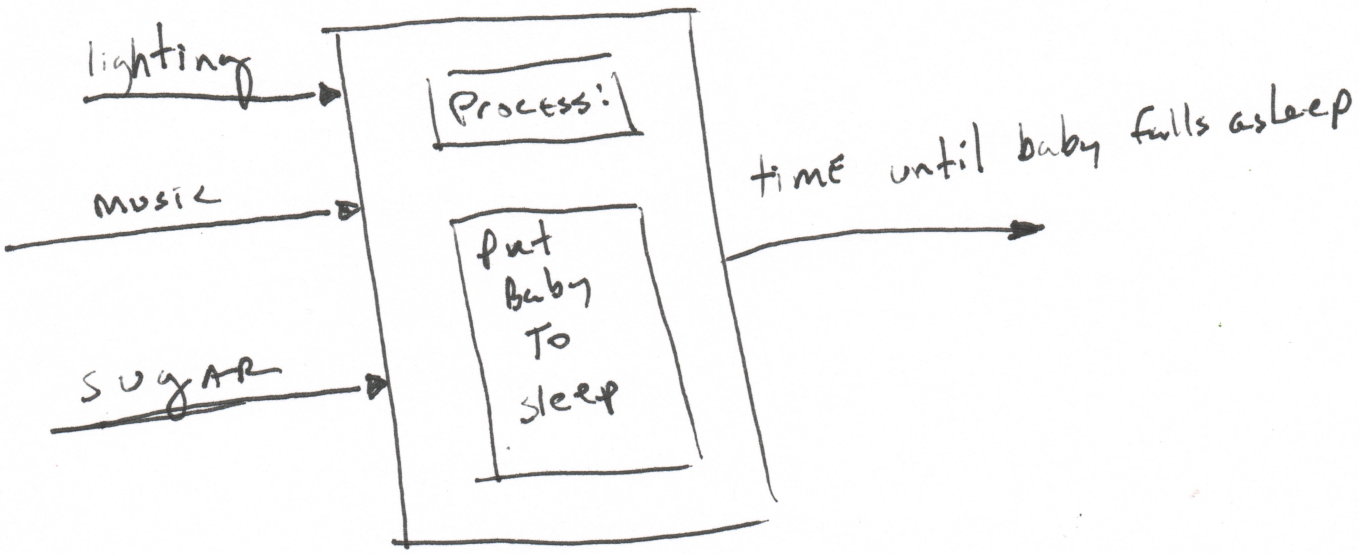
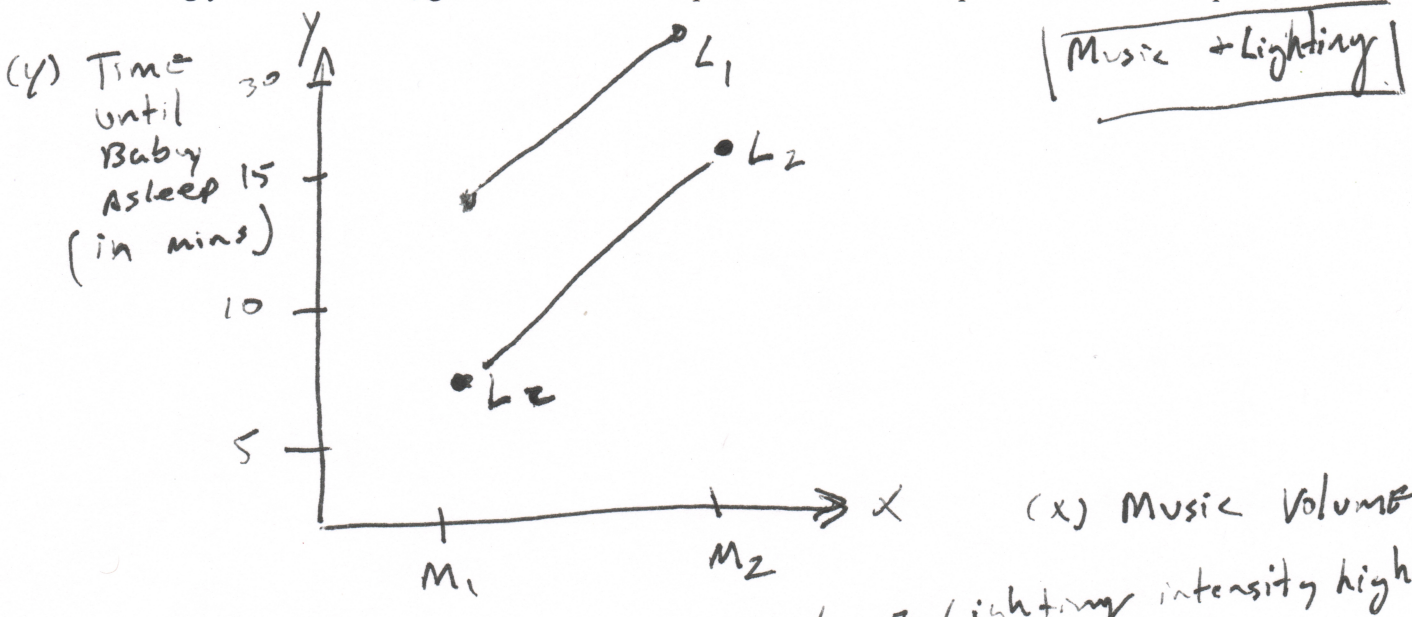
DESIGN OF EXPERIMENTS HOMEWORK
FOR
STATISTICS.COM (WEEK 1)

HW1: Write an IPO for a process you are interested in. Can you measure all the inputs and outputs?



HW2: Using your IPO above, give a realistic example of an interaction plot between two inputs.



HW3: Complete the column for the AB interaction.

Run	Input A	Input B	AB
1	+1	+1	1
2	-1	+1	-1
3	-1	0	0
4	-1	-1	1

HW4: For the data below, create an interaction plot for the AB interaction of the process center ($\bar{y}$).

Run	A	B	AB	C	AC	BC	D	y_1	y_2	y_3	$\bar{y}$	s^*
1	−	−	+	−	+	+	−	22.27	21.12	21.37	21.59	.60
2	−	−	+	+	−	−	+	14.22	15.40	10.46	13.36	2.58
3	−	+	−	−	+	−	+	22.49	23.15	22.08	22.57	.54
4	−	+	−	+	−	+	−	9.96	13.80	11.92	11.89	1.92
5	+	−	−	−	−	+	+	17.35	18.60	17.97	17.98	.62
6	+	−	−	+	+	−	−	27.08	24.54	24.57	25.40	1.46
7	+	+	+	−	−	−	−	18.36	17.63	17.04	17.68	.66
8	+	+	+	+	+	+	+	22.78	26.97	27.14	25.63	2.47

Table 1.13 Complete Experimental Matrix with Response Values for Gas Mileage Case Study

HW5: Describe what is meant by a robust design.

A design that determines factor settings that achieve desired response values while minimizing the variability due to uncontrolled or noise factors.