Research Paper

Healing Cities: Integrating Virtual Reality Therapeutic Landscapes into Urban Planning for Future Well-being

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Abstract

Fast urban development poses major obstacles for city residents' emotional well-being which requires innovative solutions in urban development planning. This research investigates whether Virtual Reality (VR) therapeutic environments should integrate with urban planning strategies to build better mental health outcomes for the future. A review of relevant literature together with case study examination allows for assessment of VR therapeutic landscape effectiveness in urban mental health support. The results indicate that VR therapeutic landscapes can produce effective solutions to traditional urban planning constraints by enabling personalized design features and integrating virtual and physical interfaces while promoting social equity standards. This research creates practical guidelines that urban planners along with policymakers should follow to develop accessible VR landscape models that enable resilient healthy urban environments.

Keywords

Virtual Reality (VR), Therapeutic Landscapes, Urban Planning, Mental Health, Urban Resilience, Smart Cities, Digital Therapeutic

1. Introduction

The quick global shift toward urbanization creates serious obstacles to preserve and enhance mental health for those who live in cities. The United Nations Department of Economic and Social Affairs (2018) predicts that urban areas will house 68% of the total world population in 2050, so we urgently need new solutions for coping with psychological distress in cities (United Nations, Department of Economic and Social Affairs, Population Division, 2018). Numerous infrastructural approaches in urban planning remain useful although they fail to address the mental health requirements of varied populations living in compact urban areas (Galea, Freudenberg and Vlahov, 2005; Kondo et al., 2018). Research demonstrates that the absence of natural areas in condensed environments leads to higher stress levels and social isolation feelings which in return drives people to find urban wellness solutions.

Scientific research has determined natural settings increase mental health by creating stress reduction benefits which enhance mood and life satisfaction. (Kaplan and Kaplan, 1989; Bowler et al., 2010). However, as urban green spaces become increasingly scarce, Virtual Reality (VR) technology delivers potential

applications to create simulated natural environments which offer urban inhabitants nature experiences with healing benefits. (Riva, Wiederhold and Mantovani, 2019; Serrano et al., 2019). Virtual reality technology provides special immersive opportunities to integrate soothing naturalistic experiences inside urban environments thus overcoming mental health challenges in existing urban planning approaches.

The study examines the use of virtual reality therapeutic environments in urban design to create transformative mental health improvement systems for city dwellers. Through its immersive adaptation mechanism Virtual Reality delivers extraordinary capabilities which help tackle spatial barriers using flexible zero-bound connectivity unavailable in physical city layouts. It aims to bridge the fields of urban planning, environmental psychology, and VR technology, with a focus on the following innovative aspects: (1) interdisciplinary integration of VR within urban planning, (2) customization of VR landscapes for diverse urban populations, (3) blending virtual and physical environments to create hybrid urban spaces, (4) promoting social and spatial equity in access to therapeutic VR landscapes, and (5) exploring the long-term efficacy of VR landscapes as a sustainable mental health intervention.

This paper is structured to offer a comprehensive exploration of the topic. The framework is upon the literature review on urban mental health and therapeutic capacity of VR. Following this, the methodology will be outlined, leading to a discussion of the findings and their implications for urban planning. The paper will conclude with recommendations for future research directions.

2. Methodology

This research uses both literature review and case study analysis to evaluate how Virtual Reality therapeutic landscapes enhance mental well-being through urban planning.

The literature review establishes the theoretical foundations and empirical proof for VR therapeutic landscapes in urban planning environments. This process includes:

(1) Theories Analysis: The study examines theoretical concepts from three domains which include urban design alongside mental health together with the function of nature as a therapeutic setting. The research explores restorative environments combine with therapeutic landscapes and demonstrates their adaptable application in virtual reality dimensions.

(2) Synthesis of previous Research: A comprehensive analysis of current research concerning VR impacts on urban planning evaluates its benefits for mental health results. The evaluation will analyze the opportunities VR provides to overcome conventional urban planning limitations alongside promotion of accessible and inclusive urban environments.

(3) Identification of Research Gaps: The research identifies specific missing areas in literature focused on VR landscapes in urban planning and the requirement for personalized design methods targeting community diversity.

The analysis of VR therapeutic landscapes demonstrates practical usage potential within urban spaces through its practical application approach. This component includes:

(1) Selection of Relevant Case Studies: A review of successful case studies presents virtual reality therapeutic landscapes within contemporary urban development models. Selected case studies demonstrate diverse VR implementation examples that focus on public involvement and mental health support and environmental instructive features while showing the adaptability of VR applications in city settings.

(2) Exploration of Application Potential: Both case studies evaluate how VR therapeutic landscapes might affect mental wellness together with public awareness and social interaction patterns. This research avoids outcome metrics in favor of identifying qualitative ways through which VR applications can support urban spaces while promoting engagement.

The combination of case studies and the literature review generates practical recommendations which benefit urban planners and policymakers through a comprehensive analysis of VR therapeutic landscape implementation for improved urban health. The synthesis of theoretical insights and practical examples through this methodology reveals VR therapeutic landscapes' substantial value for urban planning which leads to more resilient and health-promoting urban areas.

3. Background Research

3.1. Foundations and Challenges of Therapeutic Landscapes

Over the past three decades urban planning together with public health policies have received significant influence throughGesler' 1992 introduction of therapeutic landscapes. Identified during the 19th-century sanatorium movement practitioners discovered natural environments hold healing properties. Today therapeutic landscapes combine physical spaces with mental environments that promote recovery and well-being. The concept gained popularity within urban design because it provides a structure to develop spaces that optimize mental and physical health in rapidly growing metropolitan areas.

Multiple complementary theories support the foundation of therapeutic landscapes. According to Kaplan and Kaplan's (1989) Attention Restorative Theory (ART), natural settings have the ability to restore depleted cognitive resources and manage mental fatigue and stress simultaneously. Stress Reduction Theory (SRT) published by Ulrich et al.'s (1991) viewing natural scenes leads to improved emotional responses which decrease stress while improving individual well-being. Wilson's (1986) Biophilia Hypothesis indicates that humans show an inherent bond with nature which forms a cornerstone for mental well-being. These frameworks create a solid theoretical base that supports the integration of therapeutic landscapes into urban design processes.

However, the application of therapeutic landscape theory faces substantial barriers when used in urban settings. Maas et al. (2006) highlighted the unequal distribution of green spaces, particularly in communities with poorer socioeconomic conditions, therefore innovative methods must be developed to ensure therapeutic spaces receive equitable distribution throughout cities. Research by Van den Berg et al. (2015) shows that health benefits stem from quality alongside quantity of green spaces; consequently, urban design requires creating spaces that restore citizens in addition to being accessible.

3.2. Expanding Concepts and Social Dimensions

The study integrates urban blue Spaces into therapeutic landscapes and demonstrates their connection to physical and mental health (White et al., 2013). Aletta and Astolfi (2018) state that urban soundscapes create environments with healing functions by using acoustic design as a way to improve urban areas. Researchers present advanced conclusions about environmental factors that promote well-being through a multisensory approach. Utilizing a multi-sensory approach, complex environmental interactions reveal the contemporary impact of environmental factors on health.

In recent years, the social dimension of the therapeutic landscape has been increasingly recognized as a fundamental component. According to Cattell et al. (2008), spatial design in public environments generates a supportive atmosphere, which leads to social communication and thus improves mental health. The field

of therapeutic land management has now moved beyond natural resources, as researchers have incorporated the human environment into therapeutic planning methods. Völker and Kistemann (2011) examine the cultural and social aspects that influence therapeutic landscape engagement before advocating urban planning that takes cultural sensitivity into account.

3.3. Virtual Reality and Emerging Trends

City development challenges have propelled Virtual Reality technology into prominence for its ability to construct therapeutic landscapes that provide augmented therapeutic experiences. Conservative healthcare applications of virtual reality in the early stage centered around pain control combined with phobia treatment (Sveistrup, 2004). These applications took their foundation from both presence theory (Slater and Wilbur, 1997) and embodied cognition theory (Wilson, 2002). These theories describe how users psychologically experience virtual environments so they can be effectively used in psychological interventions.

Studies demonstrate VR delivers encouraging results for mental health treatment across different conditions. VR delivery methods show effectiveness in treating anxiety and depression as well as PTSD according to Riva et al. (2016). The research by Powers and Emmelkamp (2008) proved that virtual reality interventions matched traditional exposure therapy effectiveness and Etchemendy, while Etchemendy, Baños and Botella (2015) showed its potential in PTSD treatment. These findings demonstrates how VR generates therapeutic environments which effectively address accessibility limitations and offers benefits similar to physical therapeutic spaces.

The use of VR to recreate natural environments for the therapeutic purpose is particularly relevant to urban planning. The combination of virtual nature environments with sound elements presented quicker stress recovery according to Ratcliffe (2021), and White et al. (2018) demonstrated that VR nature scenes decreased pain levels and anxiety in dental patients. These research findings indicate that virtual reality applications can deliver therapeutic landscape experiences while physical nature remains scarce in urban settings.

Despite its potential, VR therapeutic landscapes encounter multiple obstacles in their path. Rebenitsch and Owen (2016) identifed cybersickness as an important factor preventing widespread adoption of VR systems as Slater and Sanchez-Vives (2016) argued for better accessible yet user-friendly VR technologies. Privacy risk and emotional concerns stand as core ethical problems which demand contemplation according to Madary and Metzinger (2016). PX implementation of VR therapy systems depends on solving its operational obstacles.

Today's artificial intelligence (AI) technologies enable a transformation in virtual reality (VR) therapy by creating personalized therapeutic landscapes that fulfill specific user needs (Ribeiro de Oliveira et al., 2022; Soliman et al., 2024). Social VR groups designed for therapy allow healthcare professionals to understand therapeutic landscapes through their social elements (Kadir et al., 2023). VR platforms get smarter through biofeedback implementations that open new potential for developing intelligent therapeutic virtual landscape environments (Rockstroh, Blum and Göritz, 2019).

Research findings show definitive evidence that VR therapeutic landscapes deliver valuable mental health benefits for use in urban environments. Through the fusion of environmental psychology theory with urban planning principles and virtual reality technology effective VR therapeutic landscapes can be applied to urban domains. Research efforts need to focus on both extended outcomes and cultural adaptations together with specific implementation practices. Urban planners achieve the creation of new healing spaces by incorporating VR therapeutic landscapes into their urban planning enhancements.

4. Case Study

Several case studies demonstrate how virtual reality therapeutic landscapes are integrated into cities to create improved mental wellness alongside improved urban areas.

4.1. Case 1: TeamLab Borderless

Through its collection The TeamLab Borderless defines the process of combining technological and natural encounters using immersive artistic displays. The Tokyo-based interactive museum functions as an interstitial space which generates dynamic merged environments by using VR alongside AR to create interactive art and nature experiences. The exhibition features natural elements such as forests and water features which visitors can directly change real-time digital environments. The machine-controlled digital interactive interface enables users to strengthen their relationship with nature and build their creativity skills. TeamLab Borderless implements educational programming to foster apprentice participation which generates both environmental insight and interactive learning opportunities. Therapeutic landscapes research support metrics showing that mental recovery occurs when people engage with natural surroundings. Arcade City's experiences prove VR platforms possess potential to develop urban spaces that balance cognitive mental and emotional social benefits along with environmental interaction.

The virtual reality technology at TeamLab Borderless provides visitors with distinct emotional connections to nature. The analysis of adaptive environments teaches practitioners how to develop therapeutic urban spaces by translating the localization capabilities of VR into usable spatial designs.

4.2. Case 2: The Eden Project

The Eden project in Cornwall, UK, creates a unique eco-park by skillfully combining new technologies with natural elements. The project incorporates multiple biomes, showcasing a range of different ecosystems from tropical rainforests to Mediterranean gardens. Through interactive displays, the Eden Project engages visitors to learn about natural processes and works to develop educational community programs focused on environmental conservation.

The project cleverly combines contemporary sensor technology with data visualization methods to enable visitors to more intuitively understand the relationship between biodiversity and ecological dynamics. The educational program serves as a foundation for the creation of environmentally conscious communities and lays a solid foundation for successful urban planning. By integrating educational activities with urban development, the Eden Project demonstrates how land transformation can be guided by sustainable outcomes that lead to effective environmental education and the development of eco-citizens.

These educational and ecological projects not only focus on enhancing the public's mental health and sense of environmental responsibility, but also promote the realization of the public good while fostering the development of urban habitat.

4.3. Miraikan (The National Museum of Emerging Science and Innovation)

In this museum, virtual reality technology demonstrates its unique ability to help the public understand scientific natural phenomena.Miraikan visitors can explore different nature exhibits through interactive displays that present much challenging scientific information in a way that is easy to understand for the layperson.Miraikan focuses on ecosystems and climate change to educate the public on important environmental topics.

In addition, the museum allows visitors to learn how to address environmental challenges while gaining relevant knowledge through workshops integrated with educational programs.Miraikan demonstrates its

philosophy of healing by helping visitors gain a deeper understanding of nature and encouraging them to consciously observe the ecosystems around them. Through this design, Miraikan showed how to support urban development and, in turn, improve mental health by teaching city dwellers about important environmental knowledge.

4.4. Gardens by the Bay

Singapore's urban planning authority has created an architectural marvel that seamlessly blends technology with natural elements to drive urban planning and development. Community members experience these sustainable park initiatives first-hand by admiring the stunning Supertrees and carefully regulated indoor horticultural environments. This interactive display skillfully combines technology with botanical displays to not only innovate the tour path, but also teach visitors a wealth of botanical knowledge.

4.5. Case Summary

Different strategies for uniting therapeutic landscape concepts with urban technology emerge from the presented four cases. The key characteristics of these cases are presented via a comparative table in Table 1.

The implementation of VR therapeutic landscape integration in urban development achieves transformational outcomes according to studied case examples. Health-promoting urban initiatives show residents how to maintain resilient environments through their combination of outreach strategies and learning programs. Architects must prioritize mental health when designing urban environments, as researchers have provided strong empirical data to support the use of interactive urban technologies.

Table 1. Summary of Case Studies in VR Therapeutic Landscapes

Case Study	Location	Type	Key Features	Outcomes	Source
TeamLab Borderless (2024)	Tokyo, Japan	Digital Art Museum	-Interactive digital installations -Real time responsive environments -Nature-inspired digital art	-Enhanced visitor engagement -Improved mood states -Interactive learning experience	https://www.teamlab.art/e/tokyo/
Eden Project (2022)	Cornwall, UK	Environmental Education Center	-Indoor rainforest biomes -Educational exhibits -Sustainable design	-Environmental awareness -Nature connection -Community engagement	https://www.edenproject.com/
Miraikan (2024)	Tokyo, Japan	Science Museum	-Interactive science exhibits -Future technology showcase -Environmental education	-Scientific underdtanding -Technology awareness -Environmental learning	https://www.miraikan.jst.go.jp/en/
Garden by the Bay (2024)	Singapore	New Digital Art Experience	-Immersive digital ecosystem experience -Interactive plant exploration	-Highlighting biodiversity interdependence -Discover plant-animal relationships	https://www.gardensbythebay.com.sg/en/things-to-do/attractions/cloud-forest.html

5. Discussion and Future Directions

5.1. Discussion of Research Outcomes

While the potential to address mental health issues affecting the health status of urban communities in virtual reality therapeutic environments remains vast, public facilities such as TeamLab Borderless and the Eden Project have shown that interactive outdoor discovery can foster deep emotional connections with natural spaces, thereby improving the mental health of citizens. The findings point to a critical need for communities to integrate more natural elements into their landscapes as urbanization accelerates in areas that lack long-term sustainable green spaces. These studies also suggest that virtual reality tools have great potential to increase public environmental awareness through ecosystem education.

Miraikan engages users by providing an interactive educational experience that translates standardized techniques in urban areas into meaningful environmental action. By incorporating virtual reality therapeutic landscapes into their work, urban planners have activated a shift towards improved quality of life for residents. The research also suggests that urban planning methods urgently need to be adapted to integrate sustainable environmental regulations with mental health priorities. Planners who apply virtual reality strategies to their design work are able to create environments that meet the needs of diverse neighborhoods, thereby building strong urban systems. Integrating therapeutic land design into urban planning through virtual reality not only contributes to public policy, but also improves individual health. Government officials should utilize virtual reality to come up with affordable and scalable solutions that put mental health equity at the forefront of high-density urban areas. Future research will require the development of automated virtual characters integrated with artificial intelligence in virtual reality therapy to automatically adjust to an individual's mental health needs and maximize treatment outcomes. This workflow emphasizes the importance of interdisciplinary teamwork and reveals the great potential for the development of city-based mental health care services.

5.2. Plans for Future Investigations

Future research could evaluate the impact of virtual reality treatment environments on long-term mental health to understand their lasting effects. To determine the success of implementation in different urban cultures, researchers could explore the scalability of the intervention in a variety of settings. Additionally, the impact of virtual reality on urban health outcomes will be better understood when mental health professionals work closely with community-engaged urban planners.

6. References

Aletta, F. and Astolfi, A. (2018) 'Soundscapes of buildings and built environments', *Building Acoustics*, 25(3), pp. 195–197. Available at: https://doi.org/10.1177/1351010X18793279.

van den Berg, M. *et al.* (2015) 'Health benefits of green spaces in the living environment: A systematic review of epidemiological studies', *Urban Forestry & Urban Greening*, 14(4), pp. 806–816. Available at: https://doi.org/10.1016/j.ufug.2015.07.008.

Bowler, D.E. *et al.* (2010) 'A systematic review of evidence for the added benefits to health of exposure to natural environments', *BMC Public Health*, 10(1), p. 456. Available at: https://doi.org/10.1186/1471-2458-10-456.

Cattell, V. *et al.* (2008) 'Mingling, observing, and lingering: Everyday public spaces and their implications for well-being and social relations', *Health & Place*, 14(3), pp. 544–561. Available at: https://doi.org/10.1016/j.healthplace.2007.10.007.

Etchemendy, E., Baños, R.M. and Botella, C. (2015) 'Virtual and augmented reality as useful and efficacious tools for the psychological treatment of emotional disorders', in *Virtual reality: Technologies, medical applications and challenges*. Hauppauge, NY, US: Nova Science Publishers (Psychology research progress), pp. 31–54.

Galea, S., Freudenberg, N. and Vlahov, D. (2005) 'Cities and population health', *Social Science & Medicine*, 60(5), pp. 1017–1033. Available at: https://doi.org/10.1016/j.socscimed.2004.06.036.

Gesler, W.M. (1992) 'Therapeutic landscapes: medical issues in light of the new cultural geography', *Social Science & Medicine (1982)*, 34(7), pp. 735–746. Available at: https://doi.org/10.1016/0277-9536(92)90360-3.

Kadir, B.N. *et al.* (2023) 'Effectiveness of Virtual Reality (VR) in Improving Social Skills in Autism Spectrum Disorder Cases: A Literature Review', in D.V. Ferezagia et al. (eds) *Proceedings of the International Conference on Vocational Education Applied Science and Technology (ICVEAST 2023)*. Paris: Atlantis Press SARL (Advances in Social Science, Education and Humanities Research), pp. 45–71. Available at: https://doi.org/10.2991/978-2-38476-132-6_6.

Kaplan, R. and Kaplan, S. (1989) *The experience of nature: a psychological perspective*. Cambridge ; New York: Cambridge University Press.

Kondo, M.C. *et al.* (2018) 'Urban Green Space and Its Impact on Human Health', *International Journal of Environmental Research and Public Health*, 15(3), p. 445. Available at: https://doi.org/10.3390/ijerph15030445.

Maas, J. *et al.* (2006) 'Green space, urbanity, and health: how strong is the relation?', *Journal of Epidemiology & Community Health*, 60(7), pp. 587–592. Available at: https://doi.org/10.1136/jech.2005.043125.

Madary, M. and Metzinger, T.K. (2016) 'Real Virtuality: A Code of Ethical Conduct. Recommendations for Good Scientific Practice and the Consumers of VR-Technology', *Frontiers in Robotics and AI*, 3. Available at: https://doi.org/10.3389/frobt.2016.00003.

Powers, M.B. and Emmelkamp, P.M.G. (2008) 'Virtual reality exposure therapy for anxiety disorders: A meta-analysis', *Journal of Anxiety Disorders*, 22(3), pp. 561–569. Available at: https://doi.org/10.1016/j.janxdis.2007.04.006.

Ratcliffe, E. (2021) 'Sound and Soundscape in Restorative Natural Environments: A Narrative Literature Review', *Frontiers in Psychology*, 12. Available at: https://doi.org/10.3389/fpsyg.2021.570563.

Rebenitsch, L. and Owen, C. (2016) 'Review on cybersickness in applications and visual displays', *Virtual Reality*, 20(2), pp. 101–125. Available at: https://doi.org/10.1007/s10055-016-0285-9.

Ribeiro de Oliveira, T. *et al.* (2022) 'Systematic Review of Virtual Reality Solutions Employing Artificial Intelligence Methods', in *Proceedings of the 23rd Symposium on Virtual and Augmented Reality*. New York, NY, USA: Association for Computing Machinery (SVR '21), pp. 42–55. Available at: https://doi.org/10.1145/3488162.3488209.

Riva, G. *et al.* (2016) 'Transforming Experience: The Potential of Augmented Reality and Virtual Reality for Enhancing Personal and Clinical Change', *Frontiers in Psychiatry*, 7. Available at: https://doi.org/10.3389/fpsyt.2016.00164.

Riva, G., Wiederhold, B.K. and Mantovani, F. (2019) 'Neuroscience of Virtual Reality: From Virtual Exposure to Embodied Medicine', *Cyberpsychology, Behavior and Social Networking*, 22(1), pp. 82–96. Available at: https://doi.org/10.1089/cyber.2017.29099.gri.

Rockstroh, C., Blum, J. and Göritz, A.S. (2019) 'Virtual reality in the application of heart rate variability biofeedback', *International Journal of Human-Computer Studies*, 130, pp. 209–220. Available at: https://doi.org/10.1016/j.ijhcs.2019.06.011.

Serrano, B. *et al.* (2019) 'Virtual reality and anxiety disorders treatment: Evolution and future perspectives', in *Virtual reality for psychological and neurocognitive interventions*. Cham, Switzerland: Springer Nature Switzerland AG (Virtual reality technologies for health and clinical applications), pp. 47–84. Available at: https://doi.org/10.1007/978-1-4939-9482-3_3.

Slater, M. and Sanchez-Vives, M.V. (2016) 'Enhancing Our Lives with Immersive Virtual Reality', *Frontiers in Robotics and AI*, 3. Available at: https://doi.org/10.3389/frobt.2016.00074.

Slater, M. and Wilbur, S. (1997) 'A Framework for Immersive Virtual Environments (FIVE): Speculations on the Role of Presence in Virtual Environments', *Presence: Teleoperators and Virtual Environments*, 6(6), pp. 603–616. Available at: https://doi.org/10.1162/pres.1997.6.6.603.

Soliman, M.M. *et al.* (2024) 'Artificial intelligence powered Metaverse: analysis, challenges and future perspectives', *Artificial Intelligence Review*, 57(2), p. 36. Available at: https://doi.org/10.1007/s10462-023-10641-x.

Sveistrup, H. (2004) 'Motor rehabilitation using virtual reality', *Journal of NeuroEngineering and Rehabilitation*, 1(1), p. 10. Available at: https://doi.org/10.1186/1743-0003-1-10.

Ulrich, R.S. *et al.* (1991) 'Stress recovery during exposure to natural and urban environments', *Journal of Environmental Psychology*, 11(3), pp. 201–230. Available at: https://doi.org/10.1016/S0272-4944(05)80184-7.

United Nations, Department of Economic and Social Affairs, Population Division (2018) *World urbanization prospects: The 2018 revision*. Available at: https://population.un.org/wup/Publications/Files/WUP2018-KeyFacts.pdf.

Völker, S. and Kistemann, T. (2011) 'The impact of blue space on human health and well-being - Salutogenetic health effects of inland surface waters: a review', *International Journal of Hygiene and Environmental Health*, 214(6), pp. 449–460. Available at: https://doi.org/10.1016/j.ijheh.2011.05.001.

White, M.P. *et al.* (2013) 'Would you be happier living in a greener urban area? A fixed-effects analysis of panel data', *Psychological Science*, 24(6), pp. 920–928. Available at: https://doi.org/10.1177/0956797612464659.

White, M.P. *et al.* (2018) 'A prescription for "nature" – the potential of using virtual nature in therapeutics', *Neuropsychiatric Disease and Treatment*, 14, pp. 3001–3013. Available at: https://doi.org/10.2147/NDT.S179038.

Wilson, E.O. (1986) *Biophilia:* Cambridge, MA: Harvard University Press.

Wilson, M. (2002) 'Six views of embodied cognition', *Psychonomic Bulletin & Review*, 9(4), pp. 625–636. Available at: https://doi.org/10.3758/BF03196322.