



Validity and reliability of heart rate variability measurement to assess stress in horses

Miranda Wallace, MU College of Veterinary Medicine
Rebecca A. Johnson, PhD, RN, FAAN, FNAP; Millsap Professor of Gerontological Nursing, MU Sinclair School of Nursing;
Director Research Center for Human-Animal Interaction
Philip J. Johnson, BVSc, MS, MRCVS, DACVIM-Large Animal Internal Medicine, DECEIM, Professor of Equine Internal Medicine, Board-Certified Specialist in Large Animal Internal Medicine



Background

- Equine assisted therapy (EAT) is reportedly effective in many human disorders.
- EAT studies rarely assess horses' stress responses during EAT.
- Those that do use invasive means to measure cortisol or only do behavior observation, which can be unreliable.
- Heart rate variability (HRV) can be a measure of physical and emotional stress.
- HRV has been measured with Polar RR HRV recorders previously.
- Prominent T-waves in horses' ECG readings can distort HRV measured by a Polar RR recorder.
- 40% of horses have a second degree AV heart block which could impact the validity of Polar RR HRV readings (Reef, et. al, 2010).

Specific Aims

1. To determine to what extent are Polar RS800CX HRV readings valid and reliable compared with an ECG.
2. To examine to what extent is HRV data reliable to determine stress in horses compared with observed stress behaviors.

Method

- Biophysiological measure of HRV using Polar RS800CX and CardioHolter monitors.
- Videotape behavioral observations.

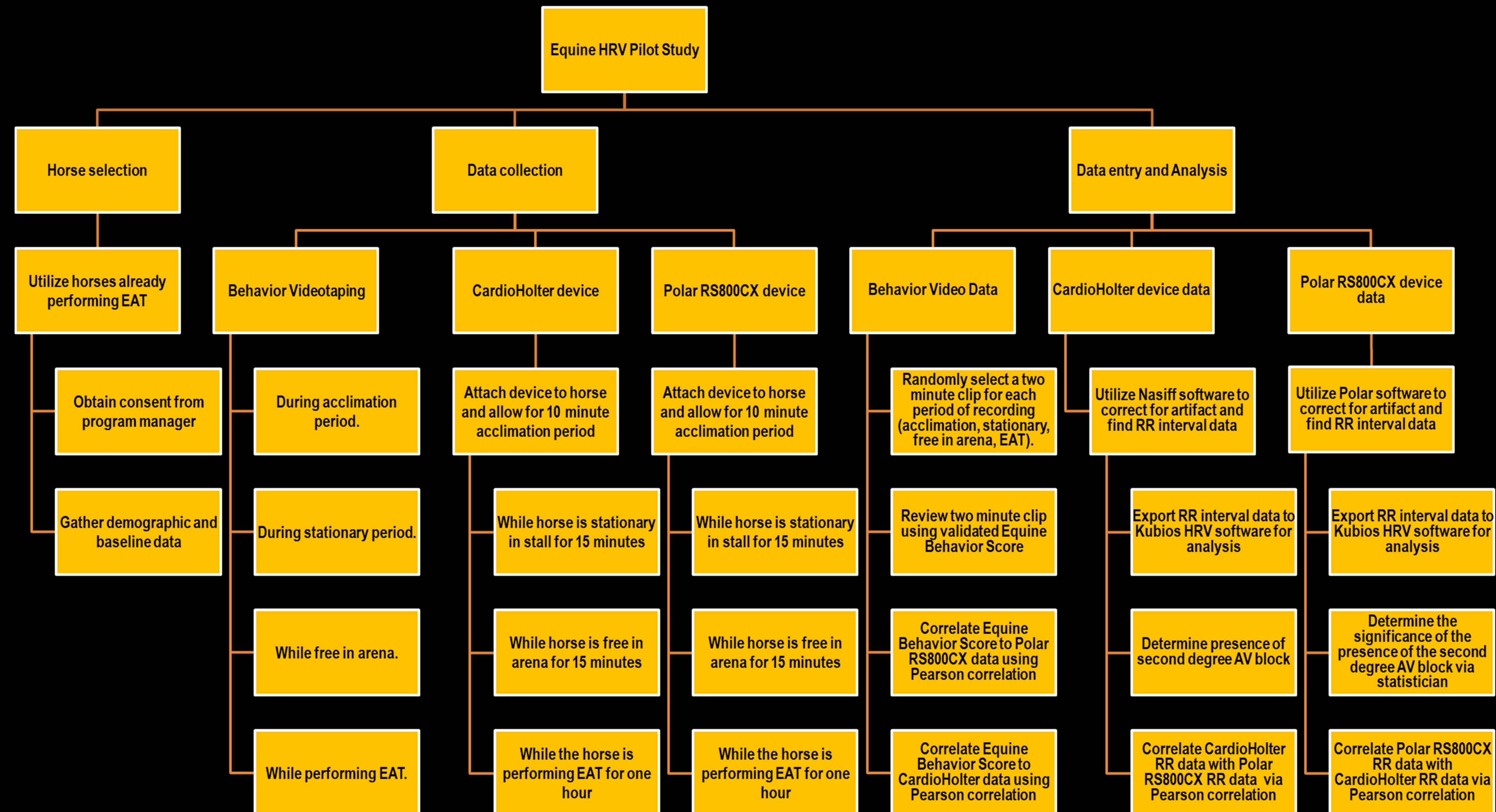
Procedure

- Attach Polar RS800CX electrode set and CardioHolter to horse and allow for a 10 minute acclimation period.
- Record data on horse in three conditions:
 - Stationary in stall
 - Free in arena
 - Working in EAT
- Randomly select two minute videotape segments for analysis using standardized equine behavior scoring instrument.
- Control for presence of 2^o AV block by comparing Polar readings with CardioHolter data.
- Polar and ECG data processed with Kubios HRV software.
- Pearson product-moment correlation coefficient utilized to establish direction and strength of relationships between devices.

Funding

- Research Center for Human-Animal Interaction
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Process Map



Data

- Data collection will begin soon.

Conclusions

- We expect to find that Polar RS800CXHRV is not significantly different than the CardioHolter when corrected for artifact via the Kubios HRV premium computer program.
- We expect to find that HRV is a valid measure of stress in horses during EAT when correlated with observed stress behavior analysis.

References

Reef, V. B., & Marr, C. M. (2010). Chapter 13-Dysrhythmias: Assessment and medical management. In *Cardiology of the Horse* (2nd ed., pp. 159-178). doi:10.1016/C2009-0-48166-2