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Pengaruh Thermal dan Multi-task terhadap Situation Awareness Pejalan Kaki
Aghnia Salsa Az Zahra, Ir. Rini Dharmastiti, M.Sc., Ph.D., IPM., ASEAN Eng.
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INTISARI

Keselamatan pejalan kaki dipengaruhi oleh kemampuan individu dalam memahami kondisi lingkungan sekitar dan merespons potensi bahaya secara tepat. Penggunaan *smartphone* saat berjalan dapat meningkatkan tuntutan perhatian karena individu harus membagi fokus antara aktivitas berjalan, layar *smartphone*, dan lingkungan sekitar. Selain itu, kondisi *thermal* lingkungan juga berpotensi memengaruhi respons fisiologis dan performa kognitif pejalan kaki. Penelitian ini bertujuan untuk mengevaluasi pengaruh kondisi *thermal* dan *multi-task* terhadap *situation awareness* pejalan kaki.

Penelitian ini melibatkan 24 responden perempuan berhijab dengan desain eksperimen *within-subject*. Setiap responden mengikuti empat kombinasi kondisi eksperimen, yaitu suhu 25°C tanpa *texting*, suhu 25°C dengan *texting*, suhu 30°C tanpa *texting*, dan suhu 30°C dengan *texting*. Pada setiap kondisi, responden berjalan di atas *treadmill* dengan kecepatan konstan 3 km/jam selama 10 menit sambil mengamati video lingkungan pejalan kaki yang ditampilkan melalui s*mar*t TV. Pengukuran *situation awareness* dilakukan menggunakan pertanyaan SPAM yang diberikan selama skenario berlangsung. Data *situation awareness* diolah melalui *Query Response* (QR) dan *Probe Response Latency* (PRL) yang dikonversi ke *Inverse Efficiency Score* (IES). Selain itu, respons *thermal* responden diukur melalui *skin temperature* dan *Thermal Sensation Vote* (TSV).

Hasil penelitian menunjukkan bahwa kondisi *thermal* tidak berpengaruh signifikan terhadap *situation awareness* pejalan kaki, dengan nilai $F(1,23) = 0,400$; $p = 0,533$; dan $\eta p^2 = 0,017$. Sebaliknya, *multi-task* berpengaruh signifikan terhadap *situation awareness*, dengan nilai $F(1,23) = 4,724$; $p = 0,040$; dan $\eta p^2 = 0,170$. Nilai IES pada kondisi dengan *texting* lebih tinggi dibandingkan kondisi tanpa *texting*, yang menunjukkan bahwa aktivitas *texting* menurunkan *situation awareness* pejalan kaki. Hasil penelitian juga menunjukkan bahwa tidak terdapat interaksi yang signifikan antara kondisi thermal dan *multi-task* terhadap *situation awareness*, dengan nilai $F(1,23) = 0,021$; $p = 0,885$; dan $\eta p^2 = 0,001$. Sementara itu, *skin temperature* dan TSV meningkat secara signifikan pada suhu 30°C dibandingkan suhu 25°C, sehingga menunjukkan adanya respons fisiologis dan subjektif terhadap perbedaan kondisi *thermal*.

Kata kunci: *Situation Awareness*, pejalan kaki, *multi-task*, *texting*, kondisi *thermal*, *Inverse Efficiency Score*

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ABSTRACT

Pedestrian safety is influenced by an individual's ability to understand the surrounding environment and respond appropriately to potential hazards. Smartphone use while walking can increase attentional demands because individuals must divide their attention between walking, the smartphone screen, and the surrounding environment. In addition, environmental thermal conditions may also affect pedestrians' physiological responses and cognitive performance. This study aims to evaluate the effects of thermal conditions and multi-tasking on pedestrian situation awareness.

This study involved 24 female participants wearing hijabs and used a within-subject experimental design. Each participant completed four experimental conditions: 25°C without texting, 25°C with texting, 30°C without texting, and 30°C with texting. In each condition, participants walked on a treadmill at a constant speed of 3 km/h for 10 minutes while observing a pedestrian environment video displayed on a smart TV. Situation awareness was measured using SPAM questions presented during the scenario. Situation awareness data were processed using Query Response (QR) and Probe Response Latency (PRL), which were then converted into an Inverse Efficiency Score (IES). In addition, participants' thermal responses were measured using skin temperature and Thermal Sensation Vote (TSV).

The results showed that thermal condition did not have a significant effect on pedestrian situation awareness, with $F(1,23) = 0.400$, $p = 0.533$, and $\eta p^2 = 0.017$. In contrast, multi-tasking had a significant effect on situation awareness, with $F(1,23) = 4.724$, $p = 0.040$, and $\eta p^2 = 0.170$. The IES value in the texting condition was higher than in the non-texting condition, indicating that texting reduced pedestrian situation awareness. The results also showed no significant interaction between thermal condition and multi-tasking on situation awareness, with $F(1,23) = 0.021$, $p = 0.885$, and $\eta p^2 = 0.001$. Meanwhile, skin temperature and TSV increased significantly at 30°C compared to 25°C, indicating physiological and subjective responses to different thermal conditions.

Keywords: Situation Awareness, pedestrian, multi-tasking, texting, thermal condition, Inverse Efficiency Score