

BAB V

KESIMPULAN DAN SARAN PENELITIAN

5.1. Kesimpulan

Dalam memahami mengenai kualitas pemulihan sebuah lingkungan, perlu diketahui faktor apa saja, mengapa, dan bagaimana sebuah lingkungan dapat mempengaruhi tingkat pemulihan seseorang. Dalam hal ini, telah banyak teori-teori dan pendapat yang telah dikemukakan mengenai faktor lingkungan apa saja yang dapat memberikan efek restorasi bagi seseorang. Selain faktor lingkungan, terdapat juga faktor persepsi kita terhadap lingkungan yang juga turut mempengaruhi efek pemulihan lingkungan.

5.1.1. Teori Restoratif

Dari semua teori yang telah dikemukakan, ada beberapa pendekatan yang berbeda-beda mengenai nilai restorasi lingkungan terhadap manusia, namun semuanya saling berkaitan dan mendukung satu sama lain dalam mengemukakan bahwa kontak dengan alam memberi efek restorasi bagi fisik dan mental seseorang. Secara ringkas, berdasarkan teori-teori yang telah di kemukakan, beberapa persyaratan lingkungan yang memberi efek restorasi bagi seseorang antara lain :

- Lingkungan fisik yang natural
- Lingkungan tidak memiliki elemen yang mengganggu perhatian (*distraction*)

- Lingkungan fisik yang dapat mempengaruhi dan membawa seseorang untuk hanyut dan terbawa oleh suasana yang dibentuk (*extend*).
- Lingkungan harus informatif
- Lingkungan tidak boleh memberi kesan berbahaya
- Lingkungan tidak boleh memiliki unsur yang memberi kesan atau mengingatkan seseorang mengenai pekerjaan atau tugas sehari-hari.
- Lingkungan harus sesuai antara kesan yang diberikan terhadap apa yang dirasakan orang tersebut.
- Lingkungan bukan merupakan tempat yang dalam mengeksplorasi membutuhkan persiapan atau antisipasi situasi yang sulit.

5.1.2. Persepsi

Kualitas pemulihan sebuah lingkungan juga di pengaruhi oleh bagaimana seseorang memersepsi lingkungan tersebut. Manusia dapat memersepsi lingkungan dengan kelima inderanya, yaitu indera penglihatan, pendengaran, penciuman, perasa, dan pengecap. Kelima indera tersebut memiliki fungsi-fungsi penting yang independen, namun saling berpengaruh dalam membentuk persepsi secara keseluruhan. Namun dari kelima indera tersebut, dalam memersepsi lingkungan, penglihatan dan pendengaran memiliki peranan yang paling tinggi.

5.1.3. Pengujian HR-HRV

Penurunan kecepatan detak jantung (*heart rate*), diikuti dengan peningkatan variabilitas denyut jantung (*Heart Rate Variability*) merupakan

ciri dari terjadinya restorasi. Secara umum, setiap orang dapat mengalami restorasi terhadap stress secara alami, namun lingkungan dapat mempengaruhi kecepatan dan efektivitas restorasi tersebut.

Hasil analisa dari pengujian terhadap 3 sampel responden menunjukkan adanya penurunan kecepatan detak jantung rata-rata sebesar 11% (dari angka rata-rata 82 bpm ke 73 bpm), diikuti dengan peningkatan tingkat variabilitas denyut jantung rata-rata sebesar 8% (dari 50 ke 58%), yang menunjukkan adanya pemulihan tingkat stress yang terjadi sebesar 8%. Hasil tersebut menunjukkan efektivitas pemulihan lingkungan tersebut terhadap penurunan stres seseorang sebesar 8%.

Dari hasil analisis yang menunjukkan adanya penurunan stress seseorang ketika berada di Kawasan Urban Oasis di bandingkan dengan Kawasan perkotaan melalui pembacaan HR dan HRV, berdasarkan hasil analisis tersebut dapat ditegaskan beberapa hal antara lain :

- Pengukuran melalui HR dan HRV dapat digunakan sebagai media pengukuran tingkat stress seseorang
- *Virtual Reality* dapat digunakan sebagai alat dan media dalam pengujian tingkat pemulihan sebuah lingkungan (*restorative environment*)
- Kawasan Urban Oasis dapat menurunkan tingkat stress seseorang sehingga dapat tepat dan cocok untuk diterapkan sebagai *restorative environment*.

5.2. Saran

Penelitian ini masih merupakan langkah awal dalam pencarian rancangan Urban Oasis yang tepat bagi Kawasan Perkotaan beriklim tropis lembab dalam rangka penurunan tingkat stress. Penelitian ini hanya merumuskan bagaimana persyaratan rancangan Urban Oasis secara umum dengan jumlah responden yang sangat terbatas, sehingga masih diperlukan adanya penelitian secara mendetail dan mendalam terhadap masing-masing elemen pada Urban Oasis agar dapat diketahui efek, dampak, dan tingkat pemulihan yang terjadi pada masing-masing elemen terhadap mental dan psikologis seseorang; dan juga penelitian terhadap interpretasi elemen-elemen tersebut dalam rancangan sehingga dapat dirumuskan rancangan yang tepat dalam mewujudkan rancangan Urban Oasis pada perkotaan beriklim tropis lembab yang tepat.

DAFTAR PUSTAKA

- Grinde, B., & Patil, G. G. (2009). Biophilia: Does Visual Contact with Nature Impact on Health and Well-Being? *International Journal of Environmental Health and Well-Being*, 2232-2343.
- MacMillan , A. (2017). *Why Nature Sounds Help You Relax, According to Science*. Retrieved from Health.com: <https://www.health.com/stress/why-nature-sounds-are-relaxing>
- Ackerman, C. (2018). *What is Kaplan's Attention Restoration Theory (ART)? Benefits + Criticisms*. Retrieved from [positivepsychologyprogram.com: https://positivepsychologyprogram.com/attention-restoration-theory/](https://positivepsychologyprogram.com/attention-restoration-theory/)
- Anter, K. F. (2013). *Daylight : Visual Comfort and Quality of Lightning*. Stockholm: University Collage of Art, Craft, and Design.
- Berto, R. (2014). The Role of Nature in Coping with Psycho-Physiological Stress: A Literature Review on Restorativeness. *Behavioral Sciences*, 394-409.
- Beukeboom, C. J., Langeveld, D., & Dijkstra, K. T. (2012). Stress-Reducing Effects of Real and Artificial Nature in a Hospital Waiting Room . *THE JOURNAL OF ALTERNATIVE AND COMPLEMENTARY MEDICINE*, 18(4), 329-333.
- Bjork, J., Albin, M., Grahn, P., Jacobsson, H., Wadbro, J., Ostregren, P. O., & Skarback, E. (2008). Recreational values of the natural environment in relation to neighbourhood satisfaction, physical activity, obesity and wellbeing.
- Boduch, M., & Fincher, W. (2009). Standards of Human Comfort : Relative and Absolute. *UTSoA - Meadows Seminar Fall 2009*. Texas: Center for Sustainable Development.

- Bratman, G. N., Hamilton, J. P., & Daily, G. C. (2012). The impacts of nature experience on human cognitive. *ANNALS OF THE NEW YORK ACADEMY OF SCIENCES*, 118-136.
- Burton, I. (1990). Factors in Urban Stress. *The Journal of Sociology & Social Welfare*, 17(1), 79-92.
- California Air Resources Board. (n.d.). *National Ambient Air Quality Standards*. Retrieved 07 28, 2018, from ca.gov: <https://ww2.arb.ca.gov/resources/national-ambient-air-quality-standards>
- Candas, V., & Dufour, A. (2005). Thermal Comfort: Multisensory interactions. *Journal of Physiological Anthropology and Applied Human Science*, 33-36.
- City of Gold Coast. (2016, january). Park Design Guidelines. *Safe, responsive and sustainable parks for our city*, 1.
- Civil Service Employee Assistance Service (CSEAS). (2015). *Understanding Stress*. Ireland: Civil Service Employee Assistance Service.
- Daniel, R. M. (2014). *The effects of the natural environment on attention restoration*. Appalachian State University, Boone, NC.
- Davenport, M. A. (2019). *How We Perceive the World*. Retrieved from Pennstate: <http://sites.psu.edu/psych256fa1602/2016/09/10/how-we-perceive-the-world/>
- Direktorat Jenderal Penataan Ruang Departemen Pekerjaan Umum. (2008). *PEDOMAN PENYEDIAAN DAN PEMANFAATAN RUANG TERBUKA HIJAU DI KAWASAN PERKOTAAN*. Indonesia: Republik Indonesia.
- Elite HRV. (2019). *Normative Elite HRV Scores by Age and Gender*. Retrieved from Elitehrv: <https://elitehrv.com/normal-heart-rate-variability-age-gender>

- Europe in figures - Eurostat Yearbook 2011. (2011). Europe in figures - Eurostat yearbook 2011. *Living conditions and social protection*. Retrieved from ec.europa.eu: <http://ec.europa.eu/eurostat/web/products-statistical-books/-/KS-CD-11-001>
- Fragrancex library. (2019). *How Your 5 Senses Are All Connected*. Retrieved from Fragrancex library: <https://www.fragrancex.com/fragrance-information/how-your-5-senses-are-all-connected>.
- Frick, H. (2006). *Arsitektur Ekologis - Konsep arsitektur ekologis di iklim tropis, penghijauan kota, dan kota ekologis, serta energi terbarukan* (Vol. 3). Yogyakarta, Yogyakarta, Indonesia: Kanisius.
- G Lu, F Yang, J A Taylor, & J F Stein. (2009). A comparison of photoplethysmography and ECG recording to analyse heart rate variability in healthy subjects. *Journal of Medical Engineering & Technology*, 634-641.
- Gagge, P. A. (1969). *MAN, HIS ENVIRONMENT, HIS COMFORT, Heating, Piping and Air Cond.*
- Gibson, J. J. (1966). *The Ecological Approach to Visual Perception* (Vol. 1). N/A: Taylor & Francis.
- Gregory, B. N., Gretchen, D. C., Benjamin, L. J., & James, J. G. (2015). The benefits of nature experience: Improved affect and cognition. *Landscape and Urban Planning*, 138, 41-50.
- Grinde, B., & Patil, G. G. (2009). Biophilia: Does Visual Contact with Nature Impact on Health and Well-Being? *Int J Environ Res Public Health*, 6(9).

- Hartmann, P., & Ibáñez, V. A. (2010). Beyond savanna: An evolutionary and environmental psychology approach to behavioral effects of nature scenery in green advertising. *Journal of Environmental Psychology*, 30(1), 119-128.
- Hedblom, M., I, K., Sang, A. O., & Gunnarsson, B. (2017). Evaluation of natural sounds in urban greenery: potential impact for urban nature preservation. *Royal Society Open Science*.
- Herrington, L. P., & Vittum, J. S. (n.d.). Human Thermal Comfort. 130-138.
- Huss Studio. (2016). *Measuring human experiences of public spaces: A methodology in the making* (Vol. 1). (I. Palti, Ed.) Melbourne, Australia: Conscious Cities Journal.
- Itten, J. (1970). *The Elements of Color*. New York: Van Nostrand Reinhold Company.
- James Evans, P. J. (2011). The walking interview: Methodology, mobility and place. *Applied Geography*, 31, 849-858.
- Jeanne Segal, P. M. (2018). *Stress Symptoms, Signs, and Causes*. Retrieved from [www.helpguide.org: https://www.helpguide.org/articles/stress/stress-symptoms-signs-and-causes.htm?pdf=true](https://www.helpguide.org/articles/stress/stress-symptoms-signs-and-causes.htm?pdf=true)
- Kim, H. G., Cheon, E. J., Bai, D. S., Hwan Lee, Y., & Koo, B. H. (2018). Stress and Heart Rate Variability: A Meta-Analysis and Review of the Literature. *Psychiatry investigation*.
- Konijnendijk, C. C., Annerstedt, M., Nielsen, A. B., & Maruthaveeran, S. (2013). Benefits of Urban Parks : A systematic review.
- Li, C.-T., Cao, J., & Li, T. M. (2016). Eustress or Distress: An Empirical Study of Perceived Stress in Everyday College Life. *UbiComp* 16, 1209-1217.

- Michaelis, J. (2013). *The Restorative Effects Of Color And Environment Type On Cognitive Functioning*. Florida: University of Central Florida.
- Moses Okechukwu Onyesolu, F. U. (2011). *Understanding Virtual Reality Technology: Advances and Applications*. Rijeka, Croatia: InTech.
- Nasir, R. A., Ahmad, S. S., & Ahmed, A. Z. (2013, September 6-8). Physical Activity and Human Comfort Correlation in an. *Asia Pacific International Conference on Environment - Behaviour Studies*, 598-609.
- National Recreation and Park Association. (2018). *Creating Mini-Parks for Increased Physical Activity*. Retrieved from National Recreation and Park Association: <https://www.nrpa.org/contentassets/f768428a39aa4035ae55b2aaff372617/pocket-parks.pdf>
- Nazir, M. (1988). *Metode Penelitian*. Jakarta, Indonesia: Ghalia Indonesia.
- Nilsson, K., Sangster, M., & Konijnendijk, C. C. (2011). Forests, Trees and Human Health and Well-being: Introduction. *Forests, Trees and Human Health*, 1-19.
- Oke, T. (1987). *Boundary Layer Climates, 2nd edition*. Methuen: New York; 435. New York: Methuen.
- Onyesolu, M. O., & Felista, U. E. (2011). Understanding Virtual Reality Technology: Advances and Applications. *Advances in Computer Science and Engineering*.
- Oxford. (2018). *Oxford Living Dictionary*. (Oxford University Press) Retrieved from xforddictionaries: <https://en.oxforddictionaries.com/definition/oasis>

- Porchter, O., Cohen, P., & Bitan, A. (2006). Climatic Behaviour of Various Urban Parks During Hot and Humid Summer in the Mediterranean City of Tel Aviv, Israel. *International Journal of Climatology*, 26, 1695-1711.
- Pradhan, P. (2012). *THE ROLE OF WATER AS A RESTORATIVE COMPONENT IN SMALL URBAN SPACES*. Alnarp: Swedish University of Agricultural Sciences .
- Ratcliffe, E., Gatersleben, B., & Sowden, P. (2018). Predicting the Perceived Restorative Potential of Bird Sounds Through Acoustics and Aesthetics. *Environment and Behavior*.
- Republik Indonesia. (2007). *UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 26 TAHUN 2007*. Jakarta: Republik Indonesia.
- Scientific American. (2002). *Do scents affect people's moods or work performance?* (a. d. Scientific American, Producer, & Scientific American) Retrieved April 24, 2018, from Scientific American: <https://www.scientificamerican.com/article/do-scents-affect-peoples/>
- Selye, H. (1956). *The Stress of Life*. New York: McGraw-Hill Book Company.
- Shafer, C. S., & Jacob, J. S. (2006). Urban Parks: The Value of Small Urban Parks, Plazas and Other Outdoor Spaces.
- Sharma , N., & Gedeon, T. (2012). Objective measures, sensors and computational techniques for stress recognition and classification: A survey. *Computer Methods and Programs in Biomedicine*. *Computer methods and programs in biomedicine*, 1287-1301.

- Spronken-Smith, R. A., Oke, T., & Lowry, W. P. (2000). Advection and the surface energy balance across an irrigated urban park. *International Journal of Climatology*, 20, 1033-1047.
- Sugiyono. (2014). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung, Jawa Barat: Alfabeta.
- Sunlight inside. (2018). *Natural light is fundamentally different than artificial light*. Retrieved from Sunlight Inside: <https://www.sunlightinside.com/light-and-health/natural-light-is-fundamentally-different-than-artificial-light/>
- Taylor, A. F., Kuo, F. E., & Sullivan, W. C. (2002). VIEWS OF NATURE AND SELF-DISCIPLINE: EVIDENCE FROM INNER CITY CHILDREN. *Journal of Environmental Psychology*, 22(1-2), 49-63.
- Tsunetsugu, Y., Lee, J., Park, B. J., Tyrväinen, L., Kagawa, T., & Miyazaki, Y. (2013). Physiological and psychological effects of viewing urban forest landscapes assessed by multiple measurements. *Landscape and Urban Planning*, 113, 90-93.
- Tyrväinen, L., Pauleit, S., Seeland, K., & Sjerp, V. d. (2005). *Benefits and Uses of Urban Forests and Trees*.
- Ulrich, R. S. (1981). *Natural Versus Urban Scenes Some Psychophysiological Effects*.
- Ulrich, R. S., & Parsons, R. (1990). influences of passive experiences with plants on individual well-being and health. *National Symposium on the Role of Horticulture in Human Well-Being and Social Development*.
- United Nation. (2014). *World's population increasingly urban with more than half living in urban areas*. Retrieved 05 20, 2018, from un:

<http://www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html>

Valtchanov, D., Barton, K. R., & Ellard, C. (2010). Restorative effects of virtual nature setting. *Cyberpsychology, behaviour, and social networking*, 503-512.

Ward, M. O., Grinstein, G., & Keim, D. (2015). *Interactive Data Visualization*. New York: A K Peters/CRC Press.

welltory. (2018). *Science-backed Data-driven wellnes*. Retrieved from Welltory: <https://welltory.com/science/>

wikiversityorg. (2018). *Psychology of natural scenes*. Retrieved from wikiversity.org: https://en.wikiversity.org/wiki/Psychology_of_natural_scenes

Wilson, J. D., McGinnis, N., Latkova, P., Tierney, P., & Yoshino, A. (2016, Fall). Urban Park Soundscapes: Association of Noise and Danger With Perceived Restoration. *Journal of Park and Recreation Administration*, 34(3), 26.

world bank group. (2016). *The World Bank*. Retrieved 05 20, 2018, from data.worldbank.org: <https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS>

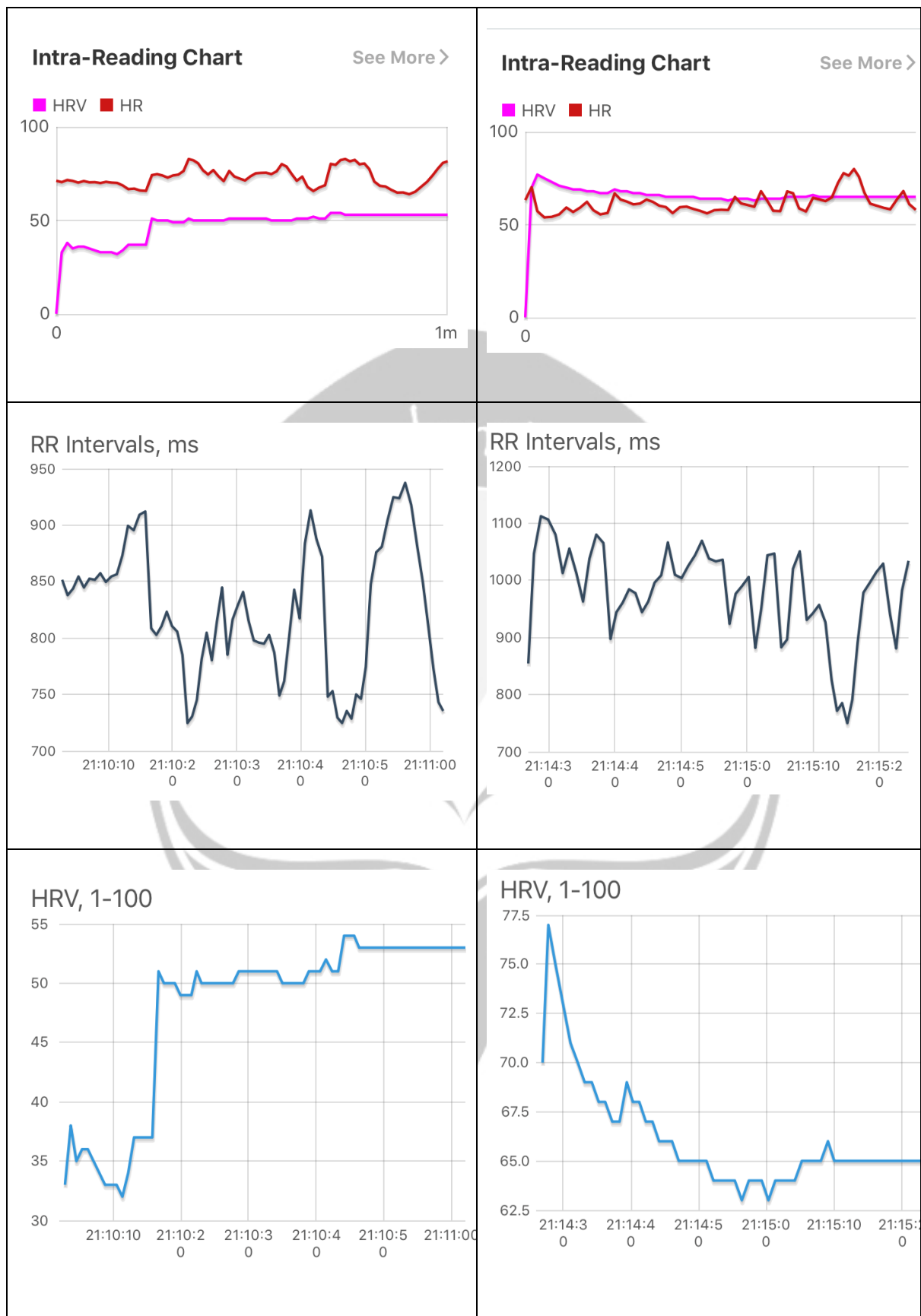
Yumi Saito, H. T. (2007). Effects of color images on stress reduction: Using images as mood stimulants. *Japan Journal of Nursing Science*, 4, 13-14.

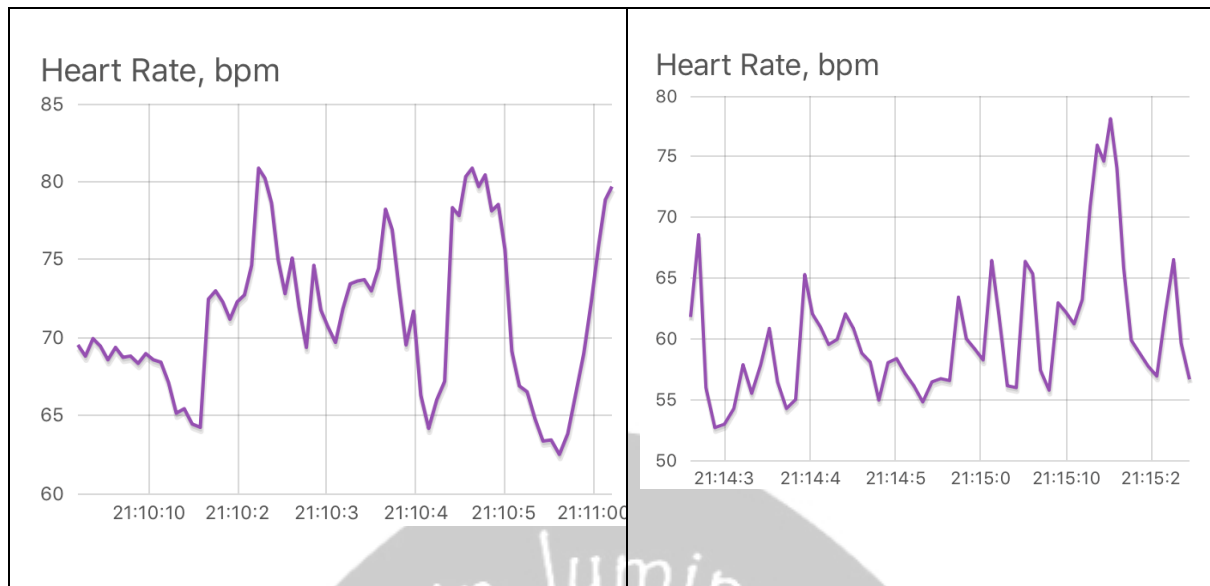


LAMPIRAN

Lampiran 1 Data hasil pengukuran responden 1

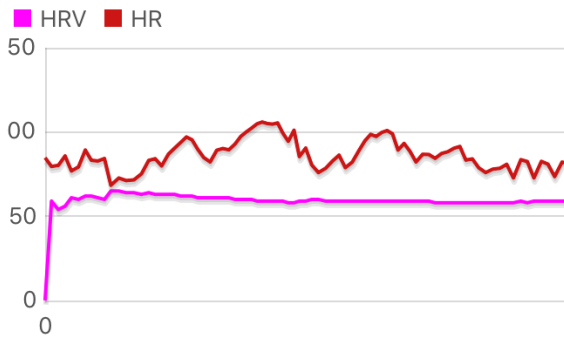
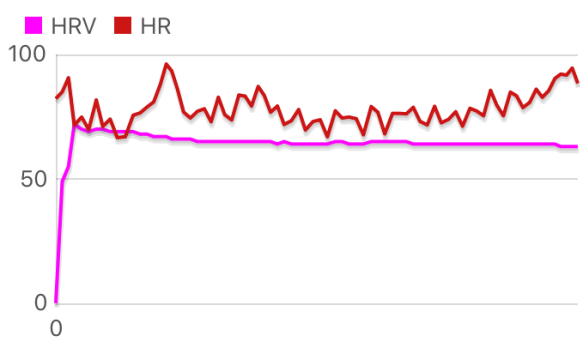
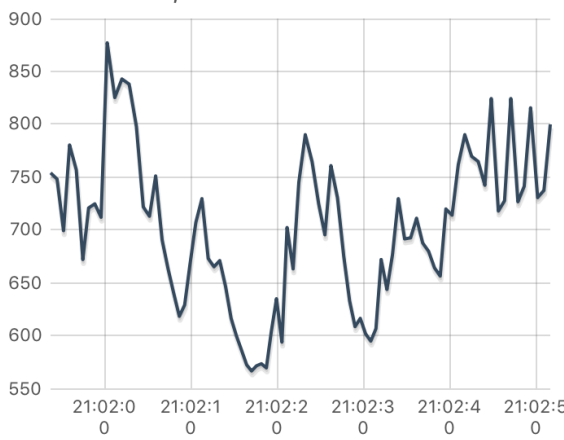
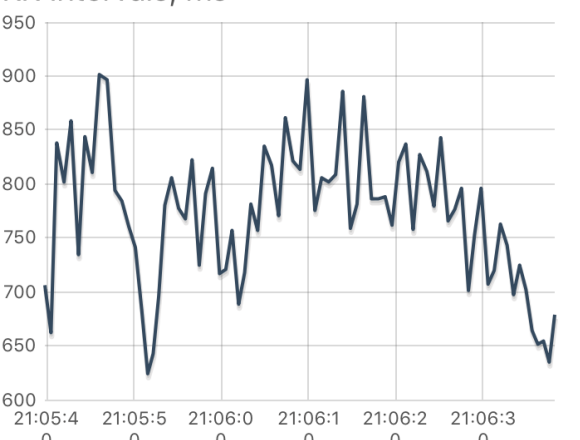
Pengukuran 1 (Kawasan Perkotaan)	Pengukuran 2 (Kawasan Urban Oasis)
Heart-rate 73	Heart-rate 62
Heartrate Variable 53	Heartrate Variable 65
HRV Time-Domain Results Mean RR interval: 822 ms rMSSD: 31.20 ms ln(rMSSD): 3.44 ms SDNN: 57.31 ms PNN50: 8% NN50: 6 7 Day HRV CV: N/A	HRV Time-Domain Results Mean RR interval: 975 ms rMSSD: 67.71 ms ln(rMSSD): 4.22 ms SDNN: 82.56 ms PNN50: 40% NN50: 24 7 Day HRV CV: N/A
HRV Frequency-Domain Results ⓘ Total Power: 1,779.13 ms ² LF* (Low Frequency Power): 1,462.64 ms ² HF (High Frequency Power): 316.49 ms ² LF/HF ratio*: 4.62	HRV Frequency-Domain Results ⓘ Total Power: 2,205.68 ms ² LF* (Low Frequency Power): 821.70 ms ² HF (High Frequency Power): 1,383.98 ms ² LF/HF ratio*: 0.59
Heart Rate Results ⓘ Minimum HR: 64.00 bpm Maximum HR: 82.80 bpm Average HR: 72.97 bpm	Heart Rate Results ⓘ Minimum HR: 53.94 bpm Maximum HR: 80.00 bpm Average HR: 61.54 bpm

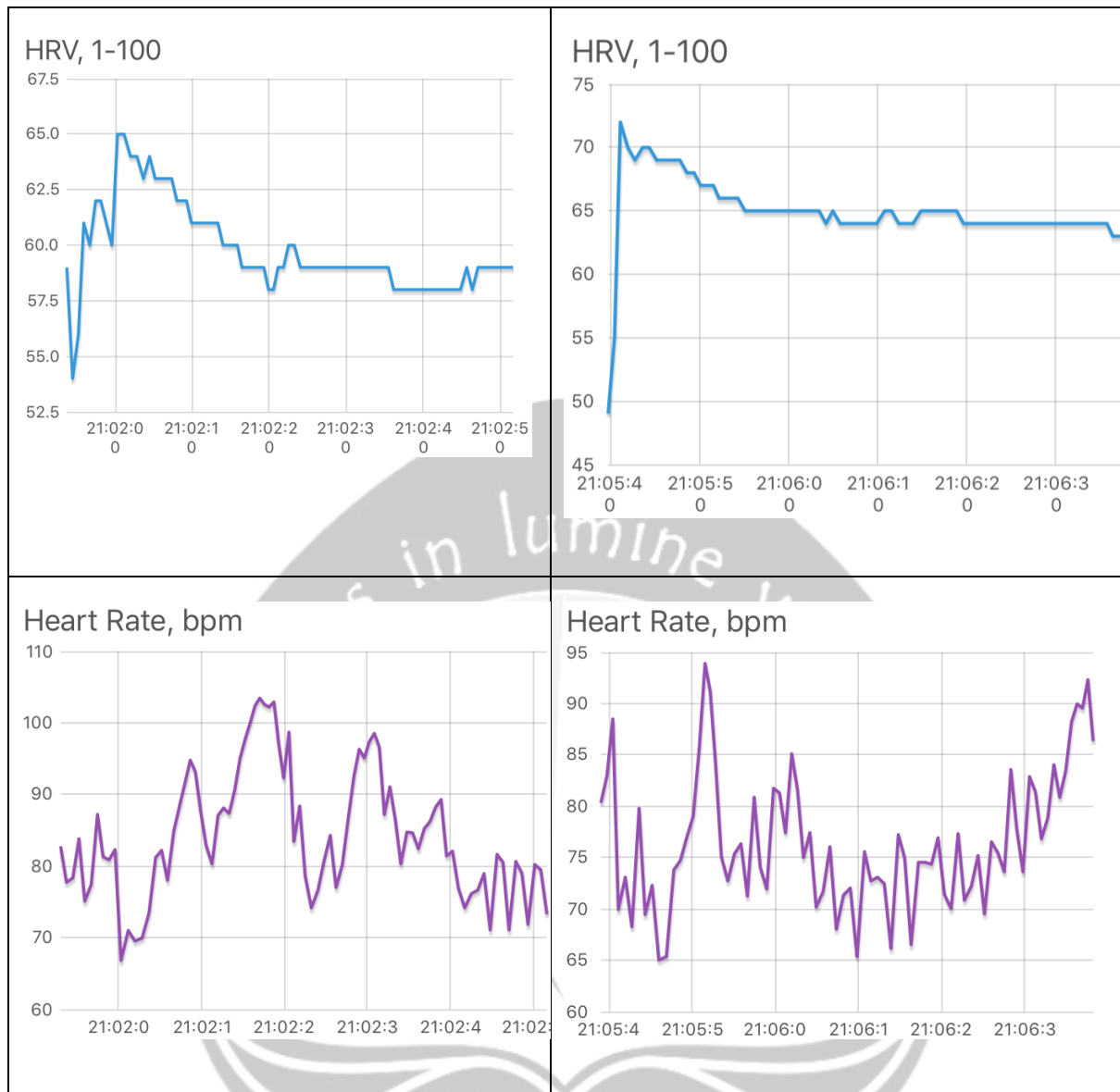




Lampiran 2 Data hasil pengukuran responden 2

Pengukuran 1 (Kawasan Perkotaan)	Pengukuran 2 (Kawasan Urban Oasis)
Heart-rate 86	Heart-rate 78
Heartrate Variable 59	Heartrate Variable 63
HRV Time-Domain Results Mean RR interval: 699 ms rMSSD: 47.44 ms ln(rMSSD): 3.86 ms SDNN: 72.63 ms PNN50: 25% NN50: 21 7 Day HRV CV: N/A	HRV Time-Domain Results Mean RR interval: 769 ms rMSSD: 60.75 ms ln(rMSSD): 4.11 ms SDNN: 64.75 ms PNN50: 42% NN50: 32 7 Day HRV CV: N/A

HRV Frequency-Domain Results ⓘ Total Power: 3,697.46 ms² LF* (Low Frequency Power): 3,332.50 ms² HF (High Frequency Power): 364.97 ms² LF/HF ratio*: 9.13	HRV Frequency-Domain Results ⓘ Total Power: 1,125.78 ms² LF* (Low Frequency Power): 671.26 ms² HF (High Frequency Power): 454.52 ms² LF/HF ratio*: 1.48
Heart Rate Results Minimum HR: 68.42 bpm Maximum HR: 105.93 bpm Average HR: 85.79 bpm	Heart Rate Results ⓘ Minimum HR: 66.57 bpm Maximum HR: 96.15 bpm Average HR: 78.04 bpm
Intra-Reading Chart See More > 	Intra-Reading Chart See More > 
RR Intervals, ms 	RR Intervals, ms 



Lampiran 3 Data hasil pengukuran responden 3

Pengukuran 1 (Kawasan Perkotaan)	Pengukuran 2 (Kawasan Urban Oasis)
Heart-rate 87	Heart-rate 78
Heartrate Variable 39	Heartrate Variable 47

HRV Time-Domain Results ⓘ Mean RR interval: 692 ms rMSSD: 12.67 ms ln(rMSSD): 2.54 ms SDNN: 40.39 ms PNN50: % NN50: 0 7 Day HRV CV: N/A	HRV Time-Domain Results Mean RR interval: 773 ms rMSSD: 21.36 ms ln(rMSSD): 3.06 ms SDNN: 58.34 ms PNN50: 1% NN50: 1 7 Day HRV CV: N/A
HRV Frequency-Domain Results ⓘ Total Power: 425.55 ms² LF* (Low Frequency Power): 390.15 ms² HF (High Frequency Power): 35.41 ms² LF/HF ratio*: 11.02 *Recent research shows measurements longer than 4 minutes are needed for confident LF and LF/HF results	HRV Frequency-Domain Results ⓘ Total Power: 772.12 ms² LF* (Low Frequency Power): 497.92 ms² HF (High Frequency Power): 274.20 ms² LF/HF ratio*: 1.82 *Recent research shows measurements longer than 4 minutes are needed for confident LF and LF/HF results
Heart Rate Results Minimum HR: 76.90 bpm Maximum HR: 99.26 bpm Average HR: 86.75 bpm	Heart Rate Results Minimum HR: 68.34 bpm Maximum HR: 92.81 bpm Average HR: 77.61 bpm

