

Monitoring dance performance intensity using rate of perceived exertion: A criterion-validity study

Maren E. Iverson, Tori M. Grootwassink, Mary C. Stenson, Donald V. Fischer, Allison M. Seifert
College of Saint Benedict/Saint John's University Department of Exercise Science and Sport Studies



Introduction

- Heart rate (HR), blood lactate (BLa) and rate of perceived exertion (RPE) are commonly used to monitor exercise intensity.^{1,2,3}
- Overall, RPE is strongly related to both external markers of exercise intensity, such as velocity, and physiological markers of exercise intensity, such as HR and BLa, during cardiorespiratory and resistance exercise.⁴
- The strength of the relationship of RPE with HR and BLa varies across different forms of rhythmic exercise; therefore, mode-specific testing is needed to establish RPE as a valid measure of exercise intensity.¹
- Research examining the relationship between HR, BLa and RPE as measures of exercise intensity during competitive dance is scarce.

Purpose

- To examine the concurrent criterion validity of RPE as a physiological measure of exercise intensity, relative to HR and BLa, during a competitive Division III jazz dance team performance.

Methods

- 14 Division III female dance team athletes volunteered to participate in the study.
- The athletes consumed a standardized meal of approximately 80 g of carbohydrate two hours prior to testing.
- The subjects' urine was tested using Accutest URS Hydration Strips to ensure normal hydration (specific gravity ≤ 1.020).
- Borg's CR-10 overall exertion RPE scale was used to assess momentary RPE; subjects were familiarized with the scale prior to testing.
- The dance test protocol was conducted in the College of St. Benedict aerobics studio and consisted of performing four progressively longer segments of the dancers' two minute competitive jazz dance routine (0 to 30 s, 0 to 60 s, 0 to 90 s, and 0 to 120 s).
- Subjects rested between dance segments until BLa concentrations returned to baseline.
- HR, BLa, and RPE were assessed immediately upon completion of each dance segment.

Results

- Bivariate correlations were used to examine the relationships between RPE, HR, and BLa concentrations.
- Significant positive relationships were found between RPE (4.5 ± 1.8) and BLa concentrations ($6.7 \text{ mmol/L} \pm 2.6$) [$r(56) = 0.634, P < .001$] and between RPE and HR ($183.4 \text{ bpm} \pm 0.7$) [$r(56) = 0.480, P < .001$] during the dance performance.



Figure 1. Drawing blood using a lancet.



Figure 2. Using a lactate meter to determine BLa.



Figure 3. Recording heart rate at 30 seconds.

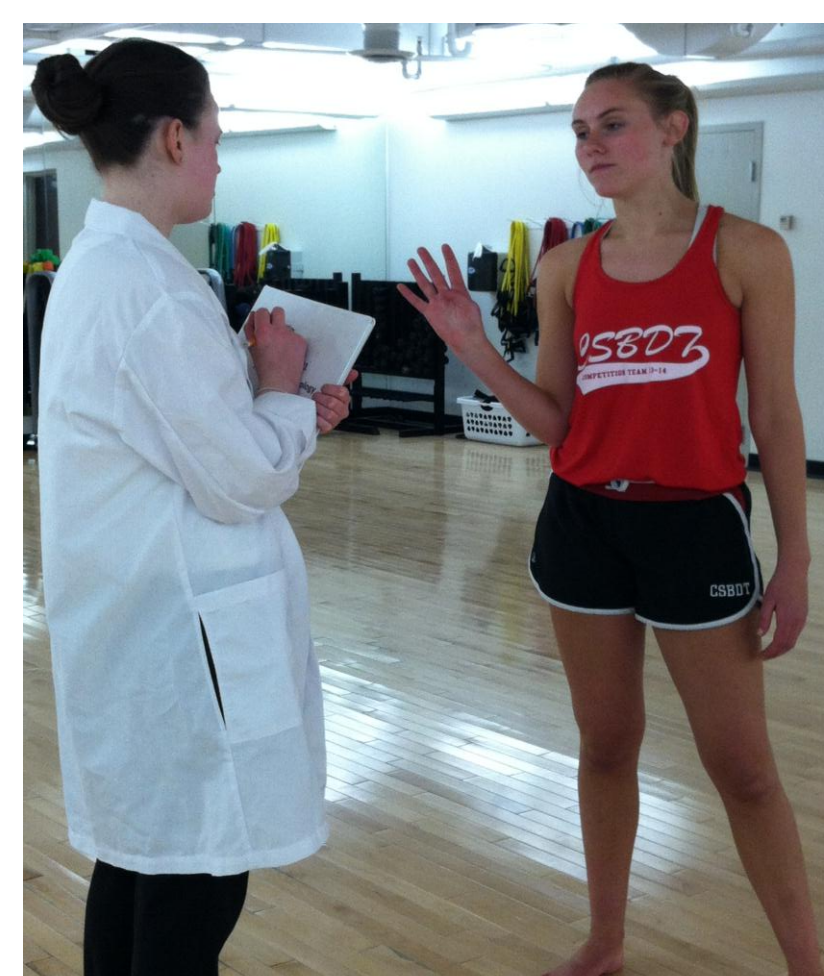


Figure 4. Determining RPE.

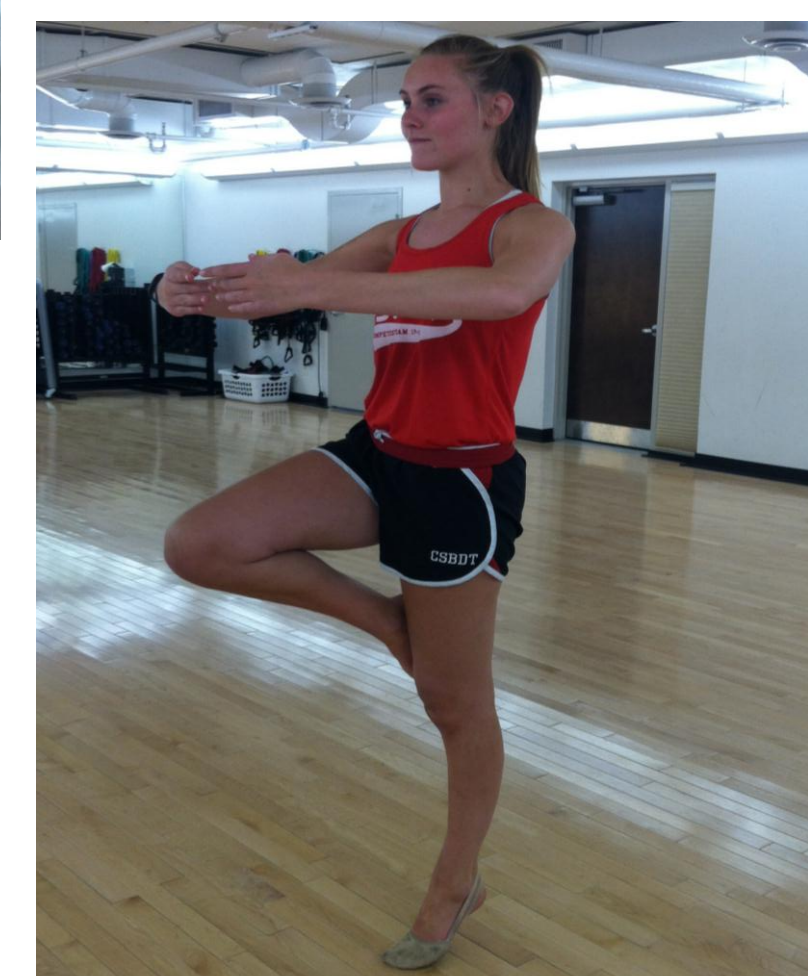


Figure 5. Athlete dancing.

Future Research

- Examine the use of RPE as a method of prescribing exercise intensity during competitive dance.
- Examine the concurrent criterion related validity of RPE as a method of monitoring exercise intensity relative to other physiological criterion measures, like $\text{VO}_{2 \text{ max}}$ and ventilation, during other forms of rhythmic exercise.

Conclusion

- RPE appears to be a valid method of monitoring exercise intensity during a competitive Division III dance team practice and performance.

Literature Cited

- ¹Zeni, A. I., Hoffman, M. D., & Clifford, P. S. (1996). Relationships among heart rate, lactate concentration, and perceived effort for different types of rhythmic exercise in women. *Archives of Physical Medicine and Rehabilitation*, 77(3), 237-241.
- ²Green, J. M., McLester, J. R., Crews, T. R., Wickwire, P. J., Pitchett, R. C., & Lomax, R. G. (2006). RPE association with lactate and heart rate during high-intensity interval cycling. *Medicine & Science in Sports & Exercise*. doi: 10.1249/01.mss.0000180359.98241.a2.
- ³Mendez-Veillanueva, A., Fernandez-Fernandez, J., Bishop, D., & Fernandez-Garcia, B. (2010). Ratings of perceived exertion-lactate association during actual singles tennis match play. *Journal of Strength and Conditioning Research*, 24(1), 165-170.
- ⁴Eston, R. (2012). Use of ratings of perceived exertion in sports. *International Journal of Sports Physiology and Performance*, 7(2), 175-182.

Discussion

- The significant positive correlations between RPE and HR, and RPE and BLa provide evidence of the criterion-related validity of RPE as a measure of exercise intensity during short-duration anaerobic dance performances.
- RPE is a convenient measure³ that can be used to monitor and regulate exercise intensity during dance practice and performance.⁴

Acknowledgments

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