PSYCHO-PHYSIOLOGICAL BENEFITS OF MOUNTAIN LANDSCAPE ENVIRONMENT AS STIMULUS FOR DIRECTED ATTENTION RESTORATION AND STRESS MITIGATION

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INTRODUCTION

- mental stress results from interactions between persons and their environment that are perceived as straining or exceeding their adaptive capacities and threatening their well being (Annerstedt et al. 2010).

- Healthcare management: cardiovascular diseases, anxiety disorders, obesity and depression (Lee and Oh, 2010; Probst, 2013)

- Directed attention phenomenon plays a major role in human capacity and its restoration is dependent upon the components of the environment. Kaplan (1995)

- landscape studies: urbanization, lifestyle changes, ameliorating potentials of nature related environments (Hartig et al., 2014)
Components of a restorative environment include:

- **Being away** - different from everyday environments
- **Extent** – Possess Enough scope and organization
- **Fascination** – Evokes effortless attention
- **Compatibility** - A purpose fit component

- **MODERN DAY** environments are only created to suite everyday living and working which offer less restorative health benefits (Thompson, 2010),

- **NATURE RELATED ENVIRONMENTS** like forests, wilderness and mountains are considered to possess significantly the possibility of enhancing restoration from stress through passive and active contact.

Kaplan, 1995
### WHY WE NEED THIS STUDY!

- **Quasi (confined or laboratory) environments:** participants viewing through a window or viewing nature scenes through video, picture slides and simulations.

<table>
<thead>
<tr>
<th><strong>QUASI/LABORATORY</strong></th>
<th><strong>REAL SITE</strong></th>
<th><strong>MIX MILIEU</strong></th>
</tr>
</thead>
</table>

- **Real-site nature related environments:** largely done in **forests** while **mountain environments** have merely been mentioned as part of **picture slides** or **video simulations**.

- **Psychometric self report measures:** to determine the magnitude of psychological human response to environmental stimuli. Very few combined both **psychological and physiological measures**.

- **Assessment of nature and human wellbeing relationships:** a **synergetic approach** of the mix of real site and psycho-physiological mode of measurement. No study was found on the restorative benefits of contact with mountain landscape environment.
AIM
To examine the mechanism and intricacies of the link between restorative environments, human response and wellbeing in a mountain landscape environment.

OBJECTIVE 1
To identify the feature(s) of the mountain landscape environment potentially influential to human perception and psychological response.

RQ1
What feature of the mountain environment yield higher restorative benefits in terms of psychological wellbeing?

OBJECTIVE 2
To investigate the magnitude to which mountain environments can stimulate human psychological and physiological well-being.

RQ2
What degree would the mountain landscape environment influence recovery from directed attention and stress?

OBJECTIVE 3
To determine the significance of the ambient mountain environment conditions on human physiological wellbeing.

RQ3
What aspects of the ambient mountain environment conditions combine to elicit human physiological wellbeing?
THEORETICAL FRAMEWORK

STRESS RECOVERY THEORY
SRT
An encounter with most unthreatening natural environment by stressed individuals would yield restorative benefits while many urban environment will mitigate recovery (Ulrich et al. 1991). Its focus is mainly on the psychological and physiological stress reduction benefits of contact with natural environments.

AESTHETIC-AFFECTIVE THEORY
AAT
Visual contact with most natural settings by a stressed individual is likely to foster positive feelings, hold interest and mitigate stressful thoughts resulting in recuperation. Related to visual perceptions of natural environments. Ulrich (1986)

ATTENTION RESTORATION THEORY
ART
Natural environments play an essential role in human functioning through the process of restorative experience (Kaplan, 1992). The theory focuses on:
• four conceptual components of a restorative environment and
• Environmental configurations that are likely to contribute to restorative experience
RESEARCH APPROACH AND PARADIGM

- A cause and effect strategy comparing contact with the urban environment and mountain landscape environment

**Psychophysical paradigm**
Focus on a people’s preference for specific landscape qualities mainly consisting of attributes in the landscape.

**Experiential paradigm**
Focus on human-environment interaction involving all the human sensory systems and perceived landscape value based on the real site experience.

**Post-Positivistic paradigm**
The development of numeric measures along the line of cause and effect, reduction of research to specific variables, hypothesis and questions, measurement and observation, and testing of theories.
WHERE?

Makurdi, Nigeria

Obudu, Nigeria

Hardscape

Population density

Heavy traffic

Commercial activities

Long vista

Waterfall

Undulating landscape

River

Forest reserve
## RESEARCH METHODOLOGY?

**STUDY DESIGN:** Quantitative (Survey + experimental)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>DESIGN</th>
<th>INSTRUMENTS</th>
<th>SAMPLE SIZE</th>
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</thead>
<tbody>
<tr>
<td><strong>PREFERENCE AND PERCEPTION</strong></td>
<td>Cross-sectional survey</td>
<td>Questionnaire</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>137 males, 63 females</td>
</tr>
<tr>
<td><strong>PSYCHOLOGICAL AND PHYSIOLOGICAL RESPONSES</strong></td>
<td>Cross-sectional survey + interrupted time-series within group experimental survey</td>
<td>Questionnaire + physical measurements of physiological indices</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16 males, 22 females</td>
</tr>
<tr>
<td><strong>AMBIENT ENVIRONMENT CONDITIONS</strong></td>
<td>Interrupted time-series experimental survey</td>
<td>Instrumented measures</td>
<td></td>
</tr>
</tbody>
</table>

### Variables

**RO1**

**PREFERENCE**
- River
- Forest
- Built
- Waterfall
- Mountain vantage point
- Artificial water park

**PERCEPTION**
- Calmness
- Stress relief
- Excitement
- Anxiousness

**RO2**

**PSYCHOLOGICAL**
- Perceived stress
- Perceived Restorativeness

**PHYSIOLOGICAL**
- Blood pressure
- Pulse Rate
- Respiratory Rate

**RO3**

**AMBIENT CONDITIONS**
- Temperature
- Humidity
PROCEDURE

PSYCHOLOGICAL MEASURES

PHYSIOLOGICAL MEASURES
Standard Mercury Sphygmomanometer, Clock

PREFERENCE AND PERCEPTION
Photo questionnaire

AMBIENT ENVIRONMENT CONDITIONS
Data Logger
- Cultural bias due to familiarity of the individuals with the structured features and not innate human characteristics is responsible for their preference.
- Perception of the restorative potential of the mountain landscape environment varies across age groups.
**FINDINGS cont’d**

- **Being away** and **compatibility** explains restorativeness and stress mitigation leading to wellbeing with regards to mountain landscape environments.
- feeling of **fascination** and **extents** in the mountain landscape environment does not indicate restoration from stress.
- **Interest, pleasantness** and **tranquillity** were found to be additional components of restorative environment.
- **Systolic blood pressure** increased while **diastolic blood pressure** and **pulse rate** decreased both in individuals and across age groups.
- respiratory rate did not indicate any tangible differences both in individuals and across the age groups.
- **female** respiratory rate increased at the mountain landscape environment slightly while male respiratory rate decreased.
- experiential contact with the mountain landscape environment influenced individual’s ability to attain a relaxed state through the reduction of their diastolic blood pressure and pulse rate.
• **Temperature** and **humidity** are aspects of the mountain landscape environment conditions that combine to influence human physiological wellbeing.

• This was found to have influenced the increase in systolic blood pressure but decrease in both diastolic blood pressure and pulse rate.

• **Being away** component of the mountain landscape environment includes a combined psychological and physiological feeling. **SEEN AND UNSEEN**

<table>
<thead>
<tr>
<th>Ambient condition</th>
<th>Environment</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t</th>
<th>Sig. (2-tailed)</th>
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</thead>
<tbody>
<tr>
<td>Temperature</td>
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<td>30.5536</td>
<td>4.22536</td>
<td>21.313</td>
<td>.000</td>
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<tr>
<td></td>
<td>Mountain</td>
<td>21.8662</td>
<td>2.26017</td>
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<td></td>
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<tr>
<td>Humidity</td>
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<td>20.10641</td>
<td>-11.815</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Mountain</td>
<td>75.0163</td>
<td>10.47910</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
study affirms the aspect of the **AAT** which asserts that visual contact with natural environments would enhance positive feelings, arouse interest and alleviate stress leading to restoration of wellbeing.

**ART** - The outcome of this study supports being away and compatibility phenomenon as components of a restorative mountain landscape environment but did not support fascination and extent.

This study supports the general aspect of **SRT** which advocates that contact with particular natural environments stimulates physiological makeup resulting in stress reduction. The second aspect linking stress recovery in natural landscape environments to human innate configuration found no support in this study.
CONCLUSION AND CONTRIBUTION

- Natural environments are typically distinct from the everyday urban environments in terms of health benefits.
- Contact with mountain landscape environments promotes recovery from stress and restoration of directed attention.

- The scope of environments: landscape types and restorative benefits.

- The link between nature experience and human wellbeing: samples from Nigeria in Africa region.

- Empirical evidence of the psycho-physiological benefits of mountain landscape environments.
LIMITATIONS AND RECOMMENDATIONS

- Monitoring the long term changes of physiological outcomes which will provide important data on the effect of contact with mountain landscape environment on chronic stress.

- **Patients** with historical stress challenges, the elderly and children.

- **Ambulatory measurements** of physiological indices: variations influenced by fluctuations in blood pressure and ambient environment conditions.

- **Recruiting females**: menstrual status should be included as a variable.
INDEXED JOURNALS


ARTICLES UNDER REVIEW

1. Physiological and psychological effects of mountain landscape environment on human wellbeing *(LANDSCAPE ONLINE JOURNAL)*
THANK YOU FOR YOUR TIME