

Hyperthermia can limit marathon running performance due to stresses on the cardiovascular, muscular and central nervous systems (Coyle, 2007). The relative balance between heat production and heat loss determines the extent of hyperthermia experienced by an individual and will be influenced by multiple factors including running economy, evaporative cooling as well as environmental conditions. Running continues to be a hugely popular activity with record numbers of participants entering big city marathons across the globe. Voight et al (2011) report an increase of 324,000 US marathon finishers from 1980 to 2009, whilst the 2019 London marathon received a record number of 414,618 applicants. Marathon finishing times have also increased since 1980 indicating an increase in non-elite runners participating in the marathon (Voight et al, 2011) who are more likely to report a running related injury (Satterthwaite et al, 1999). For non-elite participants the challenge of marathon running offers an opportunity to raise money and awareness for a charity. Running in a costume also appears to be gaining in popularity with the 2017 London Marathon receiving 130 applications for setting world records in fancy dress, 73 of which were approved and 39 world records subsequently achieved (www.virginmoneylondonmarathon.com). Running in costume has the potential to alter energy expenditure, running economy, running gait and thermal balance in an individual but little research has been undertaken to investigate these effects. Selkirk and McLellan (2004) observed in firefighters wearing personal protective equipment (PPE) that exercise tolerance time was dependent upon work rate and environmental conditions, whilst Taylor et al (2012) reported that firefighter's PPE increased physiological strain by 35%, increased VO_2 by 36% and reduced gross efficiency by 27% during bench-stepping exercise. They also observed that clothing had a significantly greater impact upon heart rate responses compared to wearing SCBA and boots (Taylor et al, 2012). de Rome et al (2015) reported that wearing motorcycle PPE led to a two-fold increase in sweat production to 0.46 ± 0.21 L/hr during 30 minutes of cycling at 30W in a hot environment compared to a control clothing condition. Importantly during the PPE trial only 60% of the sweat evaporated leading to adverse changes in psychophysical indices of feeling hot, sweaty and uncomfortable. These findings suggest that running in costume will lead to altered physical, metabolic and psychological responses dependent upon exercise intensity and costume design. We therefore invite proposals that seek to investigate the impact of running in costume in order to enhance the understanding of running in costumes and ultimately develop guidelines for those individuals preparing to compete in these events.

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