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META-ANALYSIS ON THE BENEFITS OF LIGHT THERAPY AND INTEGRATED LIGHTING
SYSTEMS ON HUMAN HEALTH, WELL-BEING, AND PSYCHOLOGICAL PERFORMANCE IN
EXTREME ENVIRONMENT ARCHITECTURE

Abstract

This meta-analysis delves into the collective impact of light therapy and integrated lighting systems on human health, well-being, and psychological performance within the unique context of extreme environment architecture. Extreme environments, exemplified by conditions such as high altitudes, polar regions, and space habitats, present distinctive challenges to individuals' mental and physical health. This study explores the combined effects of targeted light therapy and innovative integrated lighting systems as potential interventions to ameliorate the adverse consequences of extreme environmental conditions on human physiology and psychology.

The analysis synthesizes data from a diverse array of research methodologies, including controlled experiments, observational trials, and longitudinal studies, to comprehensively assess the efficacy of light-based interventions in extreme environment architecture. Utilizing robust statistical techniques, the meta-analysis investigates key outcome measures such as circadian rhythm regulation, sleep quality, mood enhancement, cognitive performance, and overall psychological well-being.

Preliminary findings reveal a positive correlation between the integration of light therapy and advanced lighting systems and improvements in health and performance parameters within extreme environment architecture. The analysis also examines potential moderating factors, including the duration and intensity of light exposure, individual variations, and architectural design elements. The insights derived from this meta-analysis contribute to refining our understanding of the synergistic benefits of combining light therapy and integrated lighting systems in extreme environments.

In conclusion, this meta-analysis advances the knowledge base regarding the benefits of light therapy and integrated lighting systems within the specialized context of extreme environment architecture. The findings offer valuable insights for architects, designers, and health professionals aiming to optimize built environments in extreme conditions, fostering human resilience, alleviating environmental stressors, and promoting overall health and well-being. Future research directions and practical implications for the integration of light-based interventions in extreme environment architecture are also discussed.