# The Role of Discriminative Stimuli and Motivation Level in a Three Response Sequence

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## Earlier Research

- Previous study by Reid, Kelly, and Weaver (1999)
- Role of Discriminative Stimuli in a Three Response Sequence
- How does a discriminative stimulus influence which response is produced next in a sequence?

## Trial Types:

Compare Accuracy:

No Tone: $R_1 \rightarrow R_2 \rightarrow R_3 \Rightarrow$ Food — $R_2$?

Tone: Tone $R_1 \rightarrow R_2 \rightarrow R_3 \Rightarrow$ Food

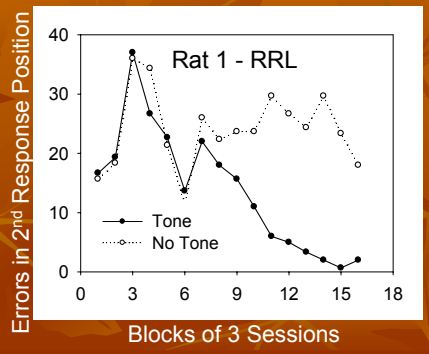
Probe: Tone $R_1 \rightarrow R_2 \rightarrow R_3 \Rightarrow$ Food — $R_3$?

Position 1 Position 2

## Sequence Types

- AAB, ABA, and ABB
- AAB is the harder sequence
- First response tells the subject to "persist" while pressing the same response a second time now means "switch" to another lever
- Conflict of meaning that does not occur with the other types of sequences

## Results




## Conclusions:

- The tone did influence the next response in the sequence:
  - IRTs were shorter in sequences with tones.
  - Justification for our experiment: Tone increased accuracy on R2 and unexpectedly increased accuracy on R3 as well

## Interpreting the Earlier Study

- Is the tone acting as one stimulus or as two separate stimuli?
- Therefore, shorten the duration of the tone so it ends before R2

## Our Experiment

- 8 naïve rats
- Rats randomly assigned to sequences from previous study (AAB, ABB, ABA)

## Procedure

- Condition 80%: Alternated between Tone and No Tone trials until 76 reinforcements were obtained or 45 min. expired

## Trial Types:

Compare Accuracy: $R_2$? $R_3$?

No Tone: $R_1 \rightarrow R_2 \rightarrow R_3 \Rightarrow$ Food

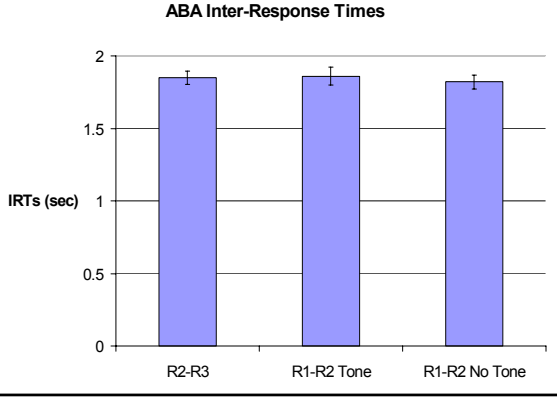
Tone: $\overset{\text{Tone}}{R_1} \rightarrow R_2 \rightarrow R_3 \Rightarrow$ Food

No Probe Trial
Manipulated Motivation Level
Increased body weight from 80% to 90%, and eventually to 100%

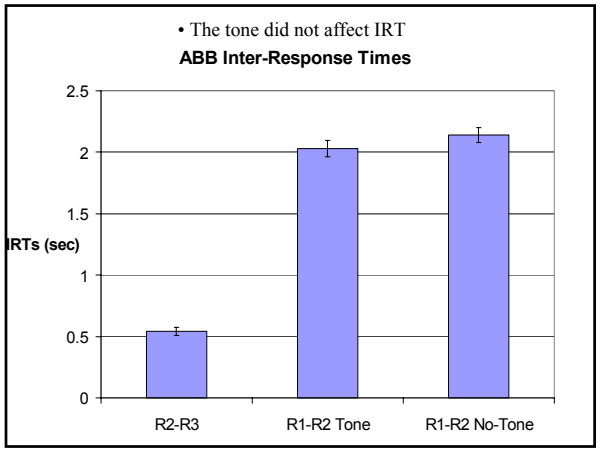
## The Tone had no effect on R2!

- Subjects did not differentiate between tone and no tone trials, in relation to accuracy of R2, after approximately 60 sessions
- Did not show same results as previous study
- Possibly tone duration was too short to be salient
- Interestingly: subjects were run more than twice as long as in previous study and still no effect
- Tone did not have an effect on R1 or R2 IRT's
- Also, trial accuracy stabilized for most subjects at 60%, not at 100%

• The tone did not affect IRT



• The tone did not affect IRT

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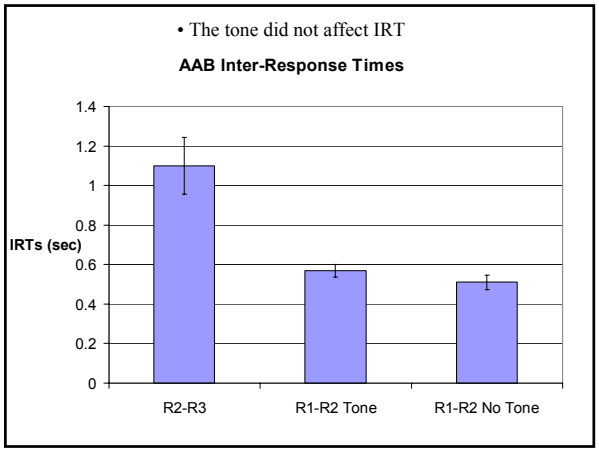
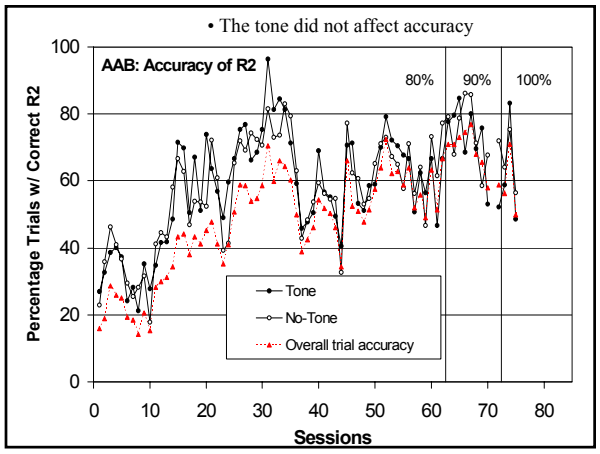



• The tone did not affect accuracy

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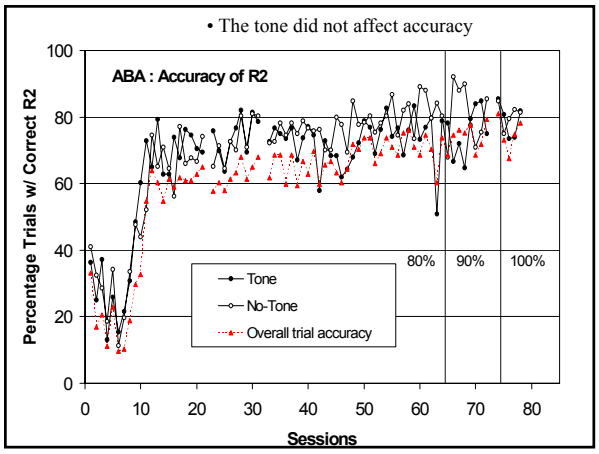


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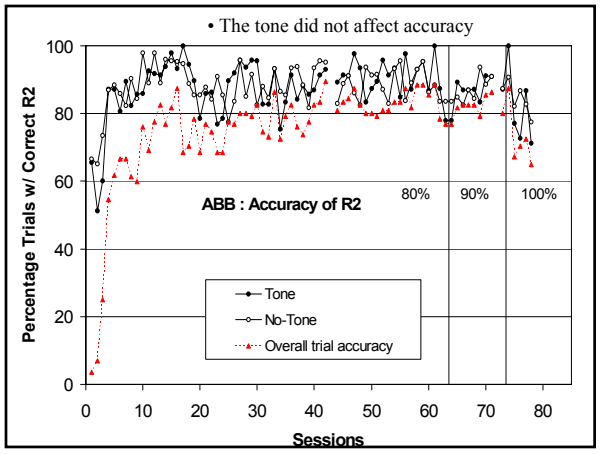
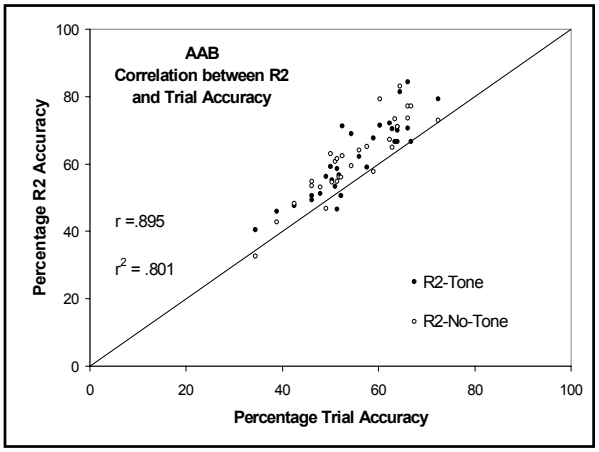
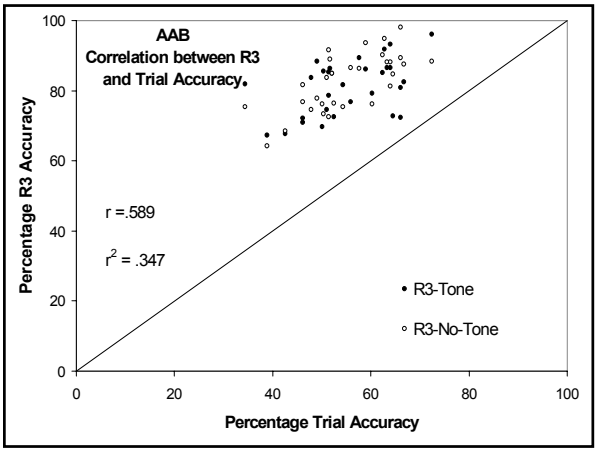


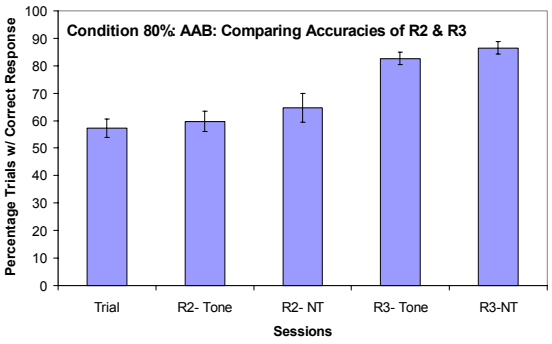

## Why Would Accuracy Become Stable at 60%?

- What are the sources of the errors? R1, R2, or R3
- Look at correlations between R2 and R3 with trial accuracy
- Compare accuracies of R2 and R3
- Also compare accuracy of R1 across sequences, in addition to doublets




• R2 was significantly less accurate than R3

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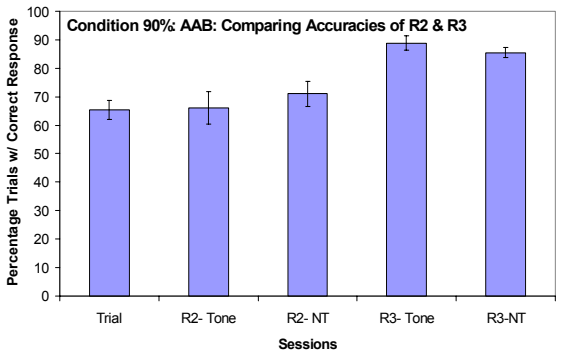


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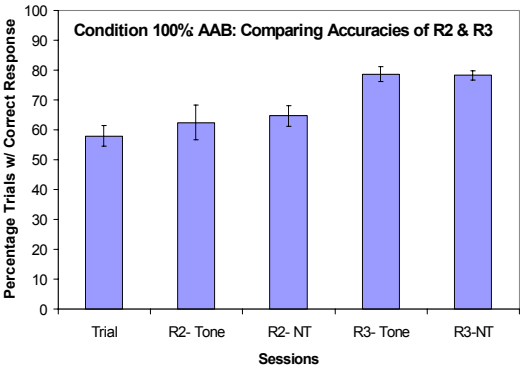
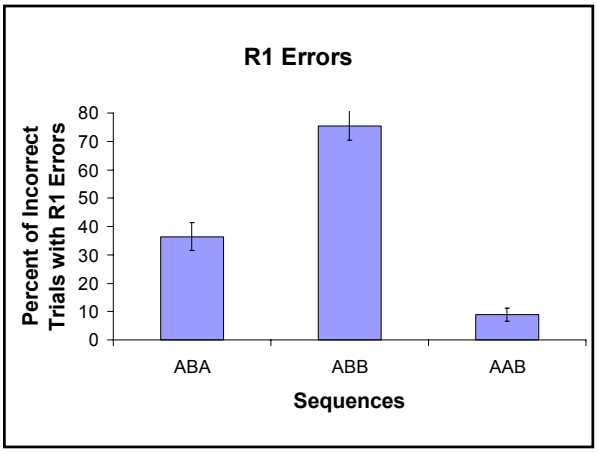
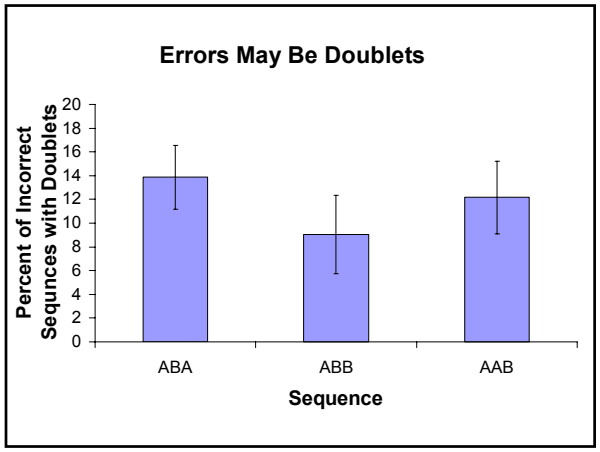





## Discussion

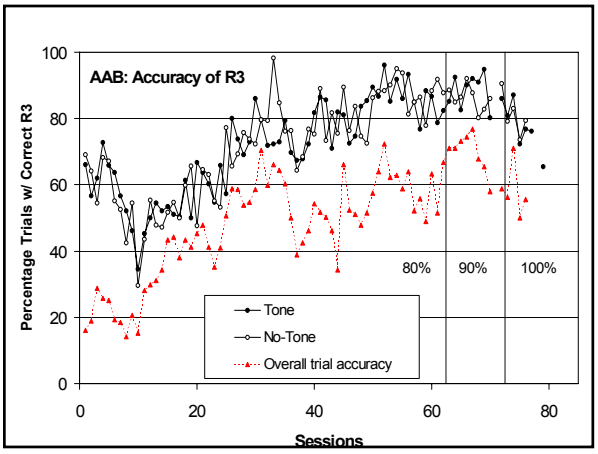
- Tone had no effect on whether or not the rat completed the sequence accurately
- R2 seems to be the major source of error for all the sequences (AAB, ABA, and ABB).
- R1 is a significant source of error for ABB also.
- Doublets are another potential source of error in the three response sequences
- Manipulation of Motivation level decreased accuracy, but did not change the source of error (R2)

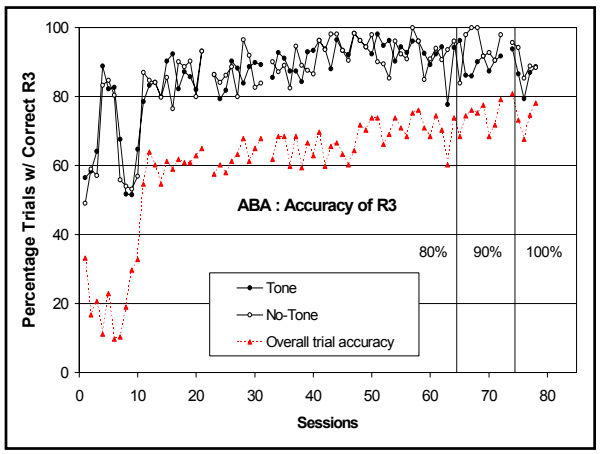
## The Question Remains…

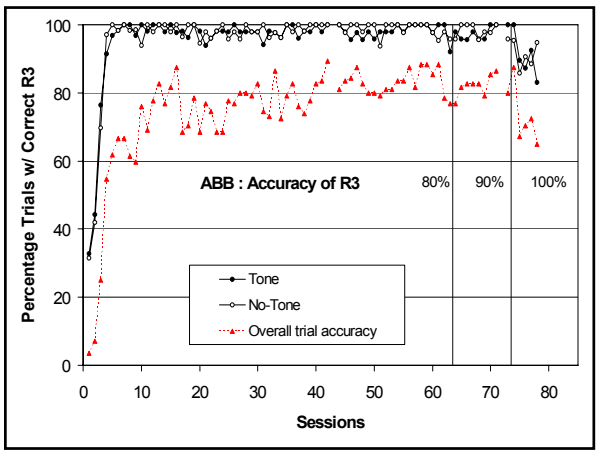
- Why would the tone not have an effect here when it had such a strong effect in the earlier study?

## The End

- WE ARE SO GRADUATING!!!




Percentage Trials w/ Correct R3
ABA : Accuracy of R3
80%
90%
100%
Tone
No-Tone
Overall trial accuracy
Sessions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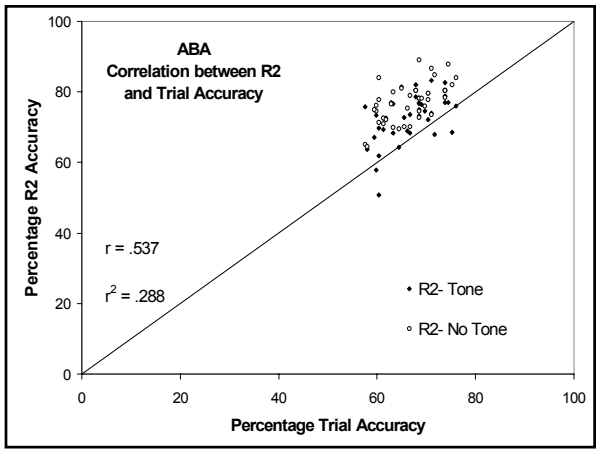
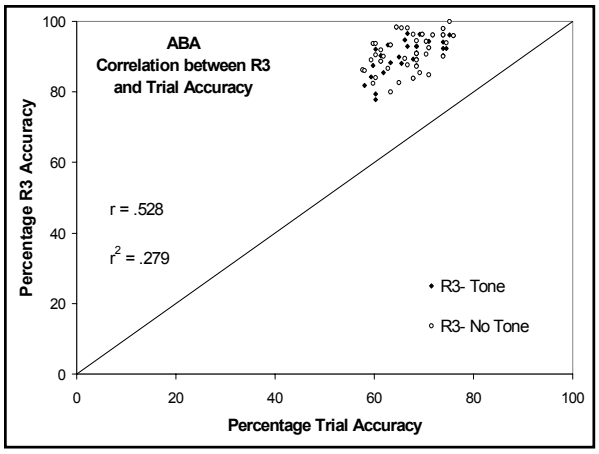

ABA
Correlation between R2
and Trial Accuracy
Percentage R2 Accuracy
r = .537
r2 = .288
R2- Tone
R2- No Tone
Percentage Trial Accuracy


ABA
Correlation between R3
and Trial Accuracy
Percentage R3 Accuracy
r = .528
r2 = .279
R3- Tone
R3- No Tone
Percentage Trial Accuracy

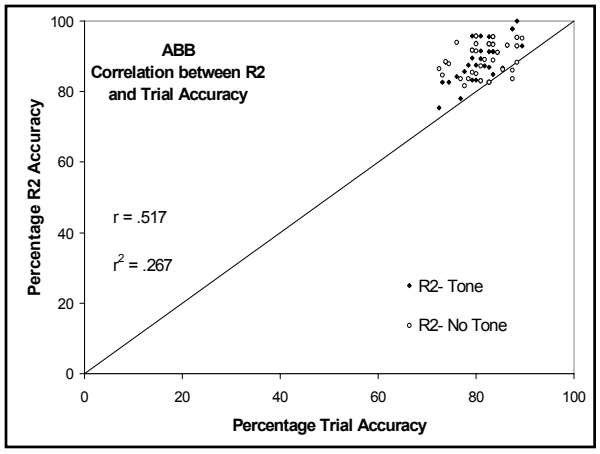


ABB
Correlation between R2
and Trial Accuracy
Percentage R2 Accuracy
r = .517
r2 = .267
R2- Tone
R2- No Tone
Percentage Trial Accuracy

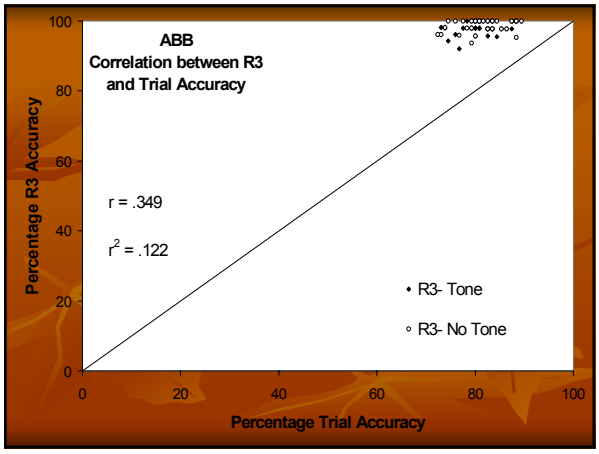
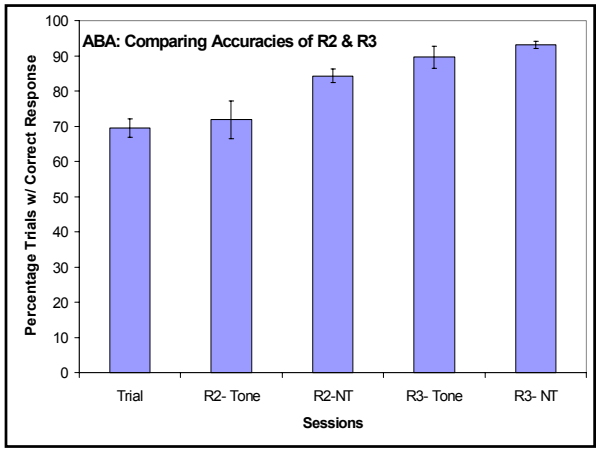
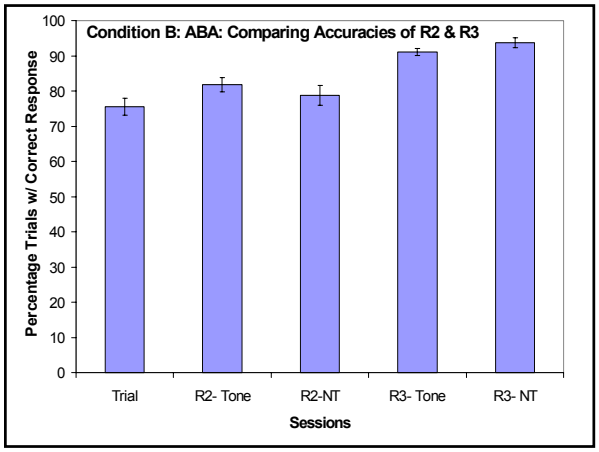
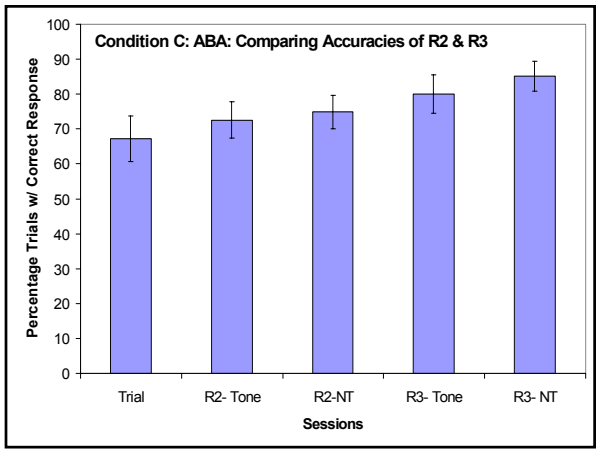


ABB
Correlation between R3
and Trial Accuracy
Percentage R3 Accuracy
r = .349
r2 = .122
R3- Tone
R3- No Tone
Percentage Trial Accuracy


ABA: Comparing Accuracies of R2 & R3
Percentage Trials w/ Correct Response
100
90
80
70
60
50
40
30
20
10
0
Trial
R2- Tone
R2-NT
R3- Tone
R3- NT
Sessions


Condition B: ABA: Comparing Accuracies of R2 & R3
Percentage Trials w/ Correct Response
100
90
80
70
60
50
40
30
20
10
0
Trial
R2- Tone
R2-NT
R3- Tone
R3- NT
Sessions


Condition C: ABA: Comparing Accuracies of R2 & R3
Percentage Trials w/ Correct Response
100
90
80
70
60
50
40
30
20
10
0
Trial
R2- Tone
R2-NT
R3- Tone
R3- NT
Sessions

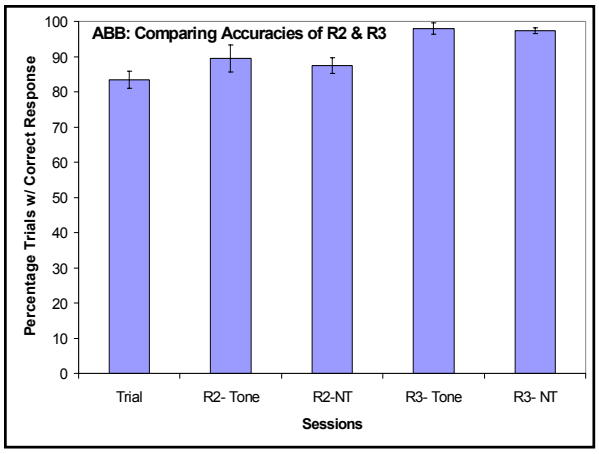
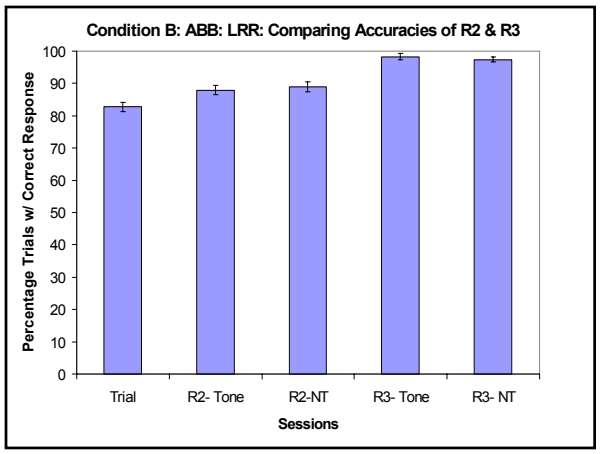
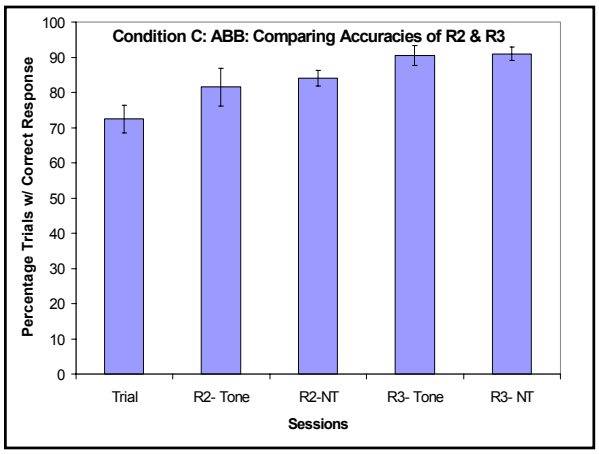


ABB: Comparing Accuracies of R2 & R3
Percentage Trials w/ Correct Response
100
90
80
70
60
50
40
30
20
10
0
Trial
R2- Tone
R2-NT
R3- Tone
R3- NT
Sessions


Condition B: ABB: LRR: Comparing Accuracies of R2 & R3
Percentage Trials w/ Correct Response
100
90
80
70
60
50
40
30
20
10
0
Trial
R2- Tone
R2-NT
R3- Tone
R3- NT
Sessions


Condition C: ABB: Comparing Accuracies of R2 & R3
Percentage Trials w/ Correct Response
100
90
80
70
60
50
40
30
20
10
0
Trial
R2- Tone
R2-NT
R3- Tone
R3- NT
Sessions