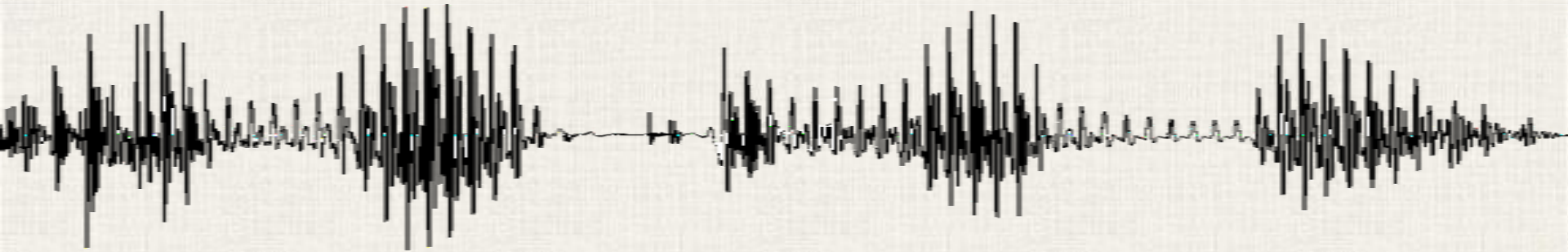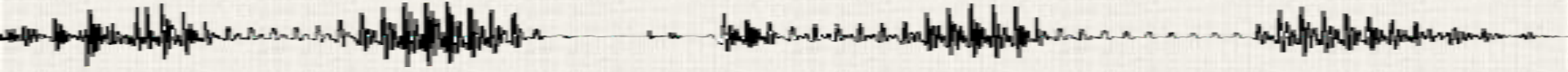# IPRO 343

Improving Communication Quality of the Drive-Thru Experience

Project Introduction

- New IPRO in Fall 2008
- Problem: Customer satisfaction in QSR Industry

Project Focus

- Ratings by customers of order-takers communication: **high in importance, low in satisfaction**

- High priority in industry is improving incoming communication **to** order-takers.

- Influences on communication between order-takers and customers:
  - Culture
  - Cognition
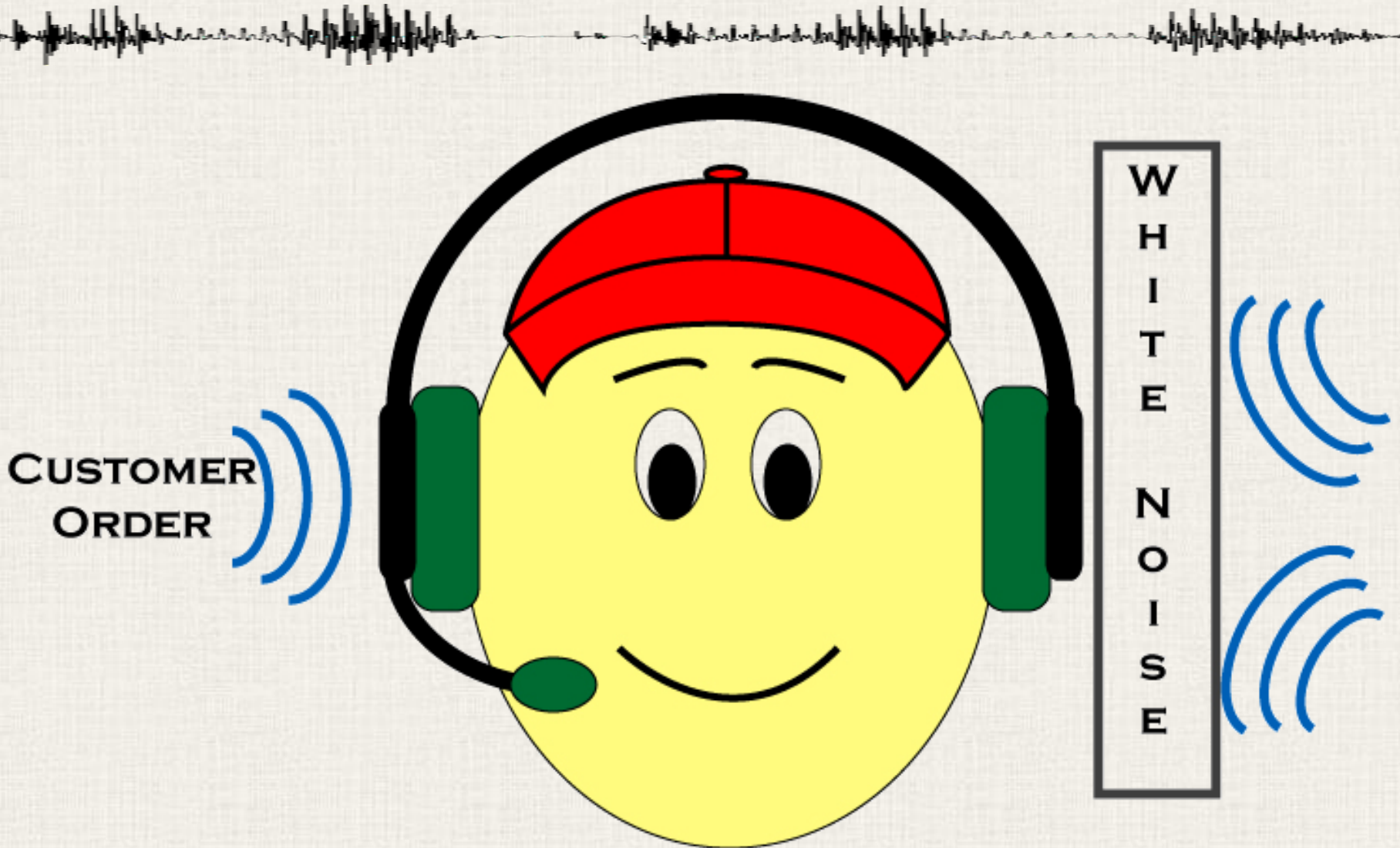 - Human-Technology Interaction
  - Acoustics

Project Goals

- Address the problem of multiple streams of speech for drive-thru order-takers
- Propose a solution and test it experimentally
- Analyze results of the experiment
- Provide future IPRO with possible areas of research

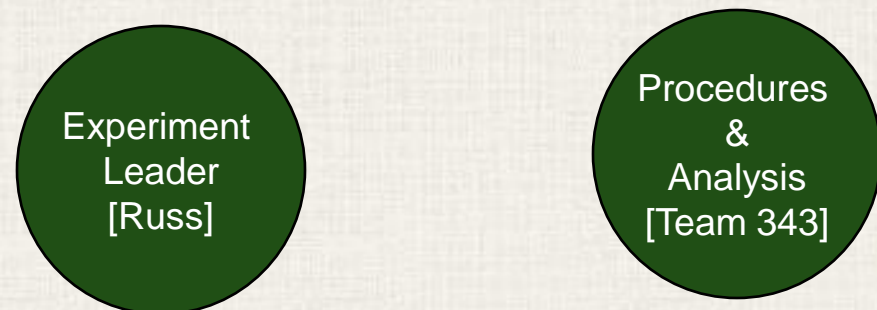# Multiple Speech Streams

The Impact of White Noise

Hypothesis

- Adding white noise to babble will improve **speech intelligibility**, as measured by accuracy.

Project Phases

Phase One

Phase Two

Editing
[Susan]

Experimental
Design
[Scott]

Document
Management
[Karen]

Recruitment
[Shavanna]

**Team Leaders
[Kevin and
Halcyon]**

Ethics/
IRB
[Matt]

Acoustics
[Sarah]

Experiment
Leader
[Russ]

Procedures
&
Analysis
[Team 343]

Budget/
Facilities
[Shaun]

Experimental Process

- Script
- Rating Tool
- Interface

Designing the Experiment

Creating Sound Files

- Order
- Babble
- White Noise

- Recruitment
- Experiment Days
- Scoring

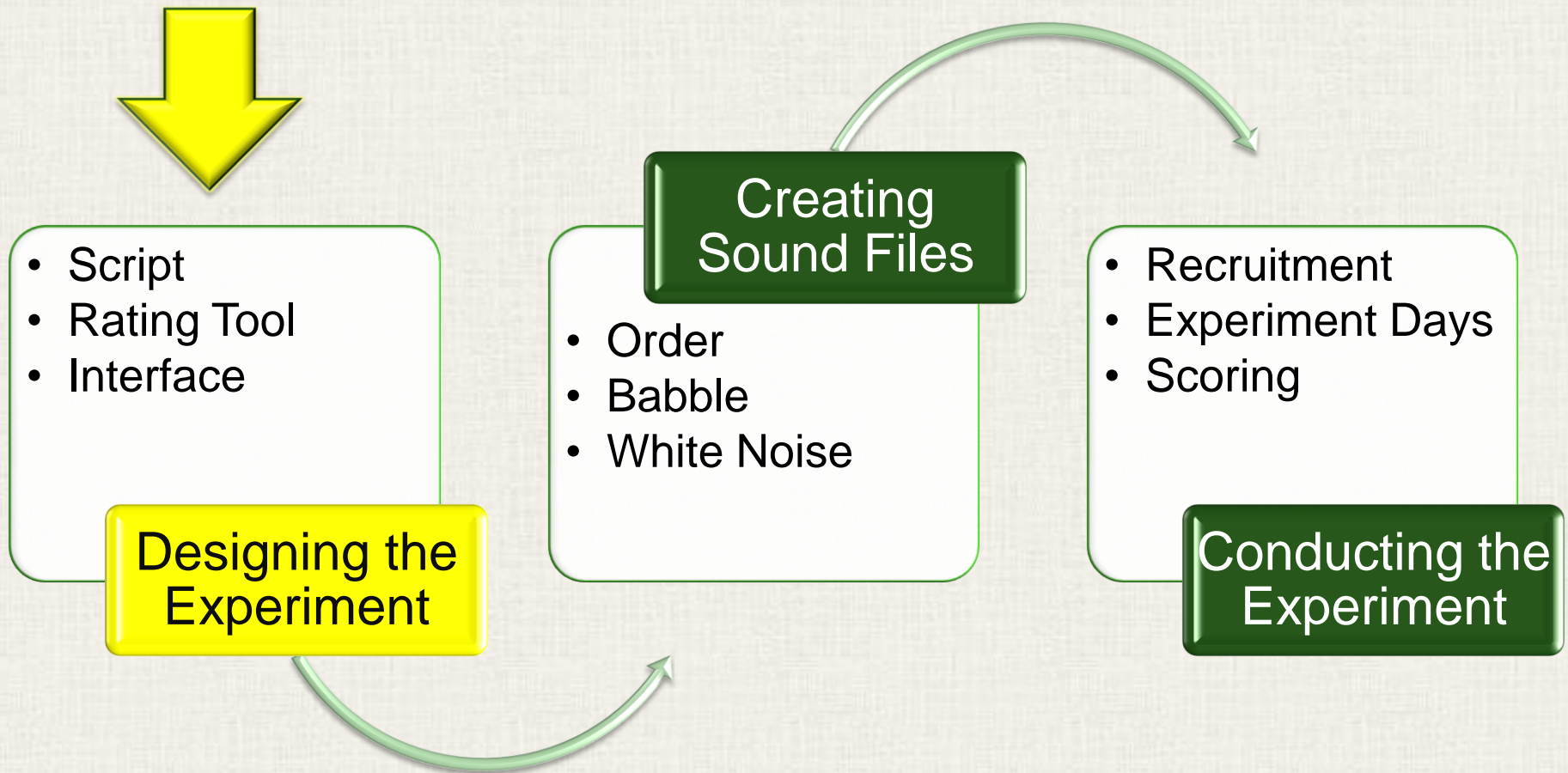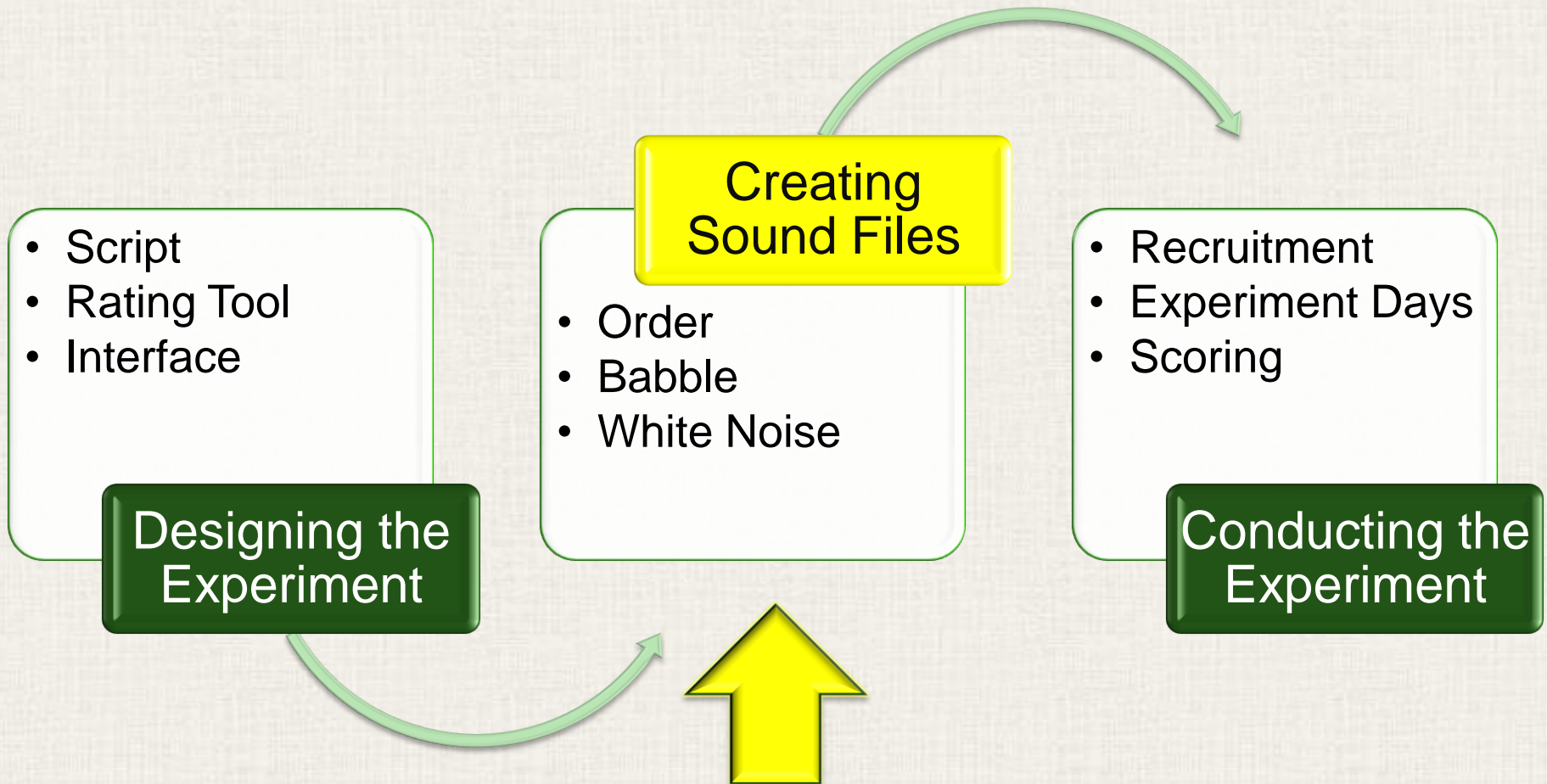**Conducting the Experiment**

Experiment Design

For each order you hear, please circle, check, or cross out the appropriate word as in the example given below:

Q	I'd like a number:	Topping	Side/Drink	For Official Use Only	
				Total Correct	Time Taken
1	1 ②③ 3 4 5 6 7 8 9 10	☑ Cheese ☐ Beans ☐ Peas ~~☐ Pickles~~ ☐ Potatoes ☐ Tomatoes	☐ Pies ☑ Fries ☐ Rice ☐ Sprite ☐ Coke ☑ Diet coke ☐ Lemonade ☐ Gatorade		

Press ENTER to continue…

Experimental Process

- Script
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Designing the Experiment

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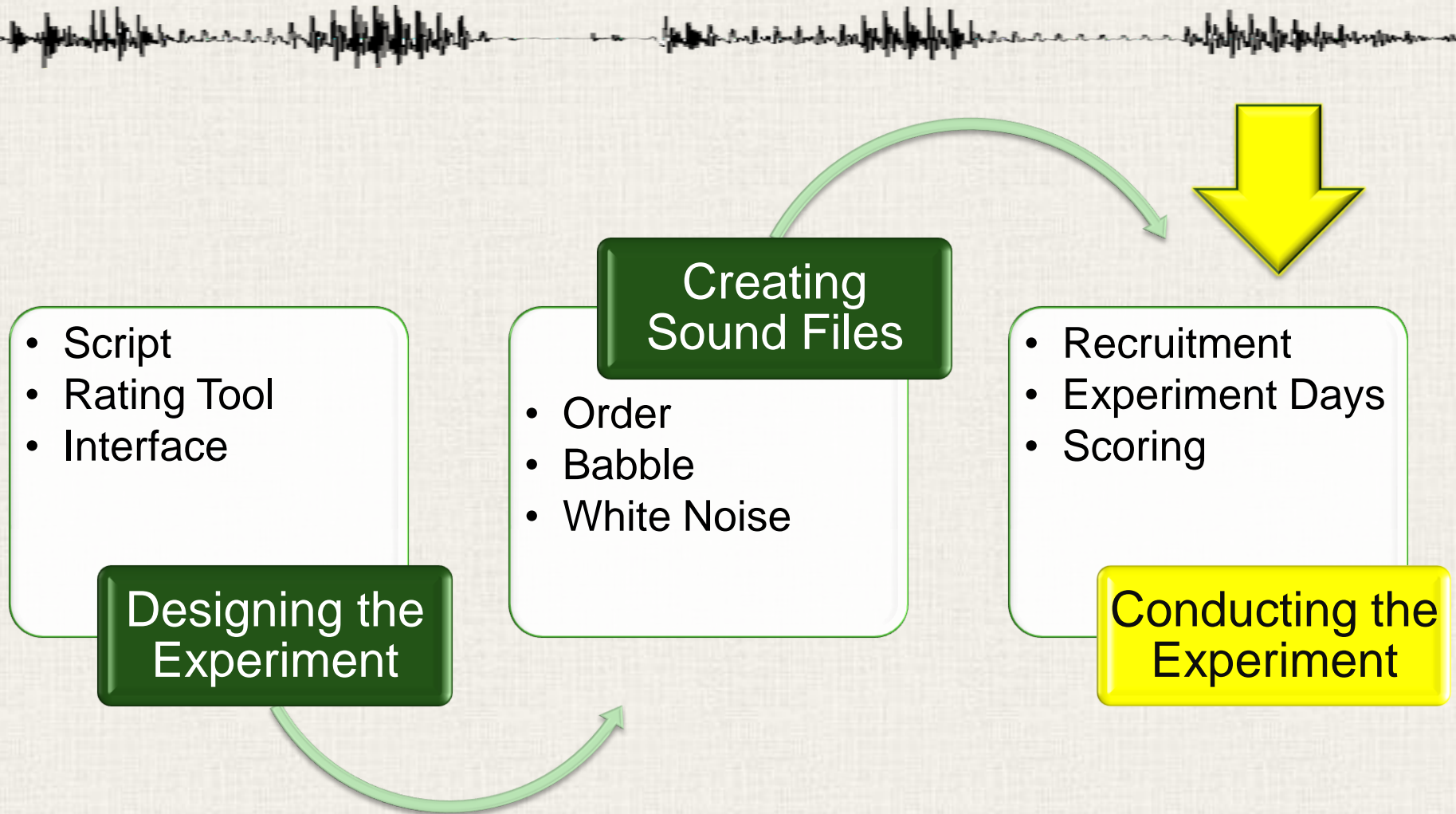**Conducting the Experiment**

Sound Creation

- Order 🔊
- Babble 🔊
- White noise 🔊
- Files were combined to form four conditions

Sound Conditions

	Low Fidelity (Filtered Sound, *i.e.* telephone quality)	High Fidelity (no filter)
Babble	20 Questions	20 Questions
Babble + White Noise	20 Questions	20 Questions

Experimental Process

- Script
- Rating Tool
- Interface

Designing the Experiment

Creating Sound Files

- Order
- Babble
- White Noise

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- Experiment Days
- Scoring

Conducting the Experiment
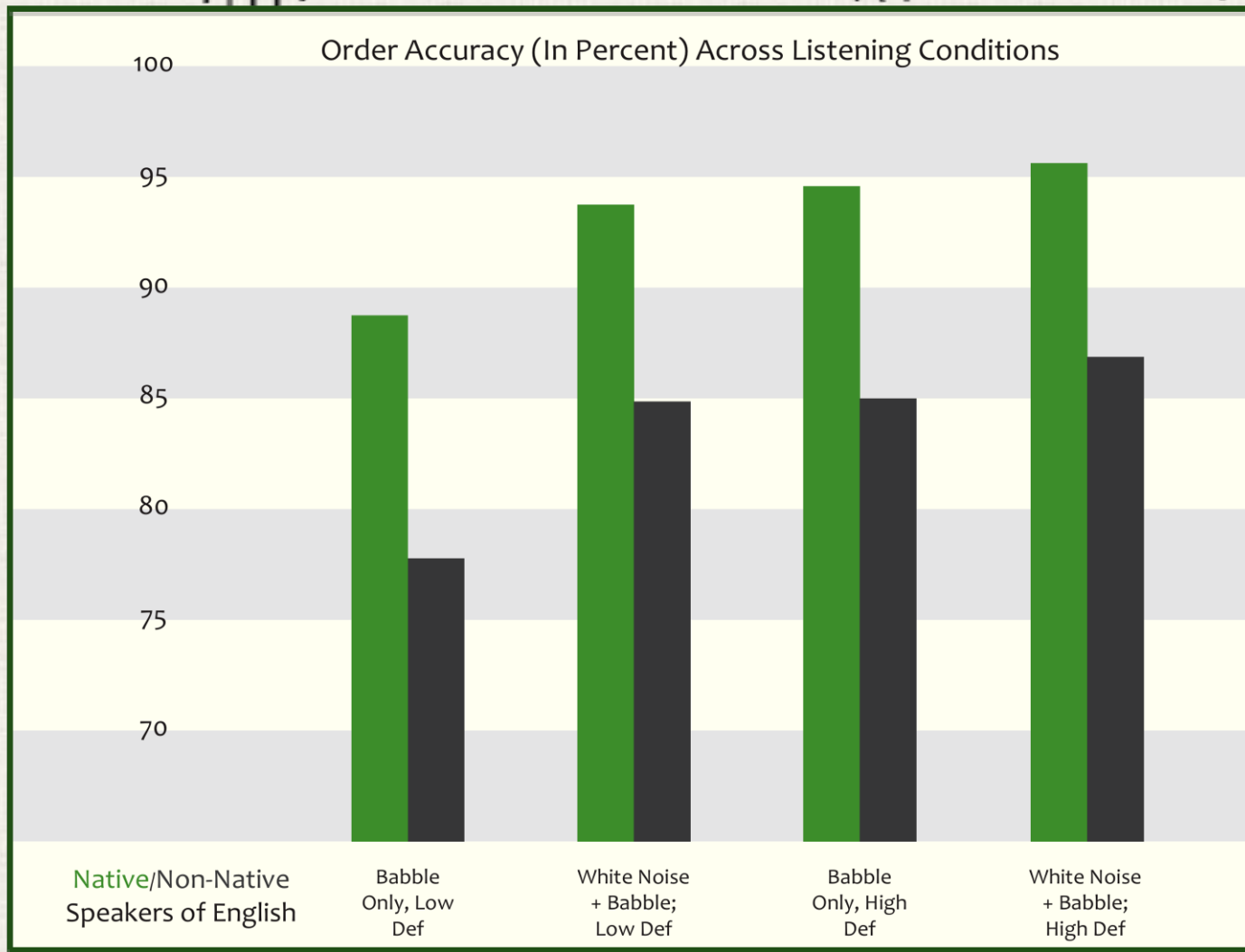
Recruitment and Testing

Experiment Results

- White noise improved intelligibility

- Higher fidelity improved intelligibility

- Native speakers on average scored higher

- White noise improved intelligibility for native and non-native speakers

Experiment Results

Order Accuracy (In Percent) Across Listening Conditions

Applications of Project

- Speech is less intelligible in noisy environments
    - Subway/Bus announcements
    - ATMs
    - Public address systems
- Non-native listeners have even more difficulty
- Broad-range white noise can improve intelligibility in some environments

Summary

- **Problem**: Customer satisfaction in QSR Industry
- **Focus:** Multiple streams of speech for drive-thru order-takers
- **Proposed Solution**: White noise generator
- 77 participants in scientific experiment
- White noise improved intelligibility
- Results will help support future IPRO

Thank you!