 284(February), 114191.

Olszewska-Guizzo, A., Fogel, A., Escoffier, N., Sia, A., Nakazawa, K., Kumagai, A., Dan, I., & Ho, R. (2022). Therapeutic Garden with Contemplative Features Induces Desirable Changes in Mood and Brain Activity in Depressed Adults. *Frontiers in psychiatry*, 13, 757056.

Patton, M. Q. (2015). *Sampling, Qualitative* (Purposeful). The Blackwell Encyclopaedia of Sociology.

Paydar, M., & Kamani Fard, A. (2021). The impact of legibility and seating areas on social interaction in the neighbourhood park and plaza. Archnet-IJAR: *International Journal of Architectural Research*, 15(3), 571-588.

Pykett, J., Osborne, T., & Resch, B. (2020). From Urban Stress to Neurourbanism: How Should We Research City Well-Being? *Annals of the American Association of Geographers*, 110(6), 1936-1951.

Soilemezi, D., & Linceviciute, S. (2018). Synthesizing Qualitative Research: Reflections and Lessons Learnt by Two New Reviewers. *International Journal of Qualitative Methods*, 17(1).

Stenfors, C. U. D., Van Hedger, S. C., Schertz, K. E., Meyer, F. A. C., Smith, K. E. L., Norman, G. J., Bourrier, S. C., Enns, J. T., Kardan, O., Jonides, J., & Berman, M. G. (2019). Positive effects of nature on cognitive performance across multiple experiments: Test order but not affect modulates the cognitive effects. *Frontiers in Psychology*, 10, Article 1413.

Syed, K., Hussein, H., & Ng, S.-C. (2023). Landscape attributes as stimuli for cognitive restoration in the outdoor environment: A systematic review and thematic analysis. *Journal of Leisure Research*, 1-21.

Thompson, C. W., Aspinall, P., Roe, J., Robertson, L., & Miller, D. (2016). Mitigating Stress and Supporting Health in Deprived Urban Communities: The Importance of Green Space and the Social Environment. *International Journal of Environmental Research and Public Health*, 13(4), 440.

Thompson, S., & Kent, J. (2013). Connecting and strengthening communities in places for health and well-being. *Australian Planner*, 51(3), 260-271.

Türkseven Doğrusoy, İ., & Zengel, R. (2017). Analysis Of Perceived Safety in Urban Parks: A Field Study in Büyükpark And Hasanağa Park. *METU Journal of the Faculty of Architecture*. https://doi.org/10.4305/metu.jfa.2017.1.7

Twedt, E., Rainey, R. M., & Proffitt, D. R. (2016). Designed Natural Spaces: Informal Gardens Are Perceived to Be More Restorative than Formal Gardens. Frontiers in Psychology, 7.

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11(3), 201-230.

Van Oordt, M., Ouwehand, K., & Paas, F. (2022). Restorative Effects of Observing Natural and Urban Scenery after Working Memory Depletion. *International Journal of Environmental Research and Public Health*, 20(1), 188.