THE MENTAL MUSINGS

The Psychological Research Newsletter

In anticipation of the move to ICA Services Centre Building (ISCB), and ongoing upgrading works, some work units would have the opportunity to design and update their workplaces. In this article, we will explore how the strategic use of colours and lighting can benefit us in our workspaces and travellers at our borders. We will also introduce designs that can benefit those with colour vision deficiencies, ensuring that everyone's needs are met.

Introduction to Colours & Lights

In the animated film Inside Out, colours symbolise emotions:

- Yellow for joy
- Green for disgust
- Blue for sadness
- Red for anger

These associations feel natural and highlight how colours carry meaning in our lives. This is an example of the many ways we connect colours with emotions and meaning. But how do we form these connections? We typically learn about the meanings of colours in 2 ways:

- **Cultural Influences**
  - Festival colours often carry traditional meanings:
    - Chinese New Year: Red = luck and prosperity
    - Valentine's Day: Pink = love and affection

- **Language Expressions**
  - Colour-based phrases convey emotions
    - "Seeing red" = anger
    - "Feeling blue" = sadness

These associations can explain why colours influence our emotions and physiology, such as heart rate. Generally, warm colours, like red and yellow, tend to stimulate and create feelings of arousal. Alternatively, cool colours, like blue and green, have a calming effect, helping us relax. By using the right colours, office spaces can boost job performance and support effective breaks.

Besides colours, lighting is also important in workplaces. White LED light comes in different "temperatures", releasing either a warm or cool hue. The appropriate lighting offers many benefits from visual comfort to concentration.

Together, colours and lighting can be used to design meaningful spaces.

<u>Some important concepts:</u>

Colours can be **warm** or **cool**. The colour wheel (shown below) separates the colours into the two categories.
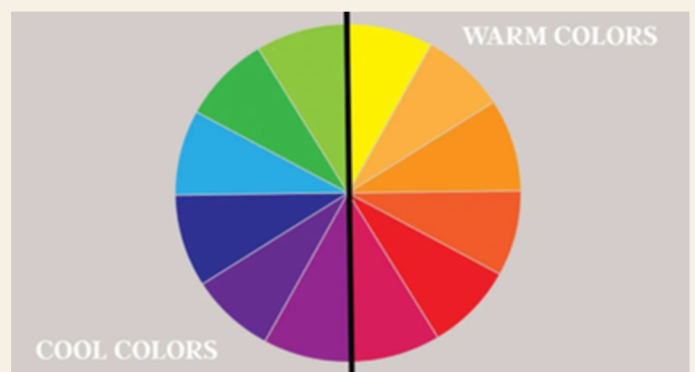
Similarly, light from white LED lamps can be warm or cool. The colour correlated temperature (CCT), measured in Kevin (K) describes the "temperature" of white LED light (refer to the picture on the right). Warmer lights range from 1000K-5000K while cooler lights range from 6000K-10,000K.

Warm   Cool
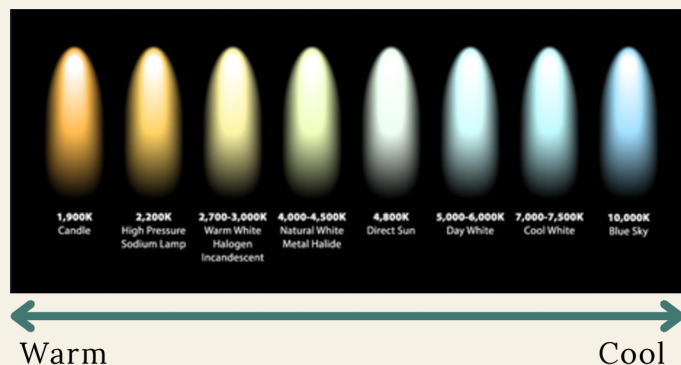
Fazilah and James are officers working at ICAB and Woodlands Checkpoint respectively. They will be sharing about their needs and some ideas to improve their workplace.

Staff Divisions Working in Offices

"I enjoy the office's air-conditioning as a break from Singapore's heat, but sitting at my desk for long periods make me feel sluggish. I also struggle to feel inspired when brainstorming ideas. However, a midday rest in the pantry always leaves me feeling refreshed."

Fazilah

Working long hours at their desks can lead to staff feeling bored and tired. How do we create an environment to increase **productivity**, **creativity** and **comfort**?

When designing spaces, it is essential to prioritise the specific aspect of job performance you want to enhance. For instance, collaborative and artistic spaces should foster creativity to encourage discussions and innovation. Meanwhile, workstations should emphasise productivity to support work engagement and efficiency.

Boosting Productivity	**Fostering Creativity**	**Promoting Relaxation**
Focus can be improved with: • **Cool white LED lights** at workstations • As completely red walls are impractical, consider using **red furniture or red patterns** on white walls	Similarly, creativity is essential in the workplace as it encourages innovation and productive discussions. We can achieve this by: • Installing **warm white LED lights** • Designing meeting rooms with **red furniture and red patterns** on walls	In contrast, employees also need areas to relax (break rooms and pantries). • Calming spaces can be created with **cool colours** (blue and green) • This is especially useful for easing anxiety before challenging tasks, like important presentations

Uniformed Officers and Travellers at our Borders:

> "Being vigilant is key to doing my job well. I must be ready to respond to threats that occur without warning. Additionally, I wonder how we can improve our borders to ensure a pleasant experience for foreigners coming to Singapore."

James

As one of Singapore's first lines of defence, our officers must act quickly during crises. At the same time, many travellers pass through our borders daily. With their differing needs, how can we ensure both are well-supported?

Officers: Enhancing Alertness

Officers are required to remain alert so they can respond quickly.

Red and yellow accents:
- Boost heart rate and arousal for faster reactions
- Install **red furniture** in officers' work areas (e.g., car booths at land checkpoints)

Cool white LED light:
- Improves focus
- Ensures visibility for inspections

However, prolonged focus can cause fatigue. Officers should take regular breaks to avoid overstimulation.

Officers: Conducting Successful Investigations

While most travellers are lawful, we must prepare for suspicious ones. Enhanced investigation rooms help officers gather more information.

Cool colours (blue, green):
- Comfortable environments encourage information sharing
- Ideal for first-time offenders
- Repeat offenders may be suspicious of welcoming rooms and will cooperate lesser

Minimise arousing colours (e.g., red):
- Reduce arousal and aggression in suspects

Travellers: Creating a Welcoming Environment

Tired, stressed travellers arrive at our borders after long journeys. A pleasant environment promotes positive interactions and reduces disorderly behaviours.

Cool colours (blue and green):
- Create a soothing environment to ease stress.
- Use in entrances and queuing areas to encourage positive interactions and reduce disorderly behaviour

Supporting People with Colour Vision Deficiencies

What are some ways we can support people with colour vision deficiencies to ensure their needs are met too? Other materials, like shape and texture, are good alternatives to colours when designing good workplaces.

Soft Edges vs Sharp Edges

We tend to prefer soft curves over straight lines and sharp shapes (e.g., rectangles and squares). How do these shapes affect us?

Rooms with sharp corners (e.g., rectangular windows):
- Associated with threats, increasing alertness
- Ideal for workspaces

Rooms with curves (e.g., rounded windows, arched roofs):
- Lower heart rates and promote comfort
- Ideal for relaxation spaces
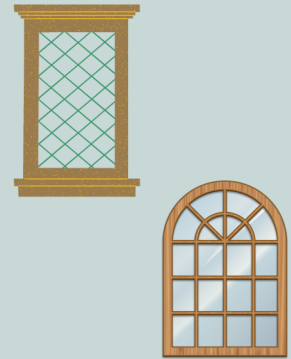
Importance of Windows

Windows providing **views of nature** are a great alternative to cool colours (blue and green). They offer multiple benefits:
- Calming scenery (e.g., trees and the sky)
- Relief from screens and harsh indoor lighting
- Improved eye comfort with natural daylight

Textures for Travellers

Our sense of touch can also offer us comfort. **Soft textures**, like carpets, provide relief to travellers by:
- Reducing distracting noise from luggage
- Soothing tired legs after long journeys

Final Thoughts

In conclusion, while psychological studies offer valuable insights, staff feedback is key for improving workspaces. This is especially important for uniformed officers' unique work environments. Additionally, understanding our staff's specific tasks (e.g., paper vs computer-based) helps guide decisions, such as lighting choices, ensuring comfort and efficiency.

Furthermore, studies often focus on a limited range of colours and lightings. Exploring the effects of other colours (e.g., purple, orange) on performance could offer further findings.

Lastly, the benefits of using the right colours and lighting go beyond workspace design. For instance, they can enhance communication in emails and public signs. While not covered in this newsletter, we encourage you to explore how these elements further improve our work.

References

AL-Ayash, A., Kane, R. T., Smith, D., & Green-Armytage, P. (2015). The influence of color on student emotion, heart rate, and performance in learning environments. Color Research & Application, 41(2), 196–205. https://doi.org/10.1002/col.21949

Bertamini, M., Palumbo, L., Gheorghes, T. N., & Galatsidas, M. (2015). Do observers like curvature or do they dislike angularity? British Journal of Psychology, 107(1), 154–178. https://doi.org/10.1111/bjop.12132

Gómez-Puerto, G., Munar, E., & Nadal, M. (2016). Preference for curvature: a historical and conceptual framework. Frontiers in Human Neuroscience, 9. https://doi.org/10.3389/fnhum.2015.00712

Hoogesteyn, K., Meijer, E. H., & Vrij, A. (2020). Detainee and layperson's expectations and preferences regarding police interview rooms. PLoS ONE, 15(11), e0241683. https://doi.org/10.1371/journal.pone.0241683

Jonauskaite, D., Epicoco, D., Al-rasheed, A. S., Aruta, J. J. B. R., Bogushevskaya, V., Brederoo, S. G., Corona, V., Fomins, S., Gizdic, A., Griber, Y. A., Havelka, J., Hirnstein, M., John, G., Jopp, D. S., Karlsson, B., Konstantinou, N., Laurent, É., Marquardt, L., Mefoh, P. C., . . . Mohr, C. (2023). A comparative analysis of colour–emotion associations in 16–88-year-old adults from 31 countries. British Journal of Psychology, 115(2), 275–305. https://doi.org/10.1111/bjop.12687

Ross, M. J., Guthrie, P., & Dumont, J. (2013). The impact of modulated, colored light on the autonomic nervous system. PubMed, 27(4), 7–16. https://pubmed.ncbi.nlm.nih.gov/24067320

Jonauskaite, D., Abu-Akel, A., Dael, N., Oberfeld, D., Abdel-Khalek, A. M., Al-Rasheed, A. S., Antonietti, J., Bogushevskaya, V., Chamseddine, A., Chkonia, E., Corona, V., Fonseca-Pedrero, E., Griber, Y. A., Grimshaw, G., Hasan, A. A., Havelka, J., Hirnstein, M., Karlsson, B. S. A., Laurent, E., . . . Mohr, C. (2020). Universal patterns in Color-Emotion associations are further shaped by linguistic and geographic proximity. Psychological Science, 31(10), 1245–1260. https://doi.org/10.1177/0956797620948810

Strachan-Regan, K., & Baumann, O. (2024). The impact of room shape on affective states, heartrate, and creative output. Heliyon, 10(6), e28340. https://doi.org/10.1016/j.heliyon.2024.e28340

Ye, M., Zheng, S., Wang, M., & Luo, M. R. (2018). The effect of dynamic correlated colour temperature changes on alertness and performance. Lighting Research & Technology, 50(7), 1070–1081. https://doi.org/10.1177/1477153518755617

Yildirim, K., Hidayetoglu, M. L., & Capanoglu, A. (2011). Effects of interior colors on mood and preference: Comparisons of two living rooms. Perceptual and Motor Skills, 112(2), 509–524. https://doi.org/10.2466/24.27.pms.112.2.509-524

Zeng, Y., Sun, H., Yu, J., & Lin, B. (2022). Effects of correlated color temperature of office light on subjective perception, mood and task performance. Building and Environment, 224, 109508. https://doi.org/10.1016/j.buildenv.2022.109508