Domestic Cones vs. Foreign Cones: Reaction Time Differences

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Background

Rationale

- When Driving at 55 mph, a Driver Would Need At Least 5 Seconds to React to Avoid a Collision
- This Equates to Detecting a Stimulus (Cone) a Distance of 122.5 Meters
- To Simulate This Distance in a Lab, Traffic Cones Were Viewed Through Small Apertures in Glasses

Equipment

- Traffic Cones Were Placed in a Specially-Constructed Box and Illuminated with a High Intensity Light
- The Box Was Black and Entirely Enclosed Except for a Small Aperture
- Three Apertures Used Corresponding to Three Distances: 60m, 90m, and 180m

Equipment

- Used Plato (Translucent Technologies) Spectacles to Simulate Headlights Shining on Cones
- Spectacles Changed From Blocked Light Source to Unblocked Light Source

Procedure

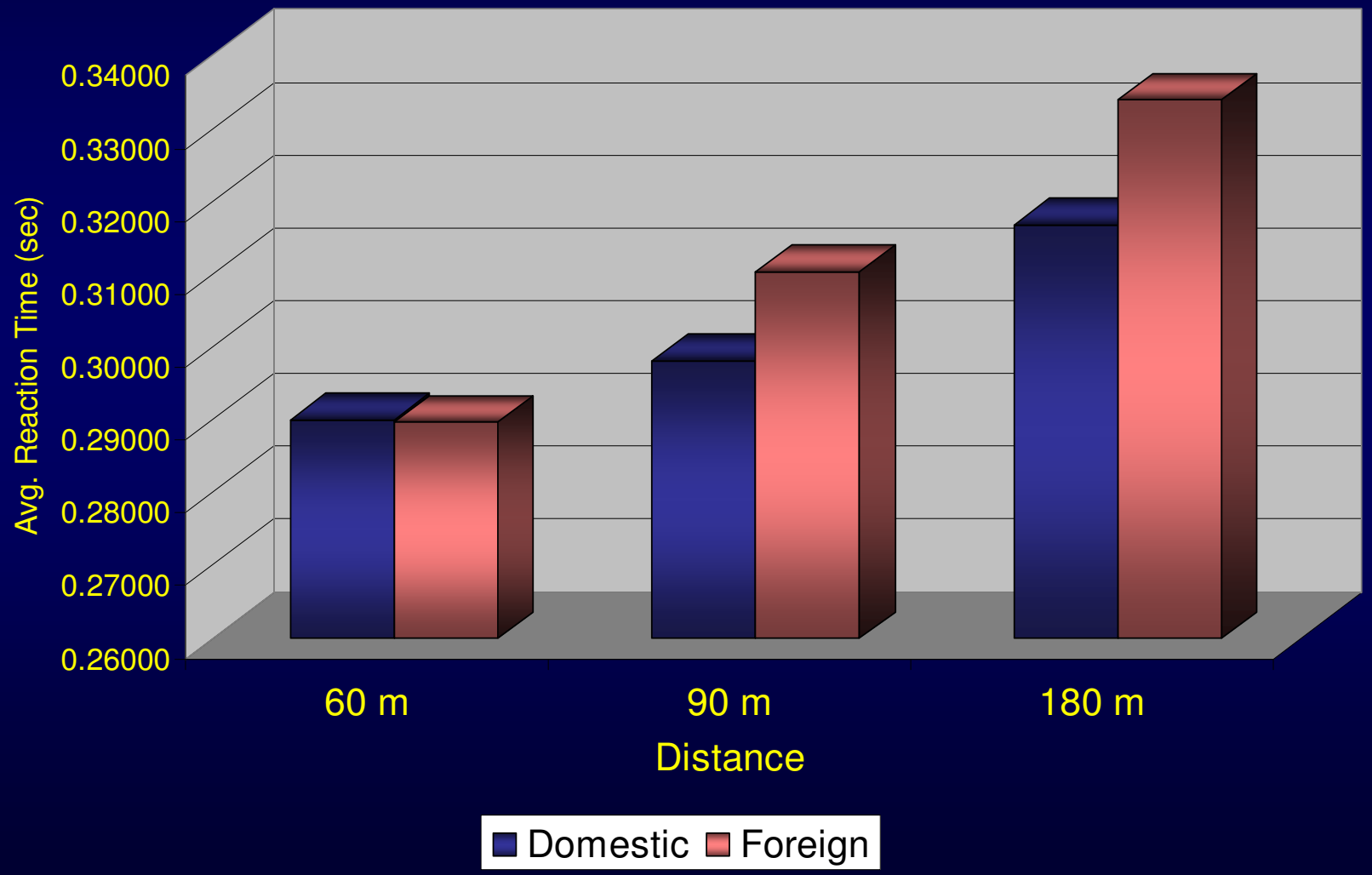
- With Head Resting on Chin Rest, Participants Instructed to Press a Button to Start Experiment
- Initially, Glasses Were Blocking Light
- At Random Times (1 to 10 seconds), Glasses Allowed Light to Shine on Cones
- Participants Pressed Button When Detecting Traffic Cone
- Process Repeated 20 Times for Each Participant

Procedure

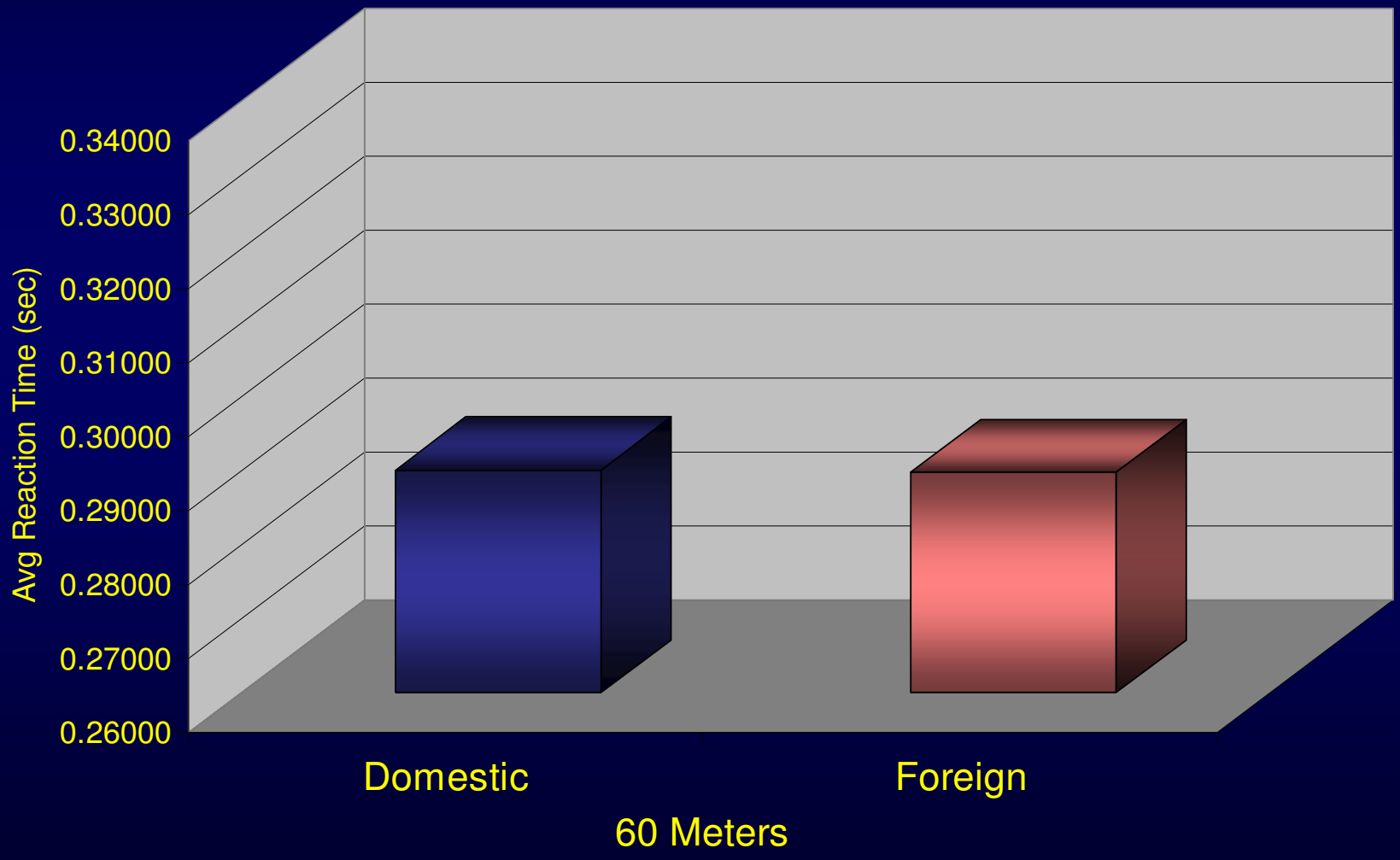
- Total of 24 Participants
- All Had Normal or Corrected Vision
- Type of Cone (Domestic vs. Foreign) and Distance (60m, 90m, and 180m) Were Counterbalanced Throughout
- Some Reacted to Domestic Cone First, Others Reacted to Foreign Cone First
- Some Reacted to 60m First; Others Reacted to 90m First; Others Reacted to 180m First

Results

Average Reaction Times



Comparison #1: 60 Meters

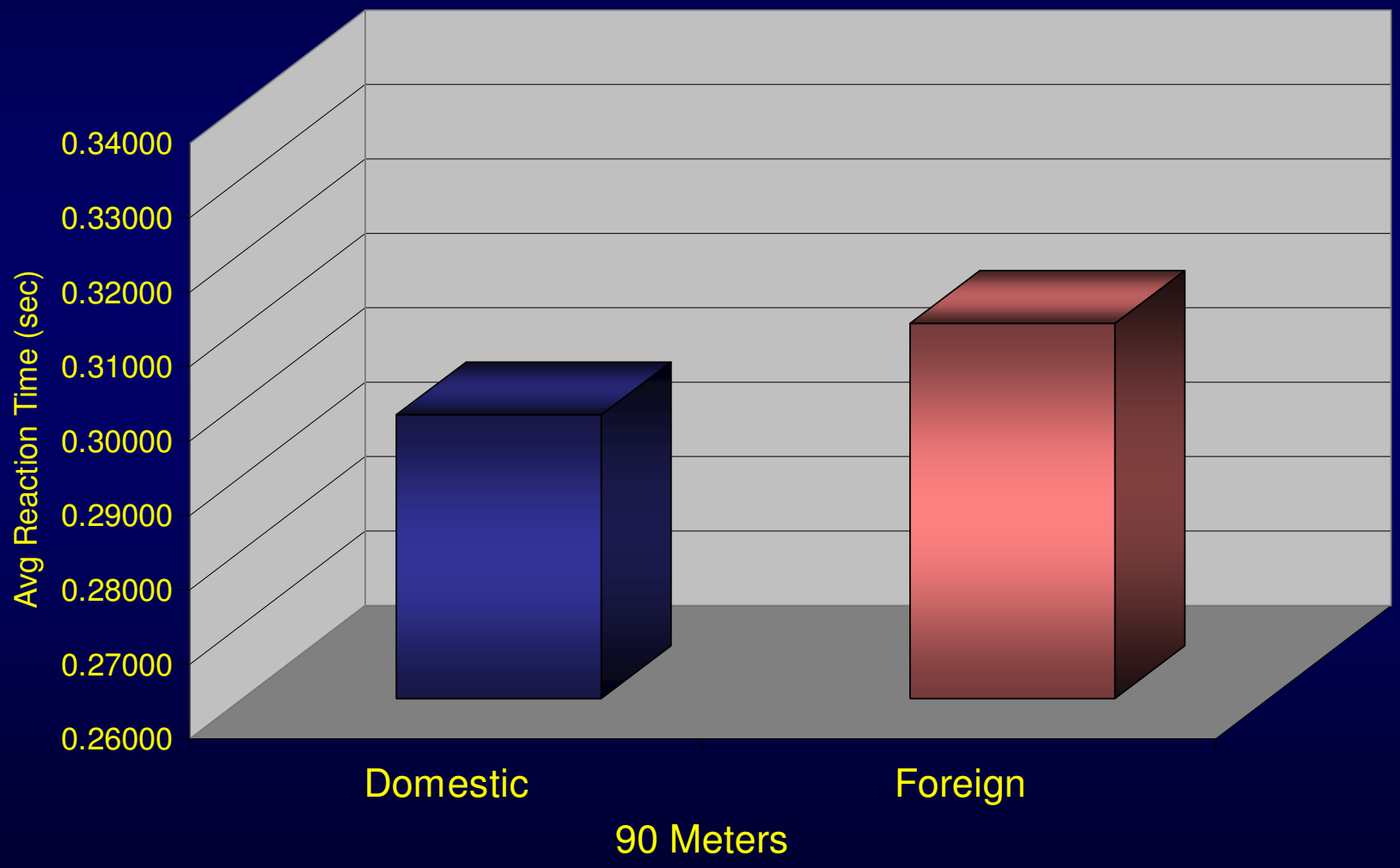


Comparison #1: 60 Meters

- Domestic Cone Reaction Time: .29008 secs
- Foreign Cone Reaction Time: .28975 secs
- No Significant Differences Between Reaction Times $t(23) = .111$, $p > .05$

- Conclusion: No Differences in Reaction Times Between Cones at 60m

Comparison #2: 90 Meters

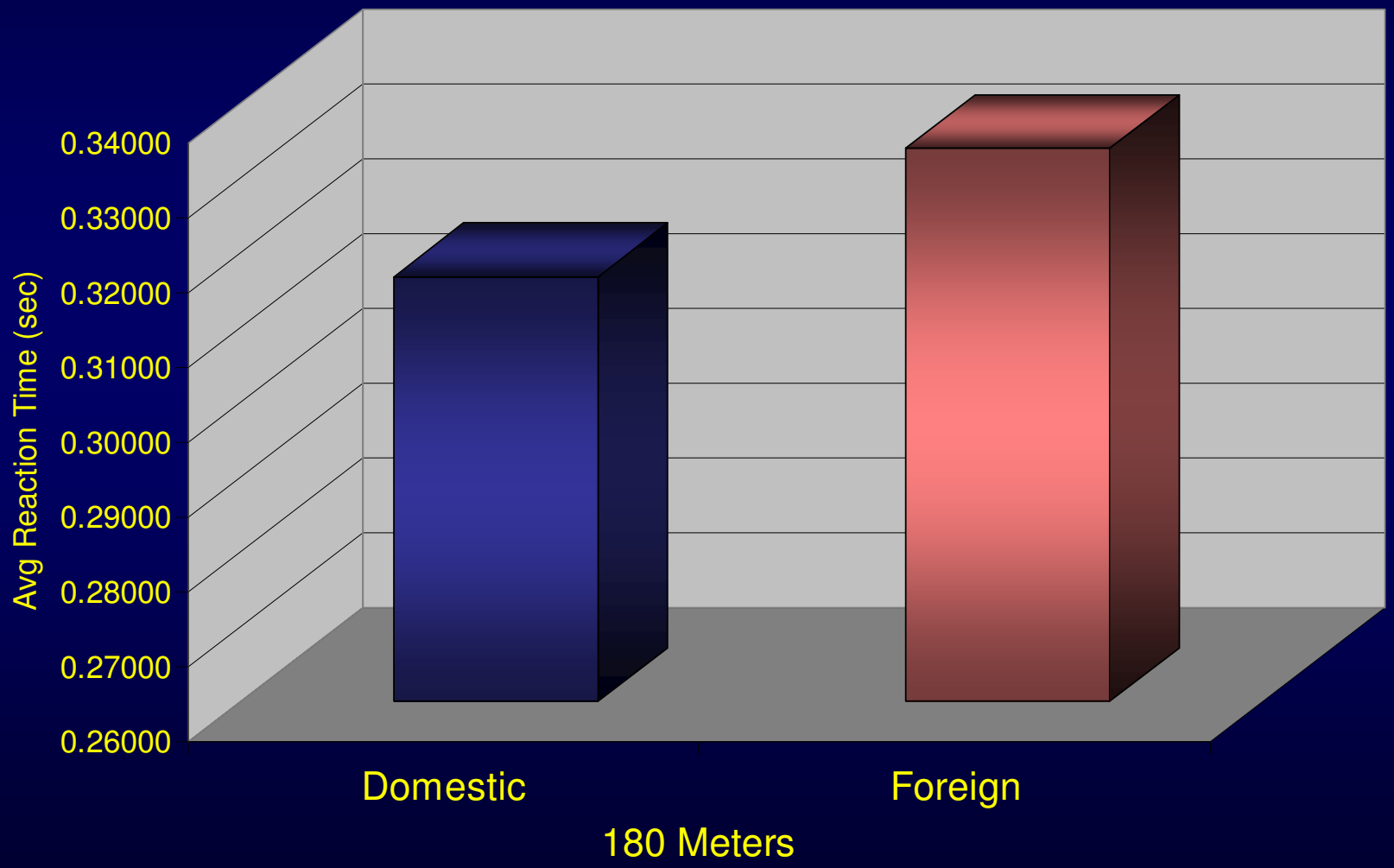


Comparison #2: 90 Meters

- Domestic Cone Reaction Time: .29812 secs
- Foreign Cone Reaction Time: .31042 secs
- Significant Differences Between Reaction Times $t(23) = -3.019$, $p < .05$

- Conclusion: There Are Differences in Reaction Times Between Cones at 90m -- Reaction Times Are Faster with Domestic Cones

Comparison #3: 180 Meters

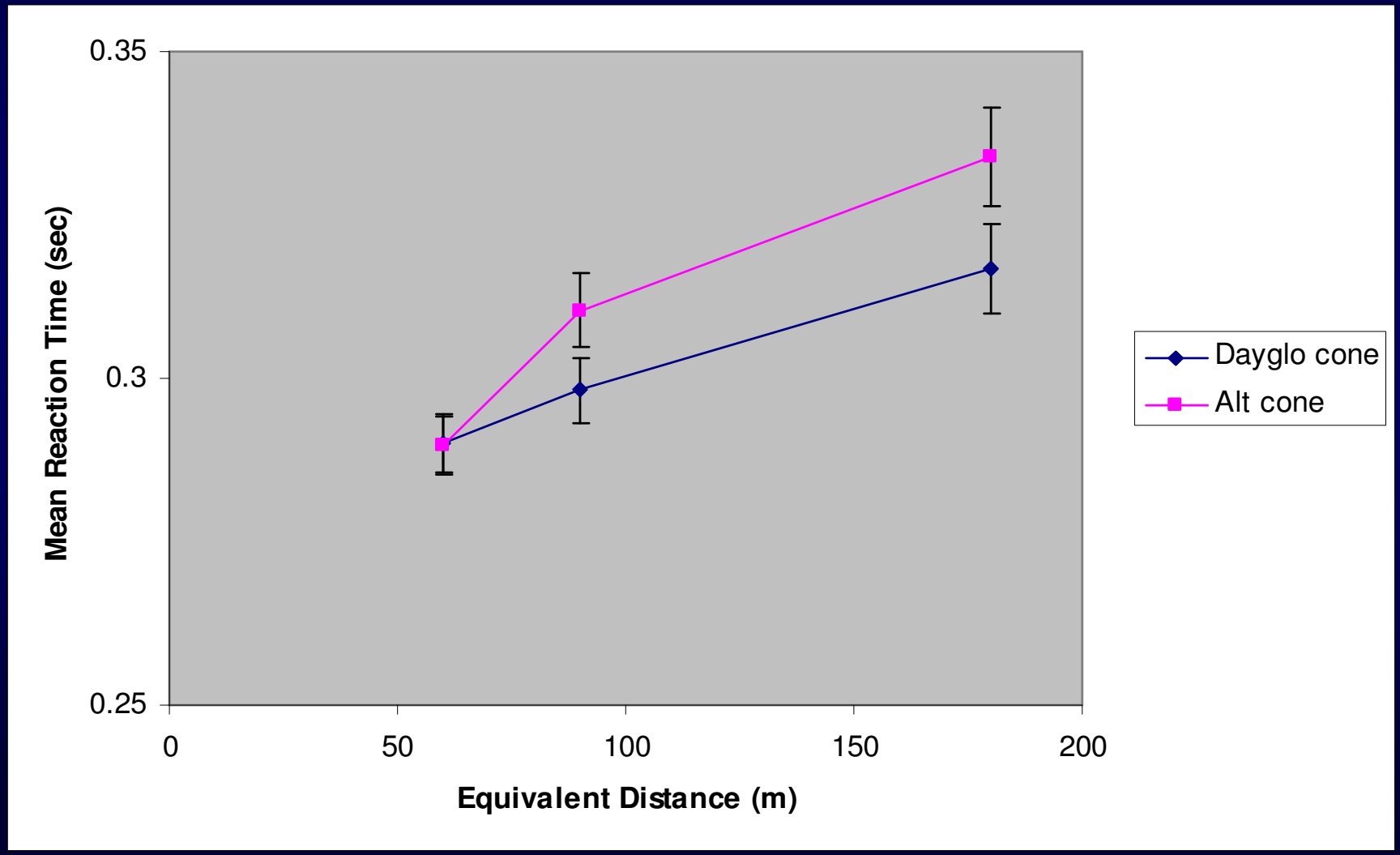


Comparison #3: 180 Meters

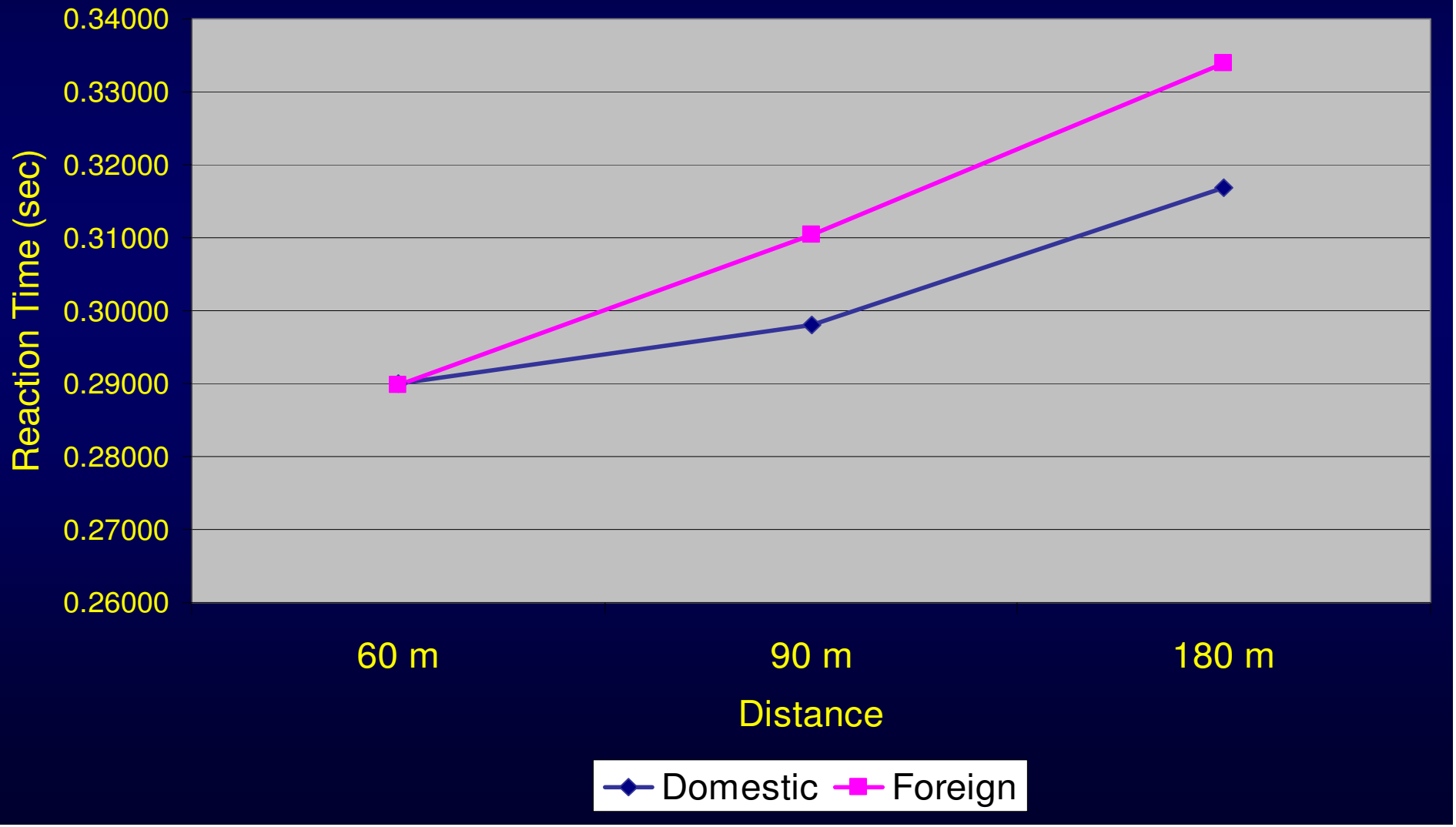
- Domestic Cone Reaction Time: .31679 secs
- Foreign Cone Reaction Time: .33400 secs
- Significant Differences Between Reaction Times $t(23) = -6.624$, $p < .05$

- Conclusion: There Are Differences in Reaction Times Between Cones at 180m – Reaction Times Are Faster with Domestic Cones

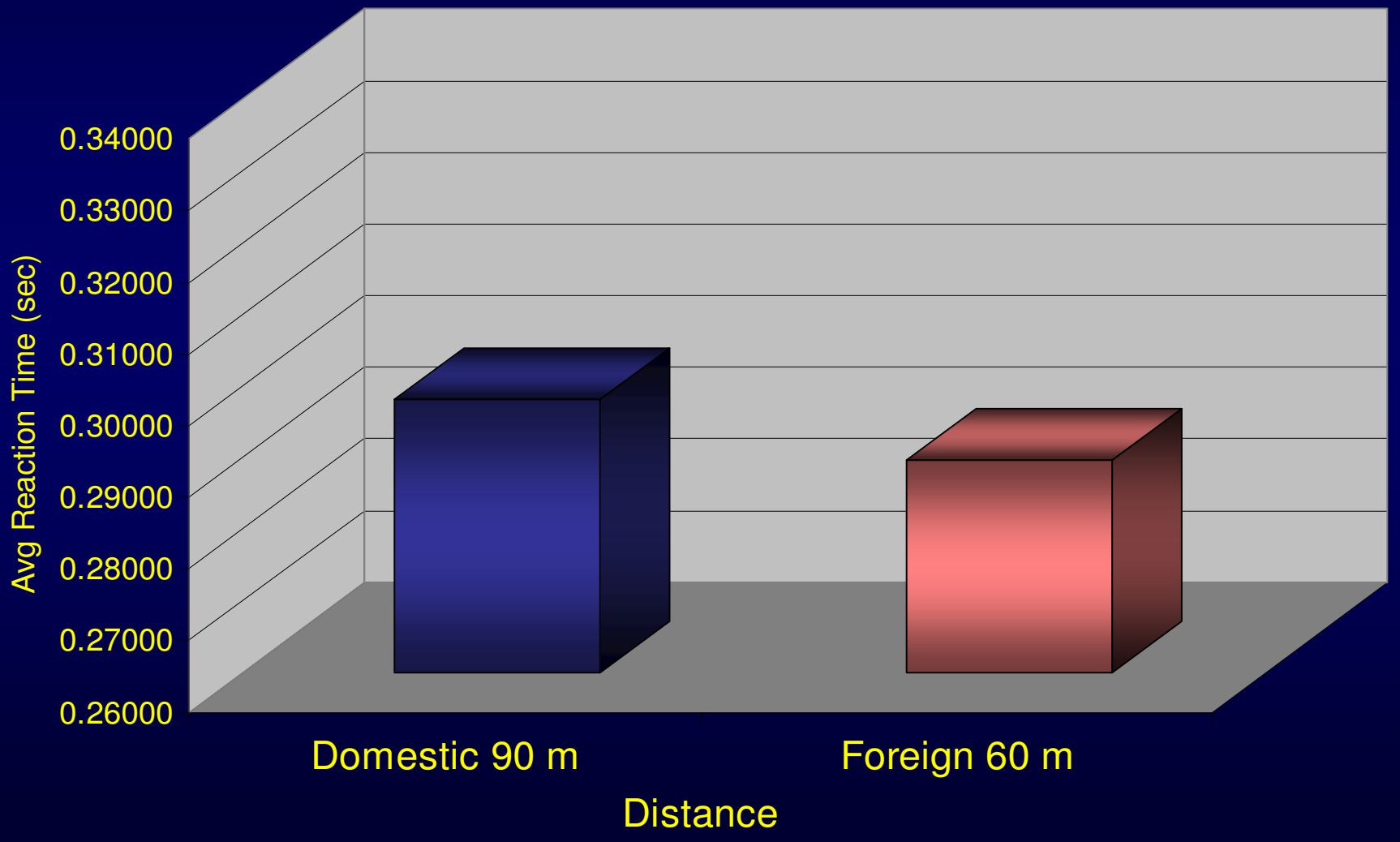
Domestic vs. Foreign Cones



Domestic vs. Foreign Cones



Unfair Comparison?
Domestic at 90m vs. Foreign at 60m

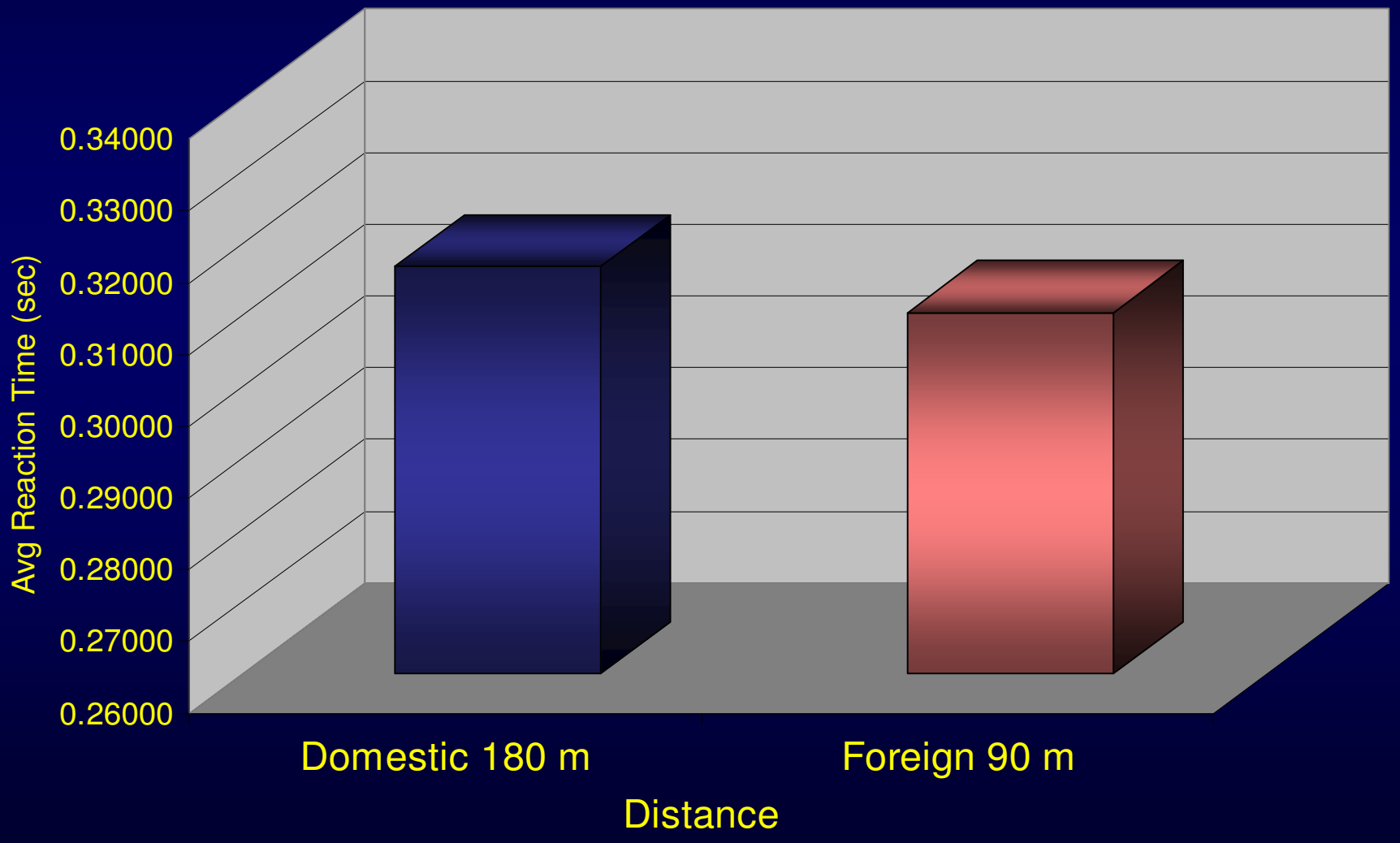


Unfair Comparison? Domestic at 90m vs. Foreign at 60m

- Domestic Cone Reaction Time at 90 Meters: .29812 secs
- Foreign Cone Reaction Time at 60 Meters: .28975 secs
- No Significant Differences Between Reaction Times $t(23) = 1.781$, $p > .05$

- Conclusion: There Are No Differences in Reaction Times Between the Domestic Cone at 90m and the Foreign Cone at 60m – Domestic Cones At 90m Are Equivalent to Foreign Cones at 60m!

Unfair Comparison?
Domestic at 180m vs. Foreign at 90m

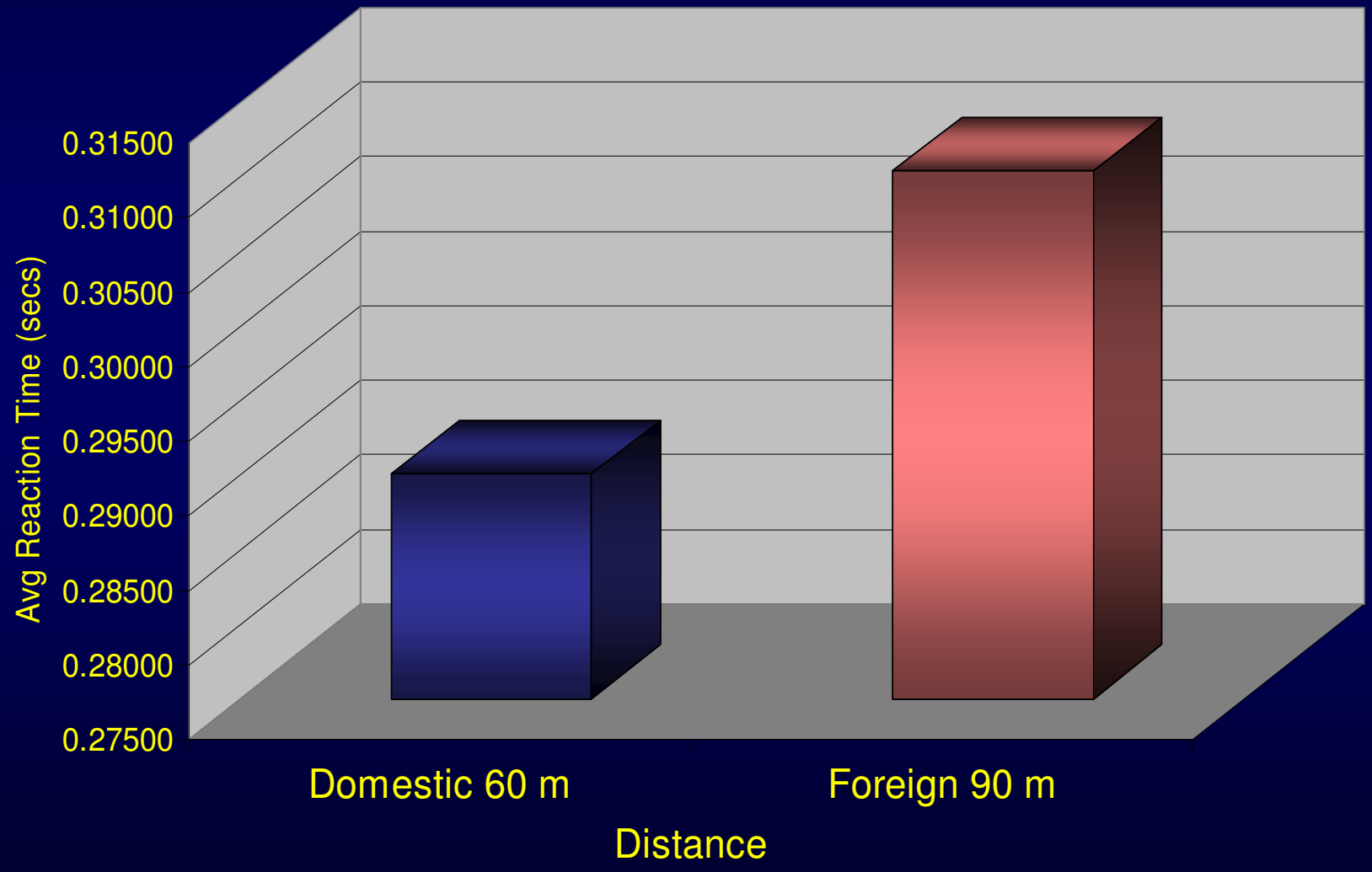


Unfair Comparison? Domestic at 180m vs. Foreign at 90m

- Domestic Cone Reaction Time at 180 Meters: .31679 secs
- Foreign Cone Reaction Time at 90 Meters: .31042 secs
- No Significant Differences Between Reaction Times $t(23) = 1.866$, $p > .05$

- Conclusion: There Are No Differences in Reaction Times Between the Domestic Cone at 180m and the Foreign Cone at 90m – Domestic Cones At 180m Are Equivalent to Foreign Cones at 90m!

What About the Opposite? Domestic at 60m vs. Foreign at 90m

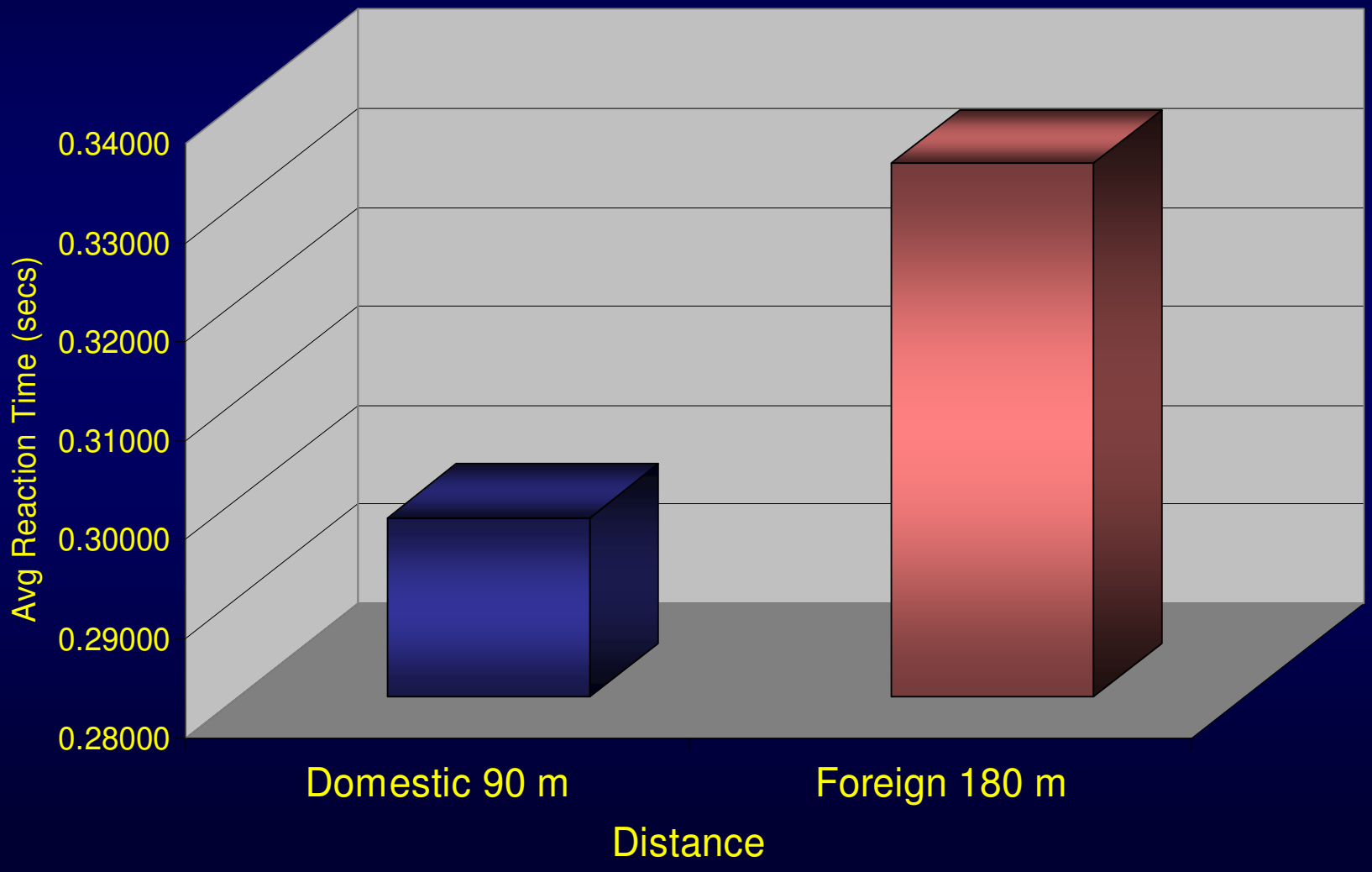


What About the Opposite? Domestic at 60m vs. Foreign at 90m

- Domestic Cone Reaction Time at 60 Meters: .29008 secs
- Foreign Cone Reaction Time at 90 Meters: .31042 secs
- Significant Differences Between Reaction Times $t(23) = 5.970$, $p < .05$

- Conclusion: There Are Significant Differences in Reaction Times Between the Domestic Cone at 60m and the Foreign Cone at 90m – Domestic Cones Are Detected Much Faster At 60m Than Foreign Cones at 90m (what you'd expect)

What About the Opposite? Domestic at 90m vs. Foreign at 180m



What About the Opposite? Domestic at 90m vs. Foreign at 180m

- Domestic Cone Reaction Time at 90 Meters: .29812 secs
- Foreign Cone Reaction Time at 180 Meters: .33400 secs
- Significant Differences Between Reaction Times $t(23) = 6.317$, $p < .05$

- Conclusion: There Are Significant Differences in Reaction Times Between the Domestic Cone at 90m and the Foreign Cone at 180m – Domestic Cones Are Detected Much Faster At 90m Than Foreign Cones at 180m (what you'd expect)

Conclusions

Conclusions

- No Differences Between Cones at 60m
  - may be too small to be helpful in most driving situations
- Domestic Cone Detected Faster at 90m than Foreign Cone
- Domestic Cone Detected Faster at 180m than Foreign Cone

Conclusions

- Domestic Cone Detected Equally at 90m as Foreign Cone at 60m
- Domestic Cone Detected Equally at 180m as Foreign Cone at 90m

Conclusions

- Overall, Results Demonstrate That, In Terms of Visual Recognition, the Domestic Cone Is Clearly and Unequivocally Superior to the Foreign Cone

Next Steps?

- Results Obtained in Simulated Driving Conditions Using Simple Vision Recognition Task With No Distractions
- Effectiveness of Domestic Cones May Be Enhanced in Simulated Driving Conditions Where Other Distractions Exist

Questions?