Cognitive Psychology 230Bm -- Laboratory Practical Students' Guide

Practical 5: Human Factors in Telephone Systems

Applied cognitive psychology (or human factors) is the application of cognitive psychology to the design of systems and tools in order to make them more effective and satisfying to use. This demonstration compares two different office phone systems, one in actual use in many businesses and universities and another that was designed by undergraduate psychology students applying their knowledge of cognitive psychology. The students believed they could design a better phone system based on the cognitive principle that natural language commands (i.e., mnemonic commands) will "fit" the users' cognitive processes and will be easier and more effective to use (a "soft technology"). They had a hypothesis that a phone system that used mnemonic commands will produce fewer errors than a system that uses arbitrary control codes.

The dependent variables in this demonstration are the speed, accuracy, and ratings of usability for people using the two office phone systems. The two phone systems have commands for forwarding calls, transferring calls, answering nearby phones, placing callers on hold, and adding a caller to a conference call. The AT&T system uses arbitrary digits and symbols to activate the various features. The mnemonic system uses the letters that appear on phones to activate the features. The goal of the mnemonic design was to make the system easier to use by making the commands easier to remember. By using letters that are associated with the names of the various features (H for hold, T for transfer, etc.) the users can make use of information already in long-term memory. It is an interesting historical note that letters originally appeared on phone dials to make calling different regional areas easier (HO for Hollywood, SU for Sutter, and so on). Phone companies have recently decided to reintroduce the use of letters on phone dials and keypads to make many numbers easier to remember, 855-DIET, 0800-86-4CARS, and 86-PIZZA for example (and of course to sell these special numbers to their business customers).

In this demonstration, participants will try both systems (a within-subjects design). For each system they will receive a brief practice session containing instructions on how to use the functions and 10 practice trials. This will be followed by 25 test trials. The procedure will then be repeated for the second system. The order that the participants try each of the two systems is randomly determined by the computer (a control variable). Instead of using actual telephone keypads, we will use the number keys across the top of our computer keyboards. The computer screen will display the letters that go with each of the number keys, DON'T use the letter keys on the keyboard to activate the features, it will not work. Speed and accuracy of responses are measured and feedback is presented to the participants at the end of each trial. At the end of each system's test complete the questionnaire attached to this handout asking you to rate the ease of use of the system you just tried.

For you to think about:

You might find that not all of the dependent measures show the same pattern. Previous years' students have observed that the fastest system is not always the most accurate. Also, when you compare the questionnaire results to the computer data you may find that the most preferred system (the one with the highest ratings of usability) is not the fastest (or in some cases the most accurate). Why do you think this might be the case?

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Data Sheet

Usability Ratings
System A (AT&T system):
Please rate the usability (ease of use) of the phone system you just tried (using the scale below)

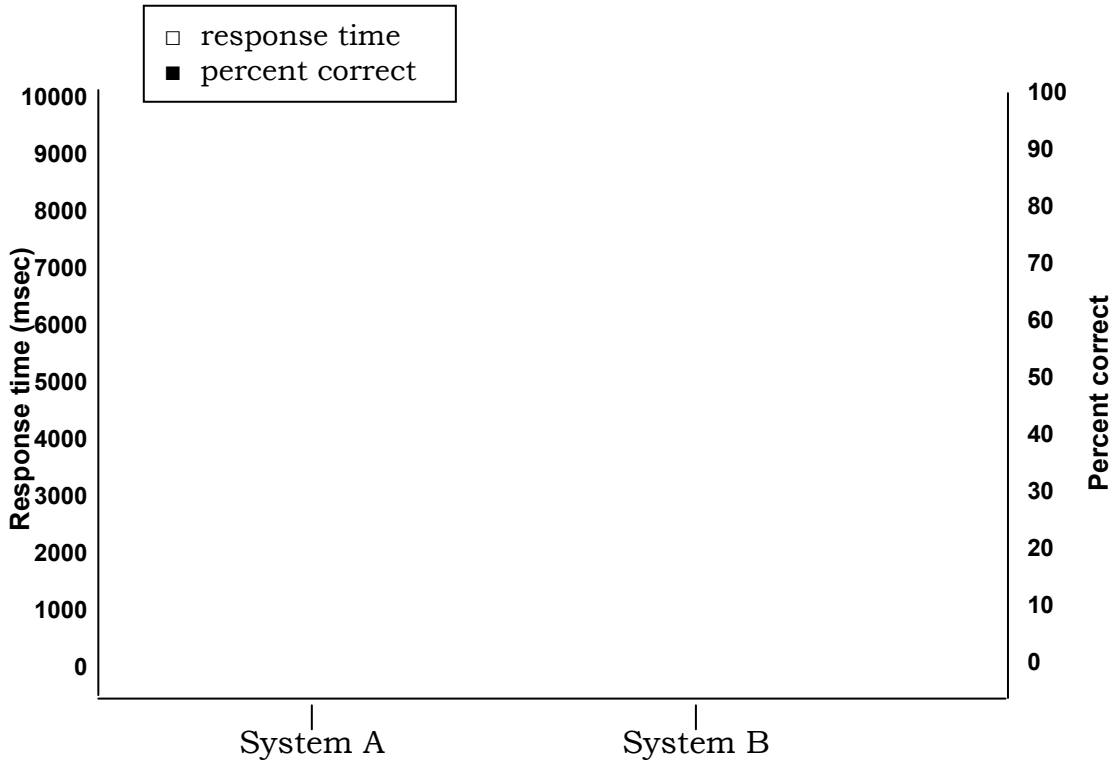
Very usable	Somewhat usable	Borderline	Somewhat unusable	Very unusable
□	□	□	□	□

System B (mnemonic system):
Please rate the usability (ease of use) of the phone system you just tried (using the scale below)

Very usable	Somewhat usable	Borderline	Somewhat unusable	Very unusable
□	□	□	□	□

Your data

	System A (AT&T)	System B (Mnemonic system)
Response time		
Percent correct		



Data Sheet

Usability Ratings – Group data
System A (AT&T system):
How many participants rated System A as:

Very usable	Somewhat usable	Borderline	Somewhat unusable	Very unusable
_____	_____	_____	_____	_____

The median rating (50th percentile) was: _____

How many participants rated System B as:

Very usable	Somewhat usable	Borderline	Somewhat unusable	Very unusable
_____	_____	_____	_____	_____

The median rating (50th percentile) was: _____

Group data

	System A (AT&T)	System B (Mnemonic system)
Response time		
Percent correct