

Study 2: Experimental Personality Research

Testing personality theory by examining the interaction of subject variables and situational variables

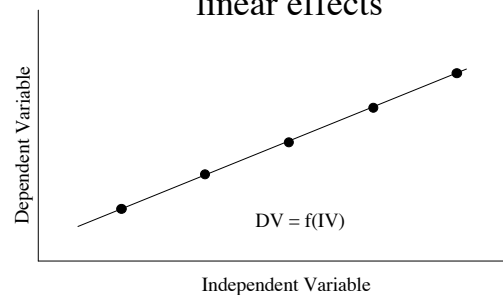
Experiment 2: Overview

- Personality differences as subject variables
- Types of relationships between Independent Variables and Dependent Variables
- Prior work on personality and performance
- Simulation study

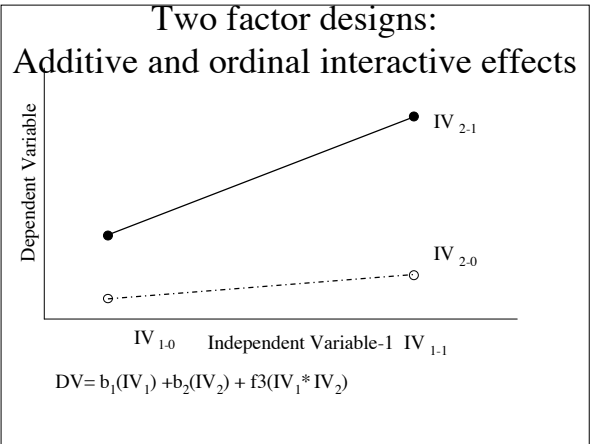
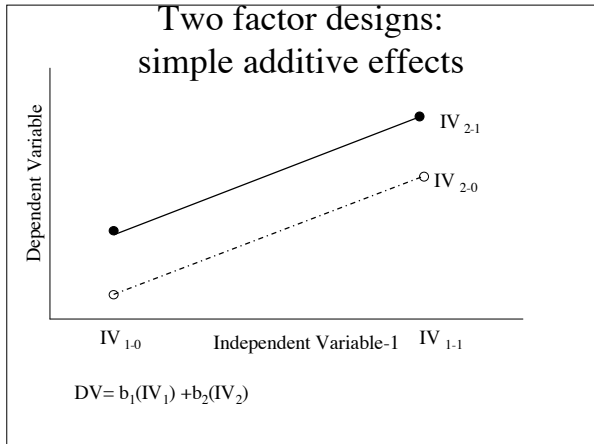
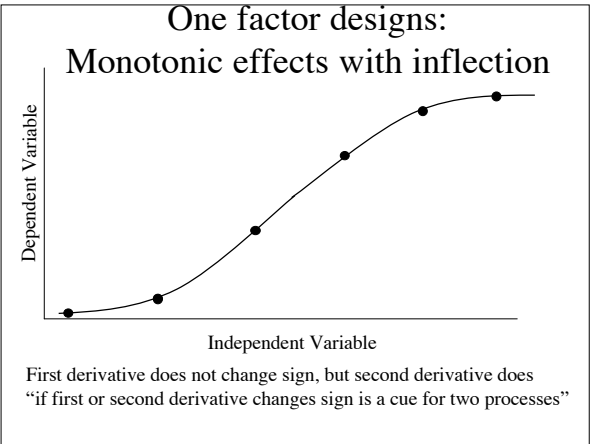
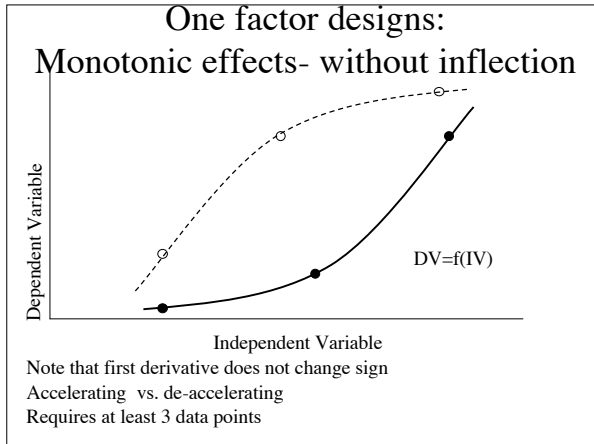
Does Personality make a difference?

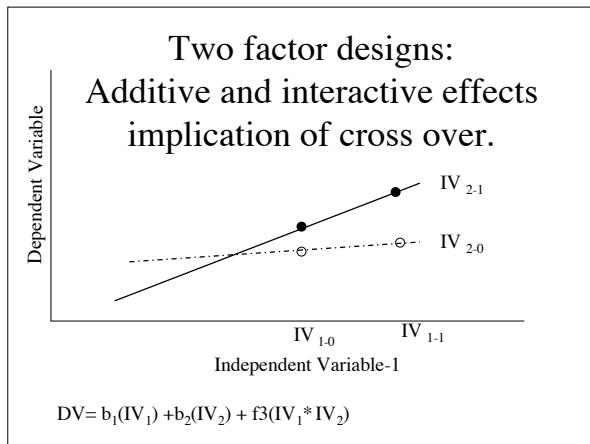
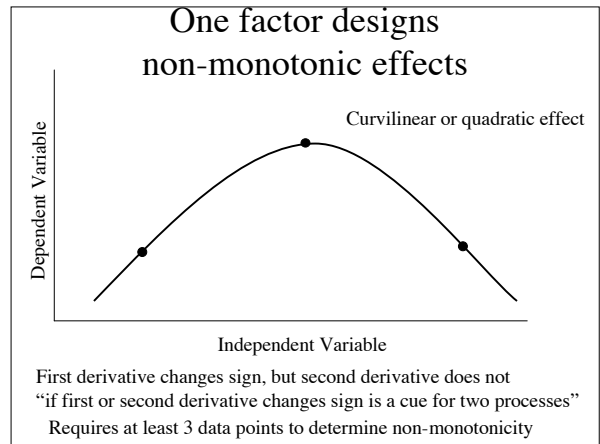
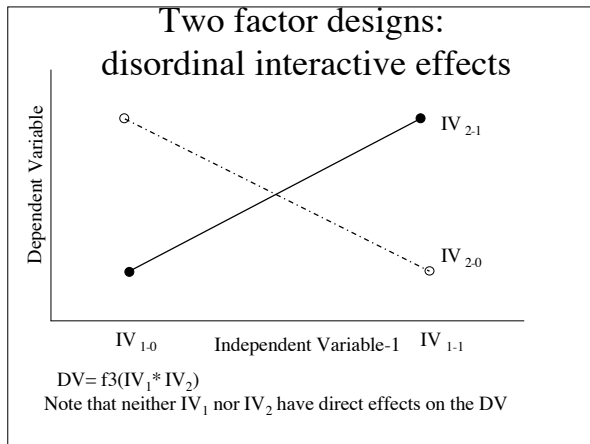
- Important Life Criteria
 - Longevity (Friedman et al.)
 - Job Performance (Hunter and Schmidt)
 - Psychological well being
- Laboratory tasks
 - Cognitive sensitivities and biases (eg., McCloud, Mathews, Matthews, etc.)
 - Systematic pattern of results with cognitive performance by stress manipulations (eg., Anderson, 1990; Anderson and Revelle, 1994; Revelle, Humphreys, Simon, Gilliland, 1980; Revelle, 1993)

One factor designs: linear effects



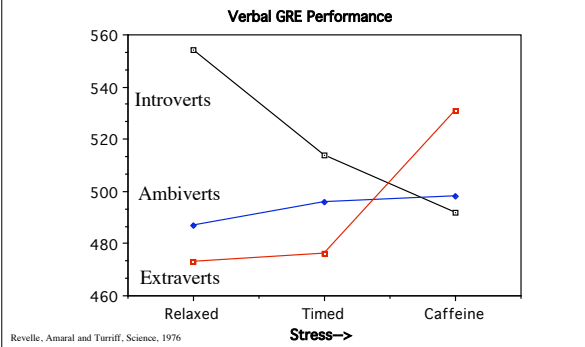
Requires two data points to determine sign of relationship, more to determine shape



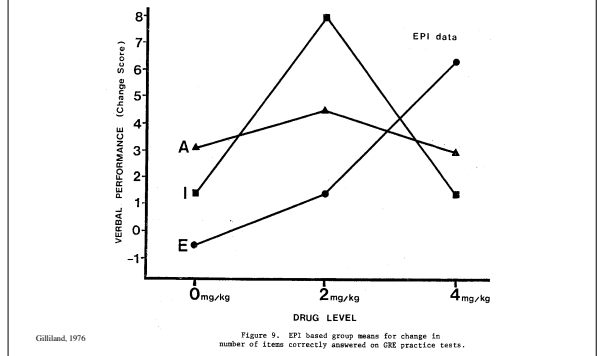


- ### Development of theory
- Prior work suggested introverts more aroused than extraverts
 - Revelle, Amaral and Turriff predicted and found that arousal manipulations helped (low aroused) extraverts but hindered (high aroused) introverts
 - Revelle, Humphreys, Simon and Gilliland found that this effect was for part of extraversion (impulsivity) and varied by time of day

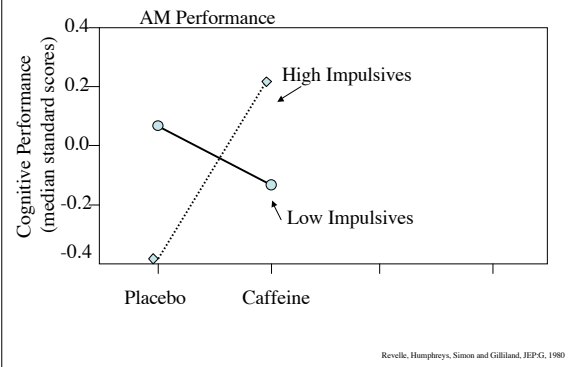
Introversion, time pressure, and caffeine: effect on verbal performance



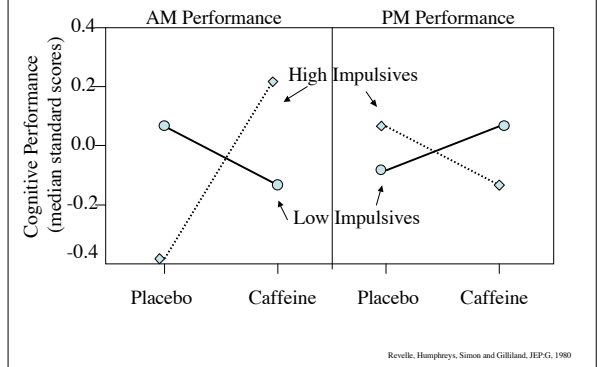
Extraversion, Caffeine, and Cognitive Performance



Impulsivity, Caffeine, and Time of Day: the effect on complex cognitive performance

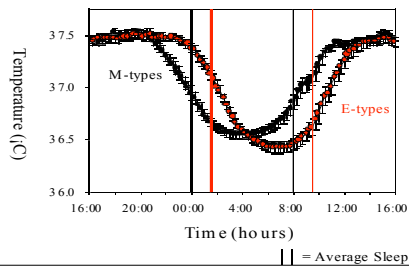


Impulsivity, Caffeine, and Time of Day: the effect on complex cognitive performance



Morningness/Eveningness and BT

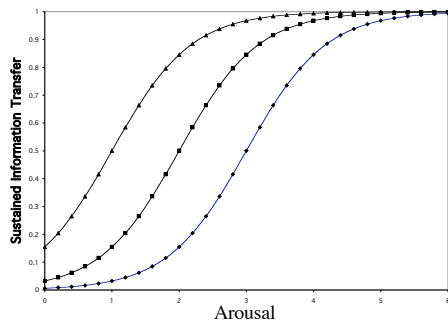
(Baehr, Revelle and Eastman, 2000)



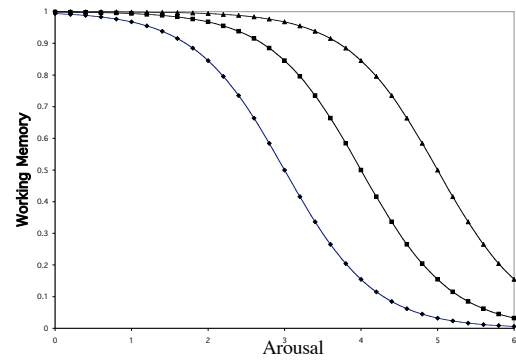
Development of Theory

- Humphreys and Revelle suggested a functional relationship between arousal and performance:
 - Arousal facilitates attention tasks
 - Arousal hinders working memory tasks
 - Arousal has curvilinear effects on complex tasks
 - Impulsivity related to arousal
 - Anxiety related to inhibition of effort

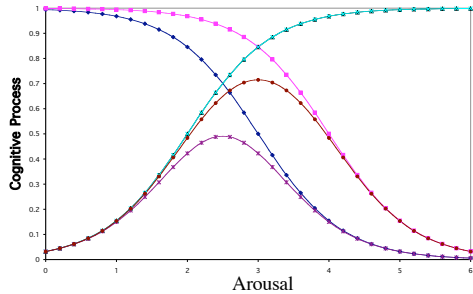
Arousal and Information Transfer



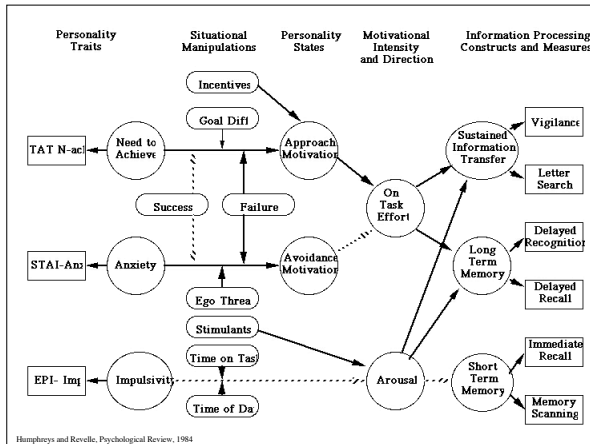
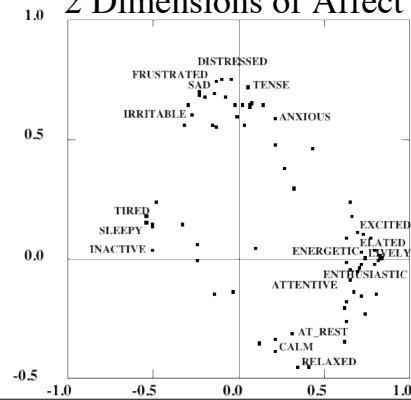
Arousal and Working Memory



Arousal and Performance: Arousal, Working Memory and Information Transfer



2 Dimensions of Affect



Experimental Tests of theory

Arousal and Memory

Arousal and sustained attention

Humphreys et al. suggested that high impulsives decay in their arousal more rapidly than do low impulsives. Proposed that impulsivity was a decay rate in arousal

Anderson and Revelle demonstrated that this effect varies by time of day

Simulation as theory

- Possible to simulate theory to see if there are parts of model that are consistent or inconsistent with real data
- Simulations can lead to new predictions and revisions of theory

Simulation study

- Full model is too complicated to study, need to choose a limited set of “interesting” variables.
- Choose among a set of independent and dependent variables
- Examine how these variables interrelate.

Simulation study: Variables

- Impulsivity (0-10)
- Anxiety (0-10)
- Caffeine (0,1)
- Time of Day (8-24)
- Gender (M=1, F=2)
- Energetic Arousal (0-100)
- Tense Arousal (0-100)
- Performance (attention task) (0-100)

Simulation study: welcome

Experimental Simulation:

A program to simulate data from a variety of psychological models.

A particular model has been specified for this experiment. By applying theory and experimental design, the student's task is determine the model.

Models may be generated with or without error.

A variety of relationships between the variables are possible:

None
Simple linear
Non-linear

The effect of combinations of variables may be

Additive
Interactive

OK

Simulation study: 2

This particular experiment simulates performance on a variety of vigilance and sustained performance tasks.

Independent Variables

Experimentally controlled

Time of Day (8am - 10 pm)

Caffeine Dosage (0 or 1 unit)

Subject Variables

Anxiety (0-10)

Impulsivity (0-10)

Sex (M=1, F=2)

Dependent Variables

Self Reports

Energetic Arousal

Tense Arousal

Performance Measures

Accuracy of detection

Go Back

OK

Simulation Study 3

For each subject, the student may specify values for the independent variables, or allow the computer to randomly choose values.

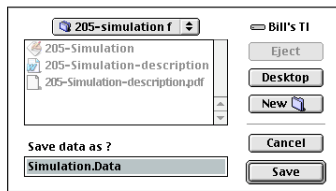
Using the underlying model, the computer then will find the values of the dependent variables based upon the values of the independent variables.

These values are displayed as well as saved as a text file that may be read by programs such as Excel.

Go Back

OK

Simulation Study 4: Enter a useful data file name (include your initials)



Simulation Study: run a subject specify the desired conditions

Subject # 1

Select the values of the independent variables or allow the computer to generate them randomly.

Caffeine (0 or 1) Random

Time of Day (8-22) Random

Trait Anxiety (0-10) Random

Impulsivity (0-10) Random

Sex (1, 2) Random

Stop

OK

Simulation Study: Independent Variables

- Either let the computer randomly assign subjects to values on the IV s or you assign them your self
- Caffeine
- Time
- Impulsivity
- Anxiety
- Sex

Sample Output for first case

For Subject # 1
 For these independent variables, the following data were observed

Caffeine	0	Energetic Arousal	53
Time of Day	8	Tense Arousal	53
Trait Anxiety	4	Performance	68
Impulsivity	3		
Sex (M=1, F=2)	2		

That is enough. Let's quit.

OK - Next subject

Sample output, another case

For Subject # 10
 For these independent variables, the following data were observed

Caffeine	1	Energetic Arousal	70
Time of Day	15	Tense Arousal	58
Trait Anxiety	5	Performance	93
Impulsivity	6		
Sex (M=1, F=2)	2		

That is enough. Let's quit.

OK - Next subject

Sample output - summary

You have asked to stop. The data have been saved to the data file. Here are some summary means. You may quit or run another experiment.

	Independent Variables		Dependent Variables	
	Mean	SD	Mean	SD
Subject ID #	6.5	3.6	Energetic Arousal	64.5 5.9
Caffeine	0.3	0.4	Tense Arousal	58.5 6.6
Time of Day	15.9	5.1	Performance	82.0 10.2
Trait Anxiety	4.3	1.4		
Impulsivity	4.7	1.6		
Sex (M=1, F=2)	1.6	0.4	Number of subjects run	12

Do another experiment

Thank you and goodbye

Stimulation: Summary of data

trial	drug	time	anxiety	impulsivity	sex	arousal	tension	performance	IMP_2	TOD_3
1	0	8	4	3	2	53	53	68	1	1
2	0	13	3	6	2	61	55	73	2	2
3	0	22	5	6	2	67	58	83	2	2
4	0	15	6	6	1	66	66	83	2	2
5	1	21	7	5	1	74	66	93	2	2
6	0	19	4	4	2	69	60	90	1	1
7	0	16	1	6	1	67	48	83	2	2
8	1	10	5	3	2	61	71	88	1	1
9	1	9	5	5	2	58	60	63	2	2
10	1	15	5	6	2	70	58	93	2	2
11	0	22	4	1	1	60	51	75	1	1
12	0	21	5	6	2	69	57	93	2	2

Simulation Study: What to do before Monday

- Develop hypotheses that you want to test
- Design an experiment that can test your hypothesis
- Consider issues of counterbalancing, randomization, etc. to control for time in quarter effects (if they are there).
- Consider how subjects are to be run (what conditions, what orders, what should be randomized, what controlled).

Simulation study: Things to consider

- Issues of power vs. time
 - More subjects lead to smaller standard errors and greater chance of detecting effects.
 - More subjects take longer to run
- Cost of running subjects
 - Selecting extreme scores on personality variables is done by group testing and leads to fewer subjects being available or greater cost per subject

Issues to Consider

- Design study that makes sense
- Don't try to study all possible variables
- Design a study that is interesting to you.