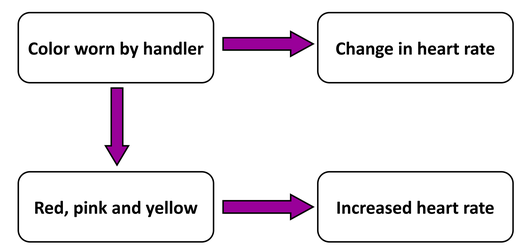
The Effect of Color Worn by a Handler on the Heart Rate of a Horse

Introduction

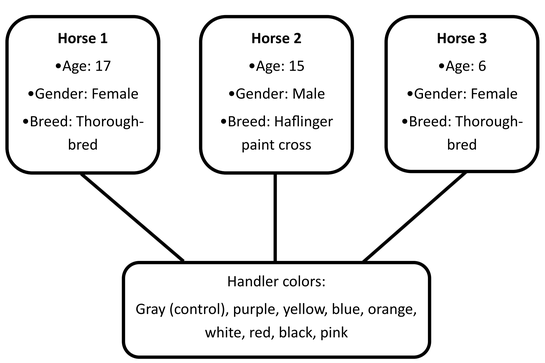
- Horses have dichromatic color vision (Carroll, 2001)
  - Vision systems designed to see well under different intensity of light than humans
- See mostly greens, dull yellows, blues and grays
- Bright yellow is most likely to cause hesitation when dealing with floor color (Hall, 2008)
- Green and gray were the least likely
- Temperament can be assessed using heart rate (Visser, 2002)
- Elevations in heart rate can suggest stress in a horse (Visser, 2002)
- Little is known about how color effects heart rate

(Hall,2008)

Hypothesis



Methods



Results

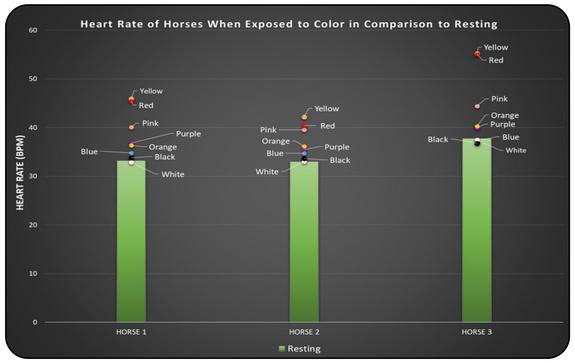


Figure 1: Comparison of the average resting heart rate of each horse to the average heart rate between four trials of each horse for all colors (Washburn,2019)

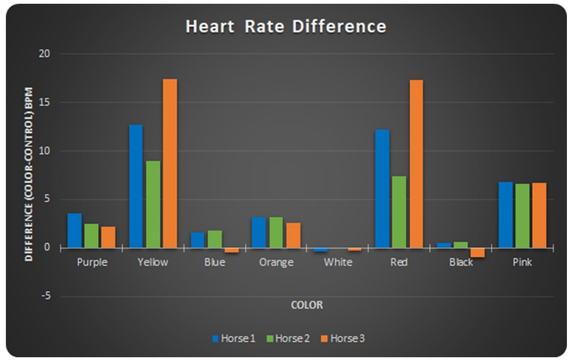


Figure 2. The difference between the heart rate of the horse when presented with each color and their control heart rate (Washburn,2019)

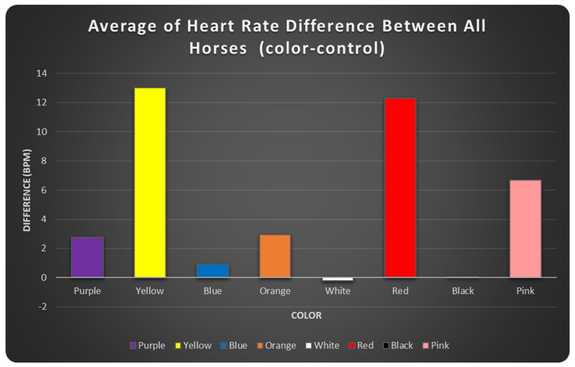


Figure 3. The average difference between all of the horses heart rates when presented with each color and their control heart rate (Washburn,2019)

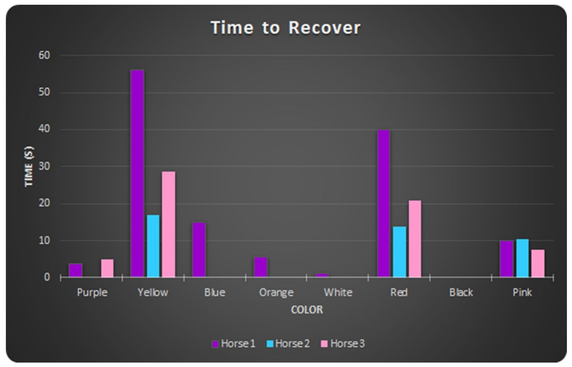


Figure 4. The time it took each horse's heart rate to return to their resting after being presented with each color (Washburn,2019)

Analysis

Red vs. Resting Heart Rate	
Red Mean	46.96666667
Variance	55.50098958
t Stat	4.297626216
P two-tail	0.05010837922

Yellow vs. Resting Heart Rate	
Yellow Mean	47.77083333
Variance	44.77083333
t Stat	5.481390421
P two-tail	0.03170819712

Pink vs. Resting Heart Rate	
Pink Mean	41.35416667
Variance	7.192708333
t Stat	92.6647182
P two-tail	0.0001164381

White vs. Resting Heart Rate	
White Mean	34.45833333
Variance	6.942708333
t Stat	-1.889822365
P two-tail	0.199359231

Purple vs. Resting Heart Rate	
Purple Mean	37.41666667
Variance	5.196614583
t Stat	6.608265501
P two-tail	0.02214173675

Blue vs. Resting Heart Rate	
Blue Mean	35.60416667
Variance	2.032552083
t Stat	1.300664954
P two-tail	0.3230594764

Orange vs. Resting Heart Rate	
Orange Mean	37.60416667
Variance	5.516927083
t Stat	15.66666667
P two-tail	0.004049510448

Black vs. Resting Heart Rate	
Black Mean	34.70833333
Variance	3.130208333
t Stat	0.07980868845
P two-tail	0.943656383

Methods

- Local veterinarian was present during all testing
- Polar H7 Heart Rate Sensor was used

Control:

- Approach at different angles with control outfits
- 8 readings of 15 seconds per test

Experimental:

- 4 trials
- Strap heart belt on wearing control outfit
- Go out of sight and change into one of colors
- Record HR every 15 seconds for 1 minute
- Time how long it takes to return to resting HR

(Washburn, 2019)

Conclusion

- Red and yellow had the greatest effect
- White and black had the least effect
- For both difference in heart rate and time to recover
- Some benefits of decreased heart rate are a potential decrease in stress for the horse which would then increase the safety of both the horse and the human interacting with them
- First known study on the effect of color worn by the handler
- One limitation was the small sample size

Future Research

- Larger sample size
- Breed, age and gender
- Colors' effect on cortisol levels

References

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