

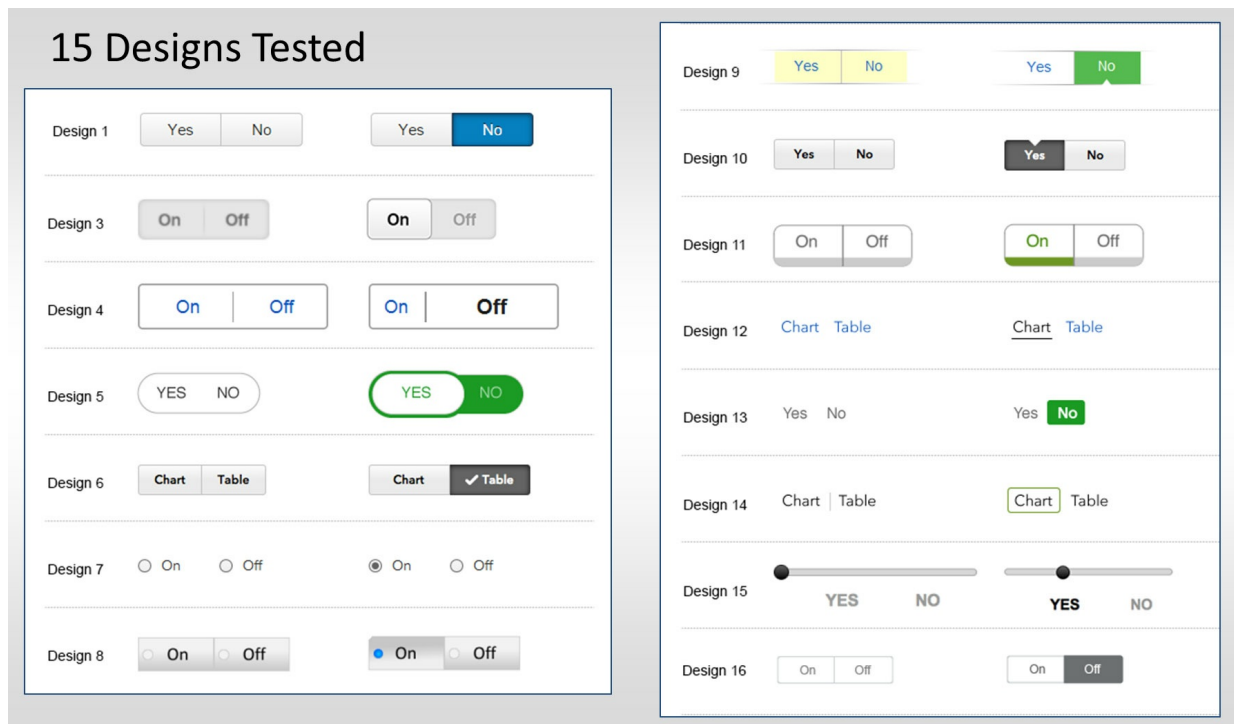
# What's the Most Effective Way to Present Two-State Toggle Buttons?

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Two-state toggle buttons (e.g., On/Off, Yes/No, etc) are very common on web sites and in mobile apps. Both the Android and iOS toolkits have standard (different) versions. In the old days, we used two radio buttons for this. In doing some usability testing of pages that contained toggle buttons (using a standard we had adopted), we noticed that some users hesitated when determining what the current state of the toggle was. So we did a “Design Challenge” within our UX department. We asked people to come up with the best designs they could for displaying two-state toggle buttons. We narrowed the submissions down to 15 different designs shown in Figure 1 that we tested in an online study using UserZoom.



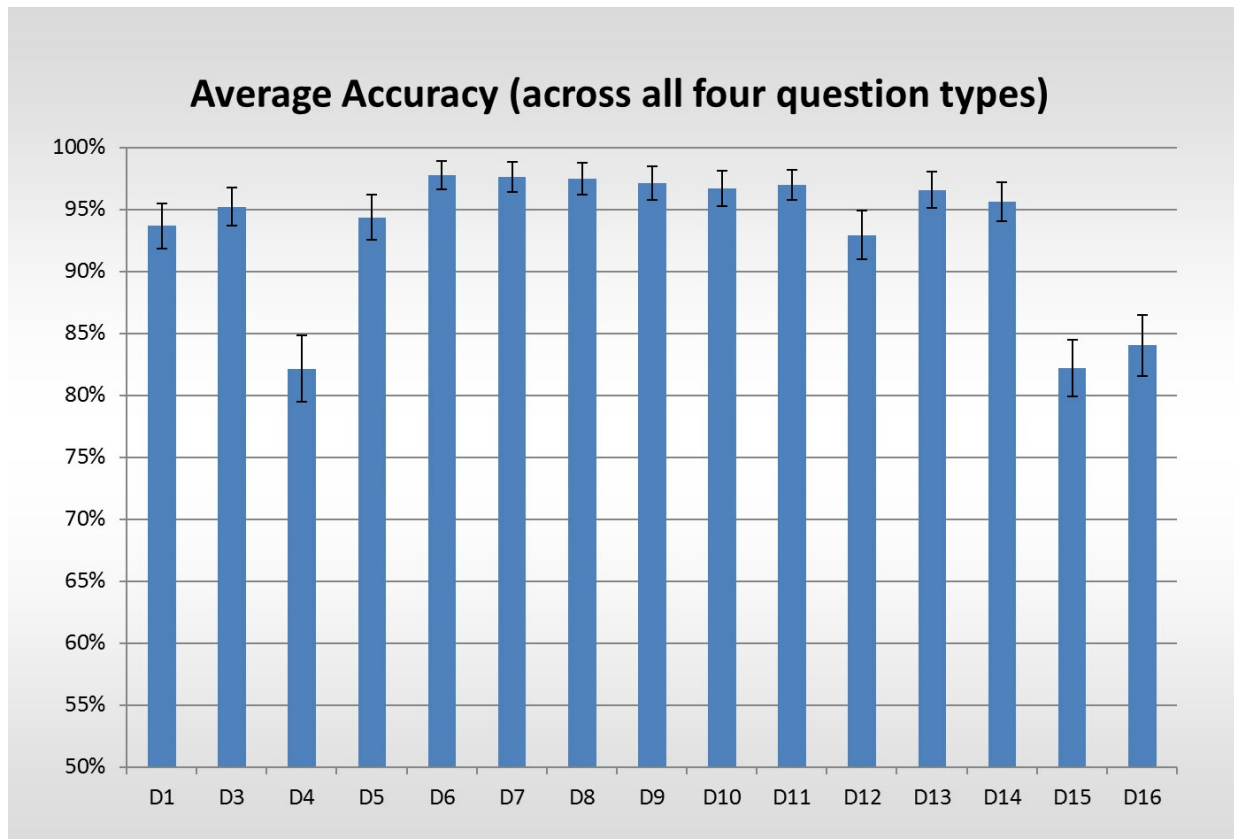
A total of 371 people completed the study. All are employees of our company recruited through a daily announcement that goes out to all employees. We used four basic tasks, of two types:

- First-click tasks:
  - Directive task: Each toggle is shown with neither state selected. Participants were directed to select a particular state. This was meant to replicate the real-world situation where users have answers in their minds before making a selection.
  - Change State task: Each toggle is shown with one state selected. Participants were tasked with changing it to the other state.
- Multiple-choice questions:
  - Each toggle is shown with neither state selected for 3 seconds. Participants were asked which state was selected (e.g., Yes/No/Neither)

- Each toggle is shown with one state selected for 3 seconds. Same question asked, as above.

Each person saw all 15 designs at various times. Within each type of task (First-click or Multiple-choice), the tasks were presented in a random order. Speed and accuracy of the responses were automatically recorded. At the end of the study, participants were shown all 15 designs at once and were asked to choose which design they thought was most effective.

The overall accuracy data is shown in Figure 2. All error bars on all charts represent the 90% confidence interval of the mean. Three designs (4, 15 & 16) yielded significantly lower accuracy rates than all the others.



The overall time data is shown in Figure 3. Four of the designs (4, 12, 15, & 16) yielded significantly longer task times than most of the others.

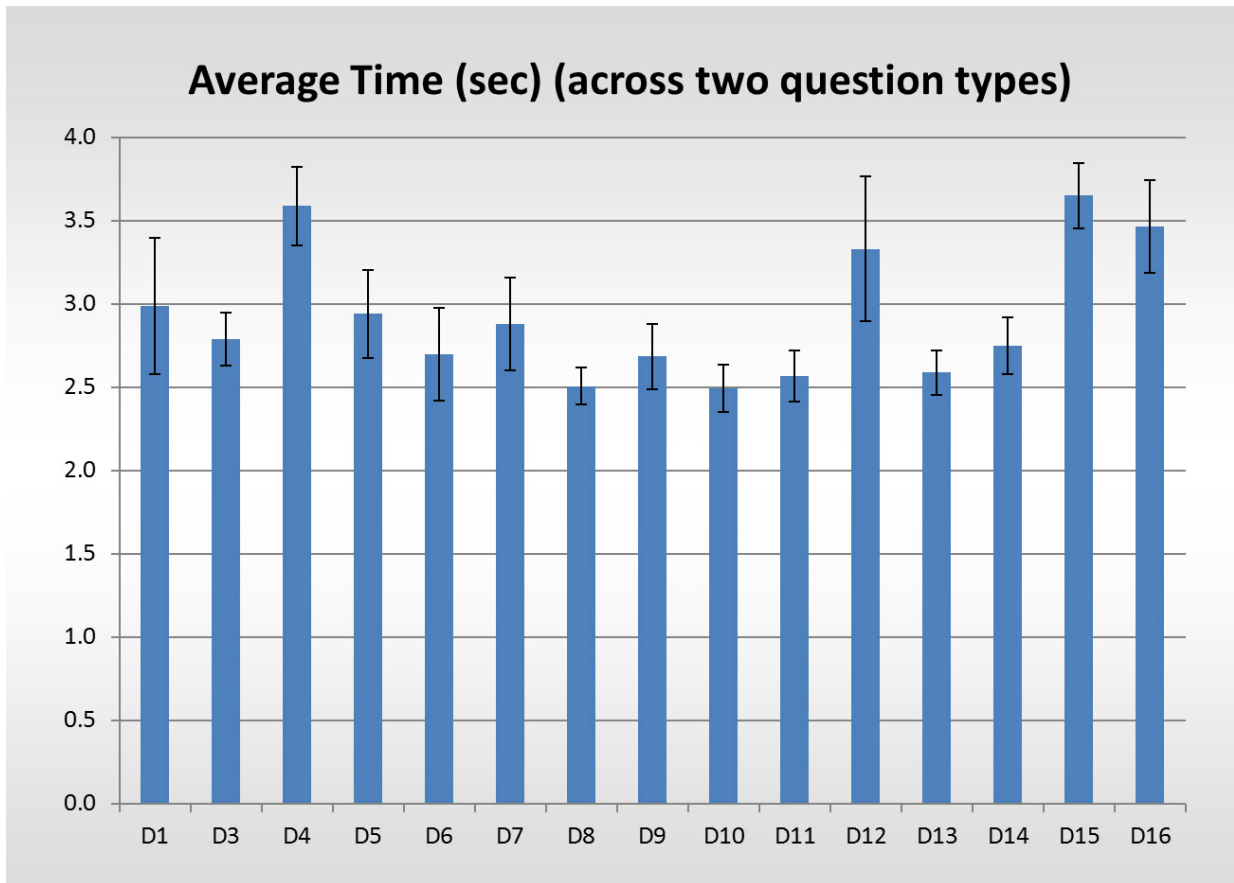


Figure 4 shows the data from the final question, where participants were asked to choose which design they thought was most effective. It shows the percentage of participants who chose each design. Clearly they had a very strong preference for designs 6 and 7.

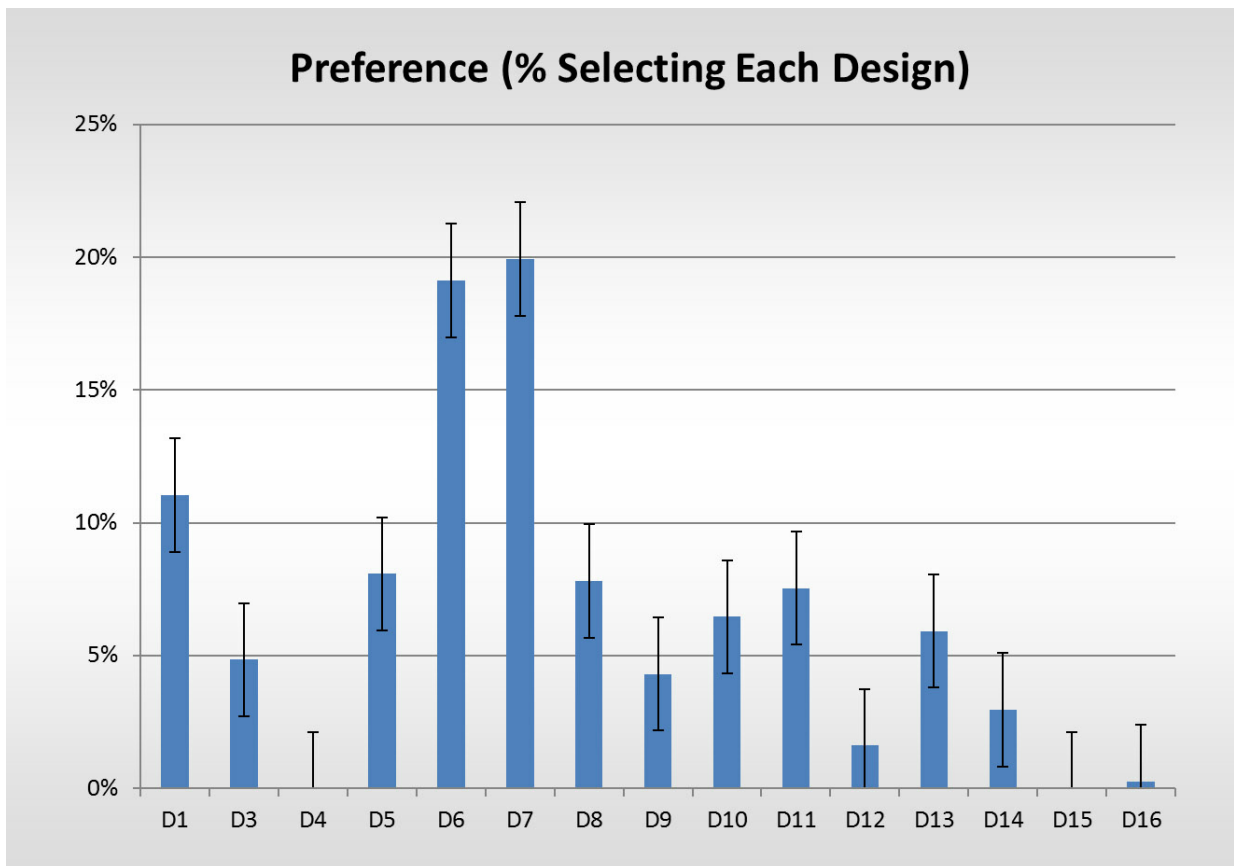
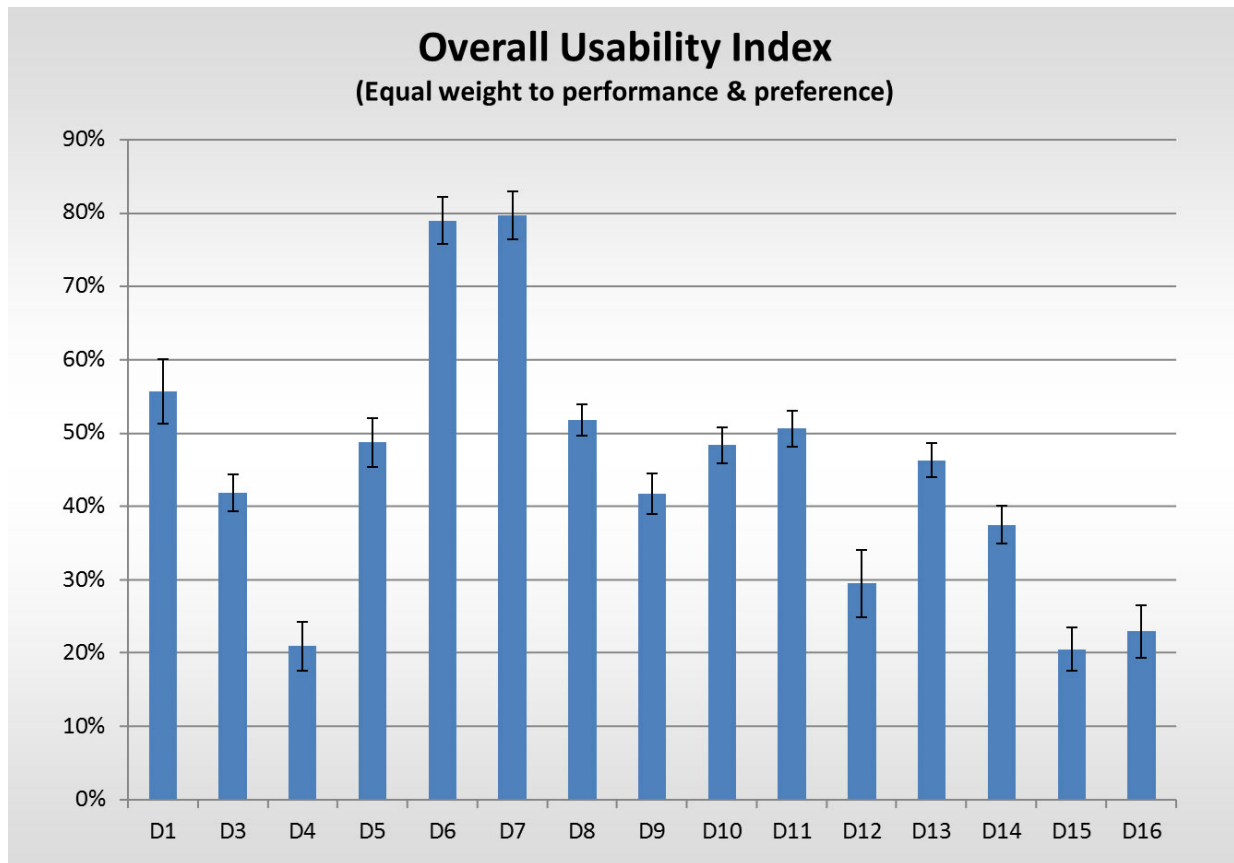


Figure 5 shows an Overall Usability Index, which is simply an equal-weighted combination of the performance and preference data. Designs 6 and 7 are the clear “winners”, having

done well in terms of performance and also being the top preference choices.



It's interesting that an old standby, traditional radio buttons, was one of the winners. It shows that some designs perhaps shouldn't be abandoned just because newer, prettier, ones come along. But Design 6, the other winner, is an example of a new design that perhaps is just as effective as one that has stood the test of time.

Note: We're now conducting a follow-up study with Mechanical Turk as the recruiting vehicle to get a broad cross-section of participants. We're also adding the current iOS and Android standards for representing 2-state toggles. (We did not include them in our previous study because they don't meet a requirement of ours of being able to indicate a third state where neither option is selected.) We expect to have the data from this larger study well before the conference.