

Exercise Response to Powwow Dancing in Healthy Adults

Brandon Ness¹, PT, DPT; Jessica Brave Heart²

¹ Assistant Professor, Physical Therapy, University of South Dakota; ² Kinesiology & Sport Management, University of South Dakota

Study Design

Prospective, observational study

Purpose

To investigate exercise response to three different powwow dance styles in healthy adults.

Background

The prevalence of diabetes and other risk factors for cardiovascular health have increased in recent years among Native Americans.¹ In Native Americans with diabetes, increased cultural identity may contribute to improved control of blood sugar levels.² Other types of cultural dances including Caribbean³, tap⁴, ballet⁵, Latin⁶, and salsa⁷ dancing have been shown to promote health and fitness. No previous investigations have explored the relationship between powwow dancing and cardiovascular exercise markers, or subjective ratings of exercise intensity.

Subjects

Eight healthy participants completed testing procedures (mean \pm SD; age: 27 ± 5.5 years, height: 1.7 ± 0.1 m, mass: 72.2 ± 9.1 kg; Tegner Activity Level Scale: 5.1 ± 0.8).

Methods

Participants performed three different powwow dances, described in Table 1, in a laboratory setting (Figure 1). Each dance lasted 3 minutes duration, separated by a 5-minute rest period. Participants were familiarized with each dance by viewing instructional videos prior to testing. Rating of perceived exertion (RPE), average heart rate (HR_{avg}), and maximal heart rate (HR_{max}) were recorded after each dance (Figure 2). HR was recorded through the use of a wearable wrist HR monitor (Polar A360 Fitness Tracker, Polar Electro, Inc., Lake Success, NY). RPE was measured via the Modified Borg CR-10 RPE Scale.⁸ From these measures, internal training load was calculated for RPE and HR_{max} respectively.



Figure 1. Testing Environment

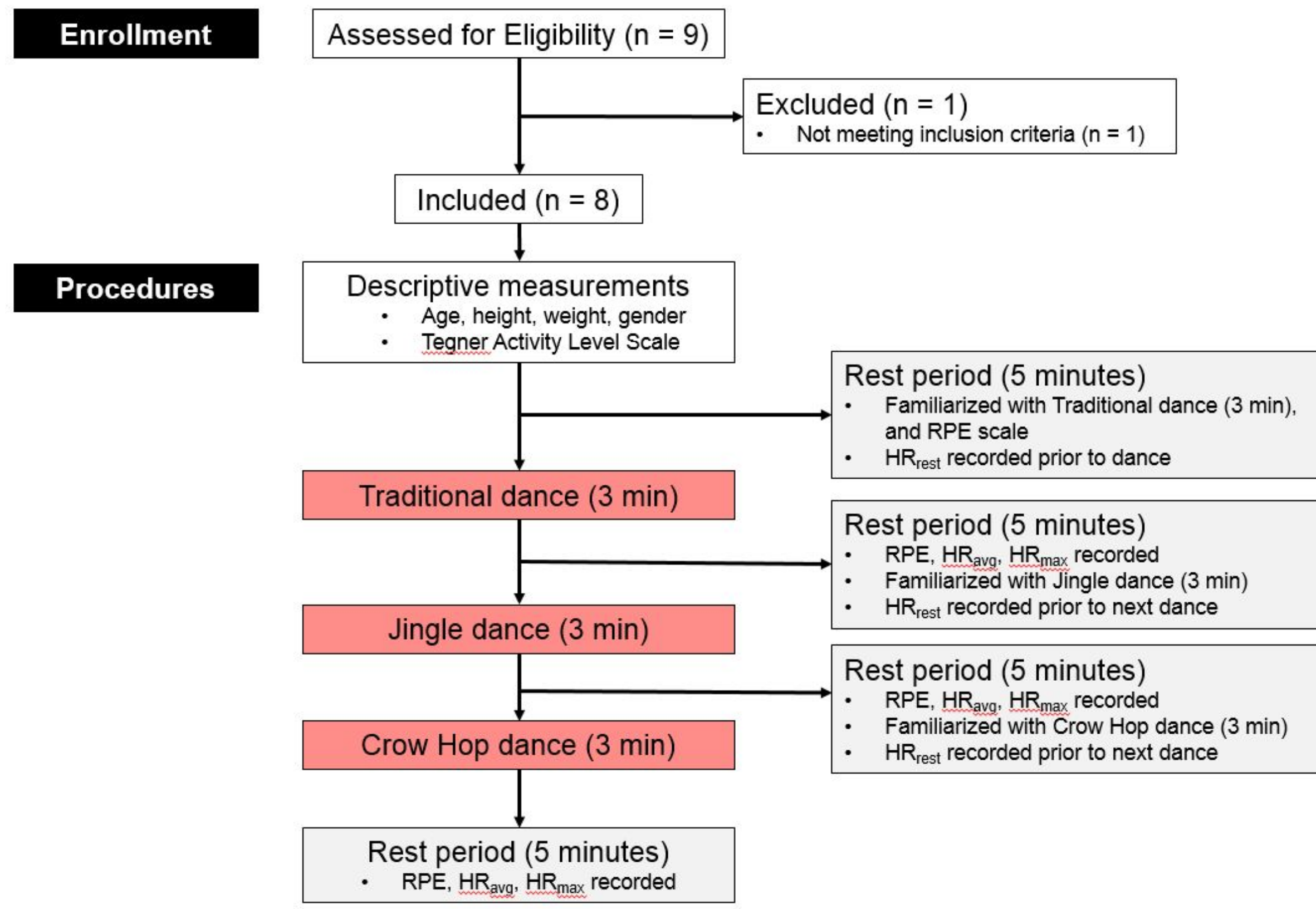


Figure 2. Powwow Dancing Procedures

Table 1. Descriptions of powwow dance types

Dance type	Description
Traditional	Female traditional dancers use very slight, but regal movements in sync with a steady drum beat. Traditional dancers need to have good leg strength and good balance. They dance in a bounce-style rhythm, zig-zag motion, or side step in a circular pattern, keeping their feet close to the ground.
Jingle	The jingle dress dancer originated from the Ojibwa tribe. The dance can either be contemporary or traditional. Traditional dancers use light footwork keeping their feet close to the ground, while contemporary dancing can include fancier, unique footwork. Their outfit features numerous metal cones that dangle from the dress which “jingle” together as the dancers move around the dance circle.
Crow Hop (Fancy)	The crow hop dance is a competitive dance form typically performed by men’s and women’s fancy dancers. The dancers follow along to the rhythm of a fast, single-beat drum pattern with precise movement.

Results

Table 2. Rating of perceived exertion, heart rate, and training load measurements according to powwow dance type

	Traditional	Jingle	Crow Hop
RPE	2.4 \pm 0.9	4.0 \pm 1.4	5.3 \pm 1.8
HR _{avg}	122.6 \pm 9.0	122.3 \pm 16.6	125.6 \pm 17.9
HR _{max}	145.6 \pm 12.0	141.5 \pm 21.4	142.9 \pm 20.0
HR _{max} / Predicted HR _{max}	0.75 \pm 0.1	0.74 \pm 0.1	0.74 \pm 0.1
Internal Training Load (RPE x duration)	7.1 \pm 2.7	12 \pm 4.24	15.8 \pm 5.5
Internal Training Load (HR _{max} x duration)	367.9 \pm 26.9	366.8 \pm 49.7	376.9 \pm 53.5

Values expressed as mean \pm SD; RPE, Rating of Perceived Exertion; HR_{avg} , average heart rate; HR_{max} , maximal heart rate

- One-way analysis of variance (ANOVA) with post-hoc Bonferonni corrections did not reveal significant differences between dance types for HR_{avg} or HR_{max}
- RPE and HR_{max} were either negatively or poorly correlated ($r = -0.5 - 0.3$)

Discussion

- Mean RPE progressively increased according to powwow dance type; however, HR_{avg} and HR_{max} remained relatively consistent.
- Mean HR_{max} achieved $>70\%$ of predicted HR_{max} across all powwow dance types.
- Mean HR_{avg} powwow dancing values, measured via a wearable wrist HR monitor, were similar to Latin dance HR_{avg} measurements as assessed through telemetry.⁶
- Donning powwow regalia may potentially influence exercise response variables in an actual powwow setting.
- Powwow dancing may be an alternative exercise method for individuals who are looking to connect to the culture.

Limitations

- Lack of established validity for wearable HR monitor device used in this study
- Generalizability due to small sample size, dance duration, & laboratory setting

Conclusion

In healthy adults, powwow dancing produced a favorable exercise response in terms of reaching training thresholds and may have the potential to promote cardiovascular health and fitness.

References

- Jernigan VBB, Duran B, Ahn D, Winkleby M. (2010). Changing patterns in health behaviors and risk factors related to cardiovascular disease among American Indians and Alaska Natives. *Am J of Public Health*. 2010;100(4):677-683.
- Penn-Kennedy J, Barber C. Cultural identity and control of diabetes among members of the Omaha Tribe in Nebraska. *Wicazo Sa Rev*. 1995;11(2):66-74.
- Di Blasio A, De Sanctis M, Gallina S, Ripari P. Are physiological characteristics of Caribbean dance useful for health? *J of Sport Med Phys Fit*. 2009;49:30-34.
- Oliveria SL, Simoes HG, Moreira SR, Lima RM, Almeida JA, Ribeiro FR, Puga GM, Campbell CG. Physiological responses to a tap dance choreography: comparisons with graded exercise test and prescription recommendations. *J Strength Cond Res*. 2010;24(7):1954-1959.
- Rodrigues-Krause J, Santos Cunha G., Alberton CL, Follmer B, Krause M, Reischak Oliveira A. Oxygen consumption and heart rate responses to isolated ballet exercise set. *J Dance Med Sci*. 2014;18(3):99-105.
- Domene PA, Easton C. Combined triaxial accelerometry and heart rate telemetry for the physiological characterization of Latin dance in non-professional adults. *J Dance Med Sci*. 2014;18(1):29.
- Guidetti L, Buzzachera C, Emerenziani GP, Meucci M, Saavedra F, Gallotta MC. Psychophysiological responses to salsa dance. *PLoS One*. 2015;10(4):1-13.
- Foster C, Florhaug JA, Franklin J, et al. A new approach to monitoring exercise training. *J Strength Cond Res*. 2001;15(1):109-115.