Psychological Task Design & Development

A Programming Workshop Part I_B – Task Design & Development

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The Design Process

- Many psychological paradigms focus on mental processes
 - E.g., executive cognitive control functions, selective attention, automatic associations, subliminal processing, etc.
- Their specs are usually **very** precise, but sometimes hard to determine. So how to translate descriptions to specific task?

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Documentation

- The answer is rigorous design documentation (a.k.a. requirements engineering)
 - Building a program in general, or a complex psychological task in our case, may take quite some effort
 - Many decisions are made; many changes to the initial design
 - Easy way to communicate your design with others
 - Half of your methods section already done ^(C)
- Let's assume most of the details are in the papers you use as a basis. And you've added some ideas of your own
 - What level of detail do you need to describe to develop (program) the task?

Design Details (1)

Block structure

How many blocks; how many (practice) trials per block (e.g., IAT)?

Block	left	right	type
1	Positive (6)	Negative (6)	Practice
2	Soda (6)	Alcohol (6)	Practice
3	<i>Positive</i> (12) + <i>Soda</i> (12)	Negative (12) + Alcohol (12)	Practice
4	Positive (24) + Soda (24)	Negative (24) + Alcohol (24)	Test
5	Alcohol (6)	Soda (6)	Practice
6	Positive (12) + Alcohol (12)	Negative (12) + Soda (12)	Practice
7	Positive (24) + Alcohol (24)	Negative (24) + Soda (24)	Test

• Data output

- Which variables do you want to measure (per trial)?
- E.g., #block, #trial, stim, response, feedback, reaction time, etc.
- Stimuli
 - Pictures (size, placement); words?
 - How many categories?

Design Details (2)

- Trial structure (make a visual timeline with ms)
 - Fixation-stimulus-response window-inter trial interval, etc.



- Feedback structure
- Instructions (which and when)
- Counterbalancing; randomization algorithms

Technical Considerations (1)

Timing accuracy

- Specific timing is very sensitive to noise from hardware (e.g., input devices: keyboard, mouse, fixed button, joystick) as well as software influences (background virus scans, choice of programming language)
- This may be very important for stimulus presentation, and RTmeasurement
- Output / synchronization: connection with fMRI / EEG materials: synchronization pulse via LPT port

Technical Considerations (2)

Display issues

- Screen size and resolution; aspect ratio (4:3 vs. 16:9)
- Refresh rate
 - TFT vs CRT vs tablets; most standard TFT have 60 Hz (16.67 ms/frame)
 - Stimulus duration therefore multiple of 16.67 (so 25 becomes 33.3)
- Rise and fall time:





The Development Process

Or: Documentation, Part II

 As the design may change during the development stage, it is important to keep it up to date!

While developing, we use a 2nd form of documentation:

- **Code comments** that explain how and why things were done in a certain way.
- This may seem a lot of on-the-side prep work, but it <u>will</u> save you loads of trouble and time in the end.