Green Work Environments: Under What Level of Work Demands Will a Restorative Intervention Work?

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Introduction

Problem:

- In 2017, the United States Bureau of Labor Statistics found that Americans spend 54.5% of their weekday time working or performing other work-related activities (United States Bureau of Labor Statistics, 2017).
- Work is consistently rated as one of the top sources of stress among Americans (Kaplan, DeShon, & Tetrick, 2017).

Attention Restoration Theory (ART):

- This theory claims that exposing oneself to nature after attention depletion can restore mental energy. This involves reducing stress, elevating mood, and improving performance on attention-heavy tasks (Hartig, Evans, Jamner, Davis, & Garling, 2003; Kaplan, 1995; Ulrich et al., 1991).
- This restoration is called the 'Restorative Effect.'

This Study:

- In this study, we are interested in seeing how well this "Restorative Effect' can be applied to both a low-intensity and high-intensity workload, as well as how its effectiveness differs between the two conditions.
- Basically, we are trying to determine if exposing someone to nature works better when the person has just completed an extremely difficult task or when they have just completed a moderately difficult task.
- We hypothesize that the Restorative Effect will occur. Its effect on the extremely difficult task in comparison to the moderately difficult task is exploratory.

Experimental Design

Independent Variables:

1. Task Difficulty: To determine whether different workload levels have different effects on performance increase
   - 15 events per minute: Easier condition
   - 30 events per minute: Difficult condition
2. Break Condition: To determine whether nature has a different effect on performance increase from that of an urban environment
   - Nature images: Experimental condition
   - Urban images: Control condition

Dependent Variables:

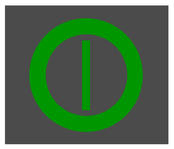
1. Task Performance Increase: How much their performance improves following the intervention
2. Heart Rate Variability: Used to measure stress and workload throughout the task from a physiological standpoint
3. Self-Report Surveys: Used to determine the stress and workload felt by participants from their point of view
   - Also used as a manipulation check to verify that the task was stressful in the eyes of the participants

Method

1. **Random Assignment:** First, participants will be randomly assigned to one of four experimental conditions:

15EPM Nature	• **Easier Task**: Target images flashing every 4 seconds for 40 minutes • **Restorative Intervention**: Looks at beautiful nature pictures for 5 minutes before continuing
15EPM Urban	• **Easier Task**: Target images flashing every 4 seconds for 40 minutes • **Control Intervention**: Looks at basic pictures of city buildings for 5 minutes before continuing
30EPM Nature	• **Difficult Task**: Target images flashing every 2 seconds for 40 minutes • **Restorative Intervention**: Looks at beautiful nature pictures for 5 minutes before continuing
30EPM Urban	• **Difficult Task**: Target images flashing every 2 seconds for 40 minutes • **Control Intervention**: Looks at basic pictures of city buildings for 5 minutes before continuing

2. **ECG Application:** Next, we will attach an ECG to the participant and acquire a baseline reading of their heart rate variability (HRV).
3. **Survey Administration:** The participant will fill out a self-report survey on how stressed and focused they feel (Likert scale).
4. **40-Minute Task:** A gauge image will be presented briefly on a screen. The participant must correctly respond when a target appears while ignoring the non-targets. For the next 40 minutes, this will occur either 15 or 30 times per minute, depending on the condition.



Non-Target

Target

5. **Intervention**: The participant will take a 5-minute break, during which they will view either nature or urban pictures, depending on the condition. Examples of each are shown below.

Nature

Urban

6. **Continuation**: Participant will perform task for 10 more minutes.
7. **Post-Survey**: Finally, the participant will fill out surveys indicating their stress and attention during the task. ECG will be removed.

Possible Outcomes & Implications

When comparing performances changes (Δ) from before the intervention to afterwards, the following 4 outcomes could occur:

1. **ΔNature > ΔUrban, Δ15EPM > Δ30EPM:** Nature groups have a significantly greater performance increase than urban groups do, with 15EPM groups having greater increases than 30EPM groups.
   - *This would support the existence of the restorative effect and imply that it has a greater effect when treating individuals experiencing lighter workloads.*
2. **ΔNature > ΔUrban, Δ30EPM > Δ15EPM:** Nature groups have a significantly greater performance increase than urban groups do, with 30EPM groups having greater increases than 15EPM groups.
   - *This would support the existence of the restorative effect and imply that it has a greater effect when treating individuals experiencing heavier workloads.*
3. **ΔNature > ΔUrban, Δ15EPM = Δ30EPM:** Nature groups have a significantly greater increase than urban groups, but no significant difference in increases between 15EPM & 30EPM groups is found.
   - *This would support the existence of the restorative effect but not that it has different effects on different workload levels.*
4. **ΔUrban ≥ ΔNature:** Nature and urban groups have similar performance increases, **OR** urban groups have a significantly greater increase than nature groups do.
   - *This would not support the existence of the restorative effect.*

Impact on Health & Well-Being

Turning Those Frowns Upside-Down!

- As mentioned before, work is very stressful to all kinds of people.
- If we can use nature to make the crushing burden of work just a little bit easier, we will unquestionably leave a positive impact.
- If we can successfully support the efficacy of the restorative effect, the scientific community will be able to make more compelling recommendations regarding workplace environments.

The Time is Now!

- COVID-19 has caused a dramatic re-evaluation of workplace conditions the world over. People are thinking about this right now!
- Significant results in this study would be perfectly timed to create a positive health impact in a world that so desperately needs it.

Acknowledgements

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Works Cited

Hartig, T., Evans, G.W., Jamner, L.D., Davis, D.S., & Garling,T. (2003). Tracking restoration in natural and urban field settings. Journal of Environmental Psychology, 23, 109-123.

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