Apple's 3D-Touch Technology and its Impact on User Experience

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3D-Touch

- Pressure sensitive touchscreen technology.

- **Goal:** evaluate the usefulness of 3D Touch as an interface for a mobile application.

Approach

- How does 3D-Touch affect the *user experience* of mobile applications?

- Interesting aspects of user experience:

    A. Accuracy.

   B. Cognitive Overhead.

    C. Error recovery.

A. Accuracy

- 3D-Touch to quantify pressure.

- 2004 study[1]—pressure sensitive styluses for performing selection tasks:

  - Hour-long training required if no visual feedback.

1. Ramos, Gonzalo, Matthew Boulos, and Ravin Balakrishnan. "Pressure widgets." Proceedings of the SIGCHI conference on Human factors in computing systems. ACM, 2004.
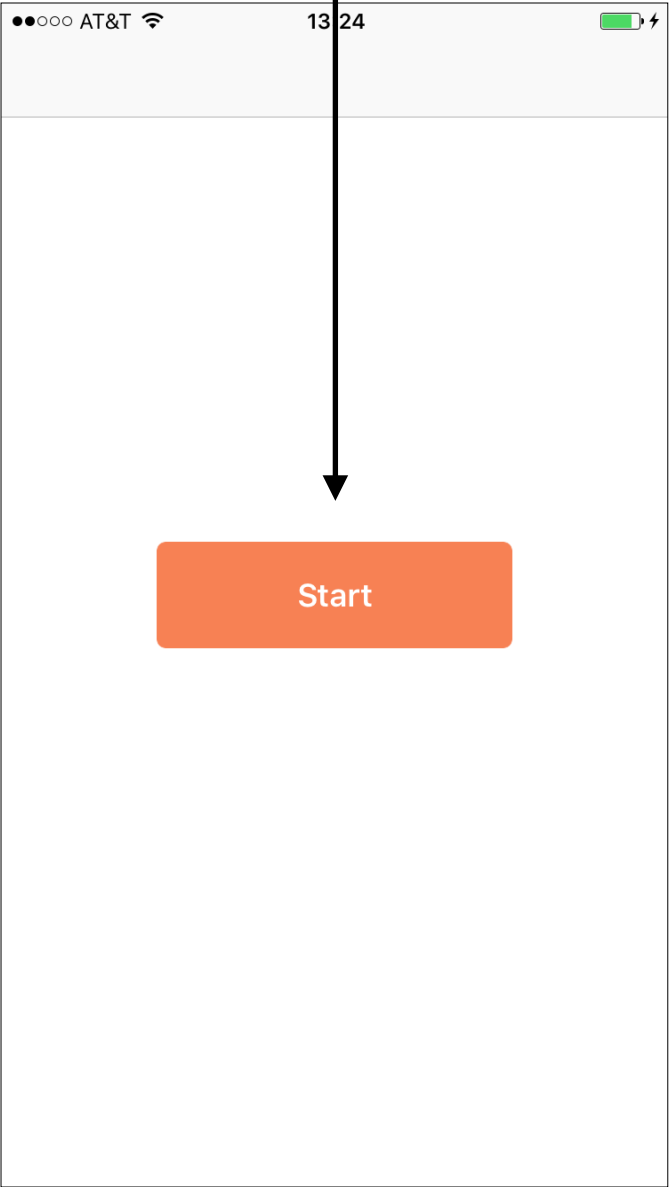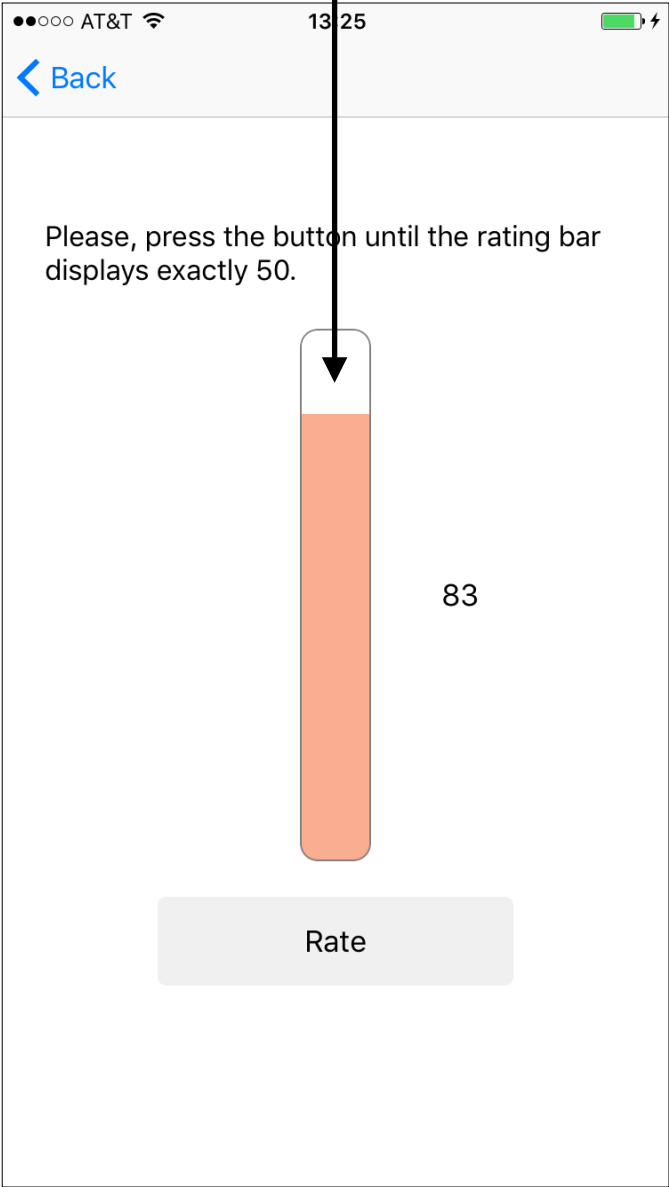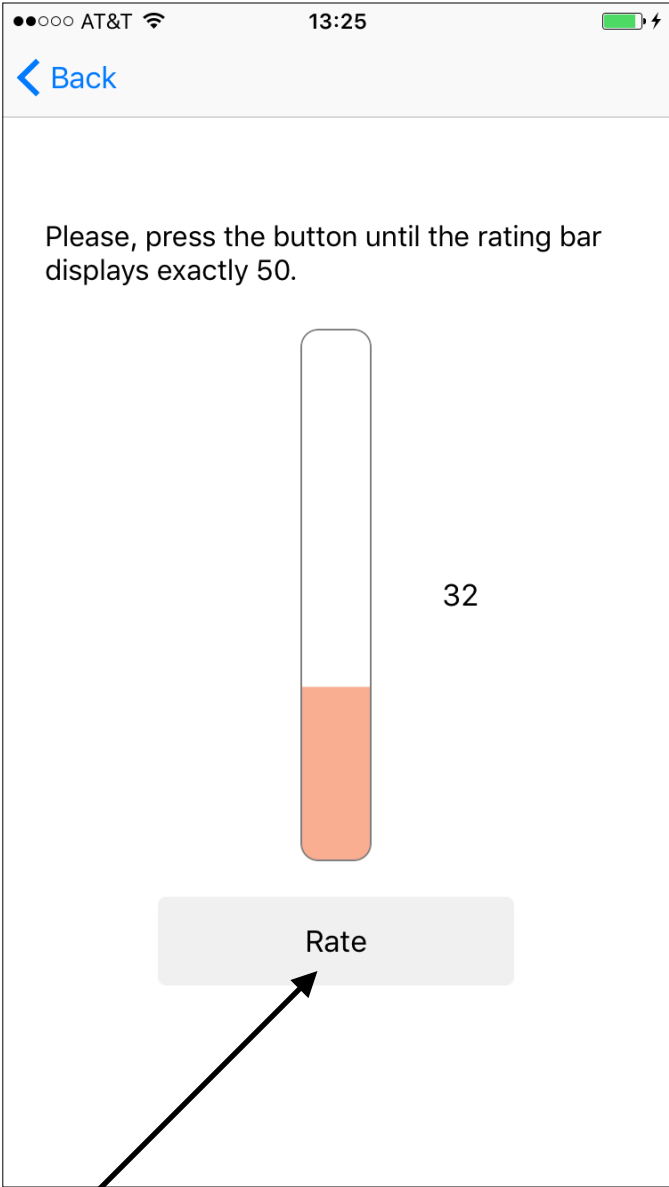
Testing Accuracy
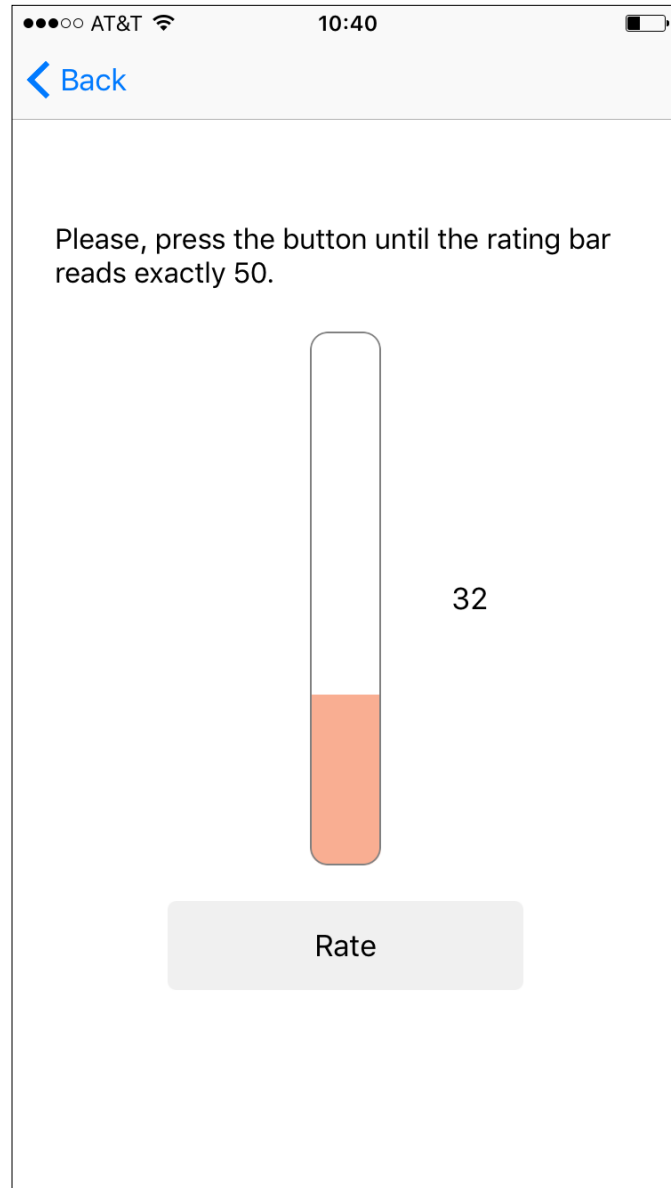
3D-Touch Button
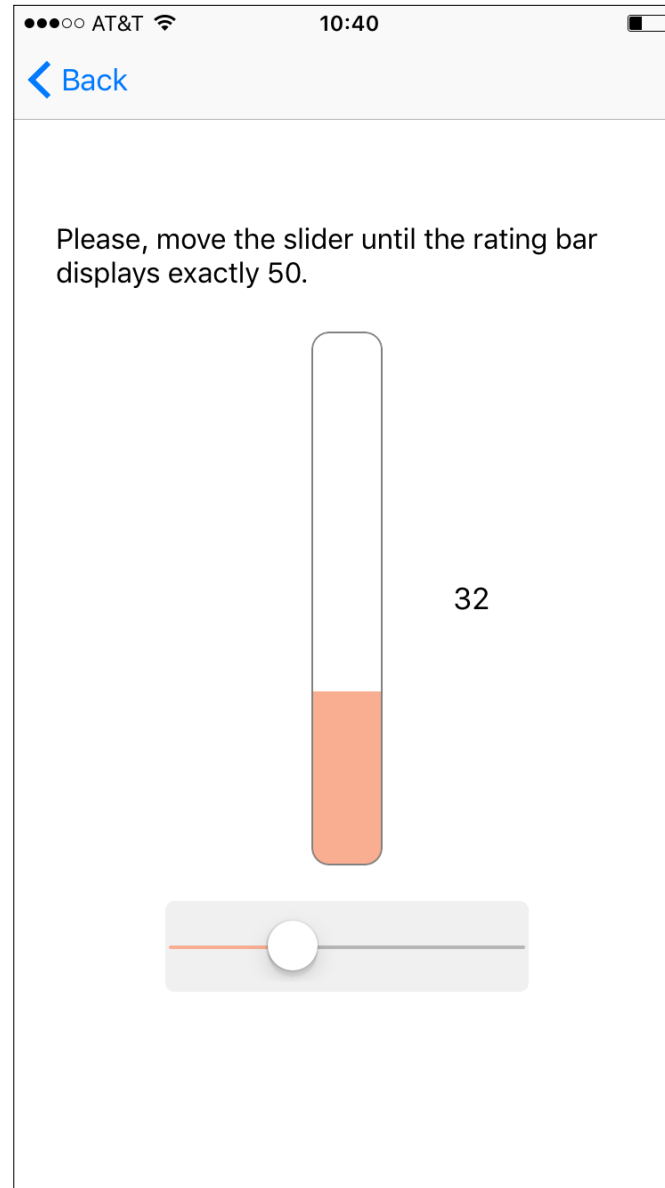
Traditional Slider

- Exact target vs. ± 3 range.

- User is aware of treatment.

- Within-subject study.

Start Rating (starts timer)

Visual feedback is provided (rating bar)

●●○○○ AT&T 📶   13:24   🔋⚡

Start

●●○○○ AT&T 📶   13:25   🔋⚡

‹ Back

Please, press the button until the rating bar displays exactly 50.

32

Rate

●●○○○ AT&T 📶   13:25   🔋⚡

‹ Back

Please, press the button until the rating bar displays exactly 50.

83

Rate

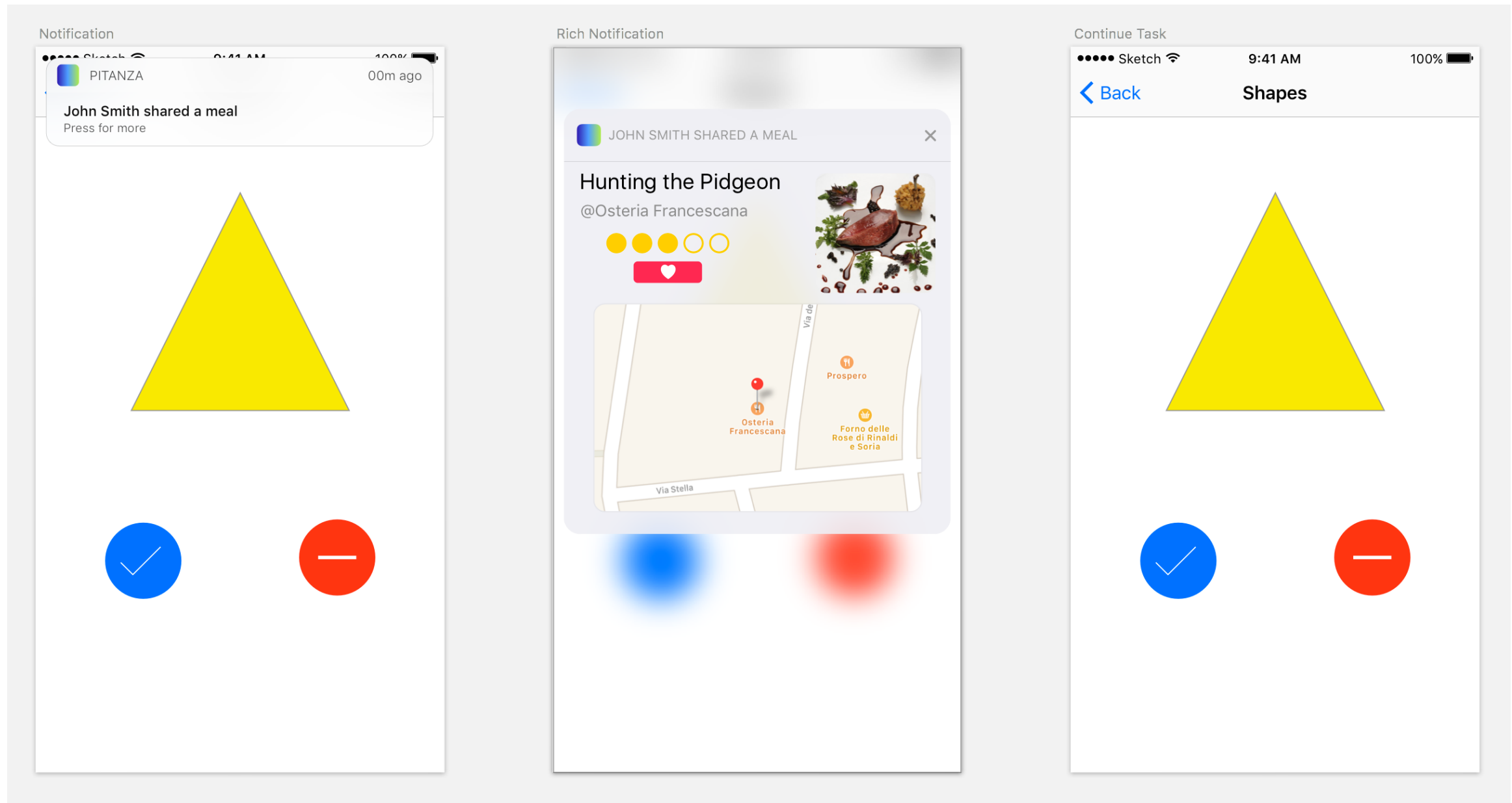3D-Touch Button (pressure sensitive).

Evaluation

- Number of attempts.

- Time it takes to reach target value.

B. Cognitive Overhead

- Pressure sensitive notifications.

- Haptic feedback.

- Streamlined notification interaction.
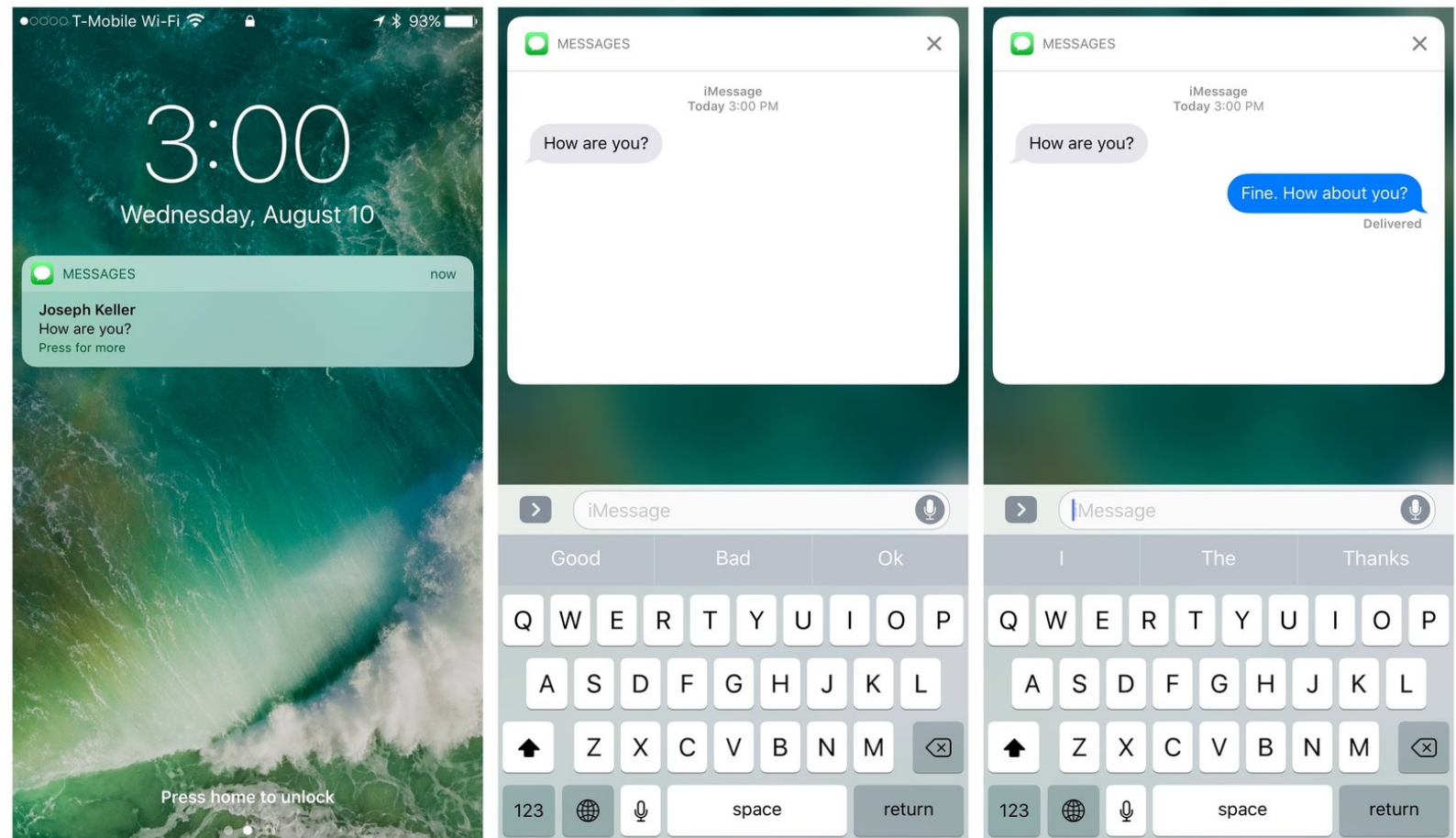
- **"Shape" Game** Rules:
  - Green + Square
  - Yellow + Triangle
  - Red + Circle
  - Blue + Diamond

- Unfamiliar to users and easy to play.

- **Hypothesis**: 3D-Touch is a less disruptive notification system.
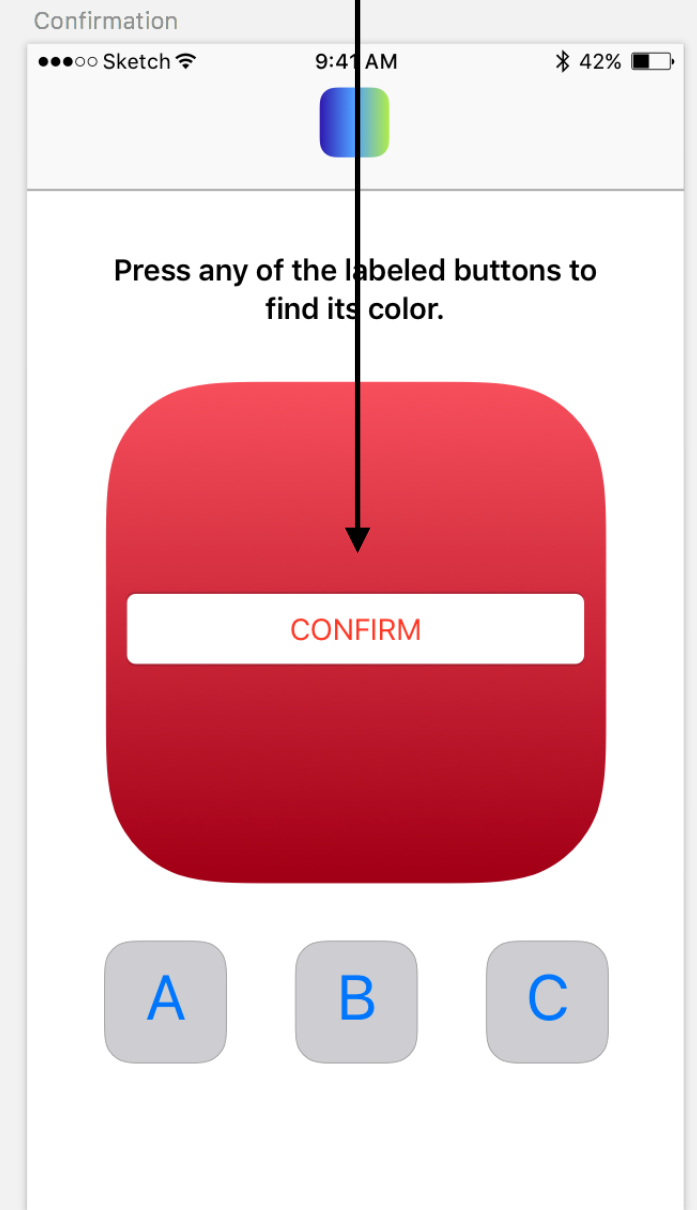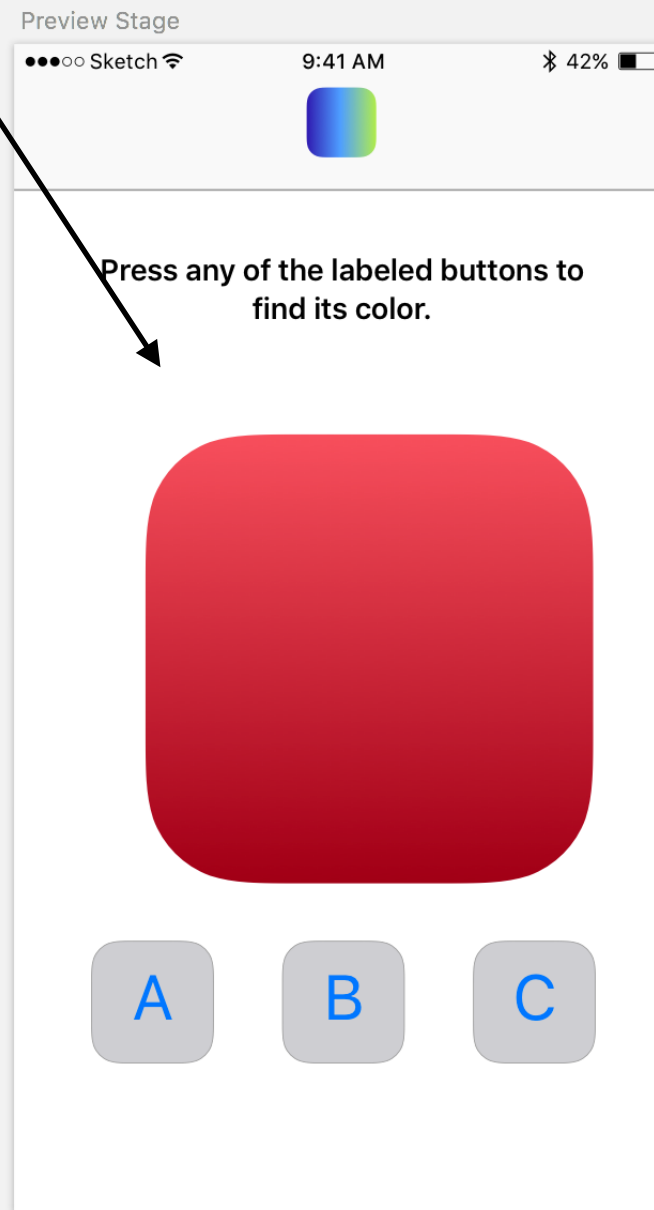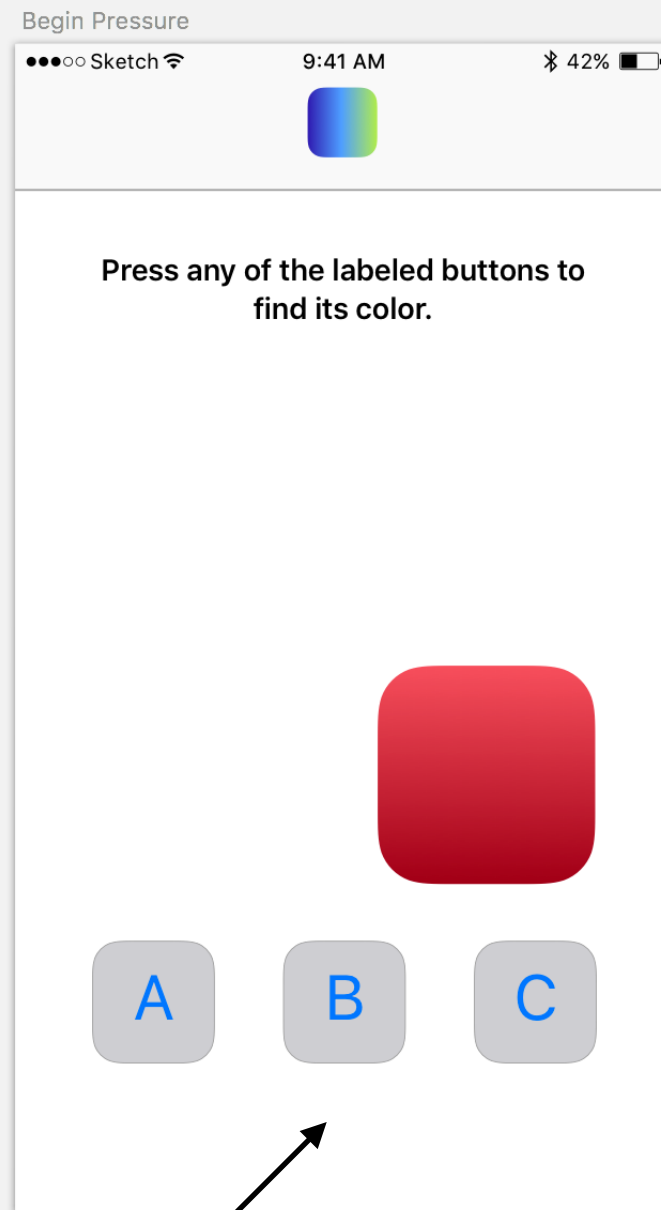
Evaluation

- From dismissal of notification: how much time does the user take to make the next move?

C. Error Recovery

- 3D-Touch's "Preview" environment:

  - As pressure increases, the user can see a content preview.

  - If user releases pressure, the content preview aborts.

  - **Hypothesis:** 3D-Touch works as an error recovery mechanism that prevents unwanted navigation.

Color panel grows.

Haptic feedback—awaiting for confirmation.

Pressure sensitive buttons.

Evaluation

- Number of attempts.

- Time it takes to find the target color.

Current Status

- Accuracy experiment has been fully implemented.

  - Plan to run the experiment next week.

- Cognitive Overhead and Error Recovery experiments are future work.