

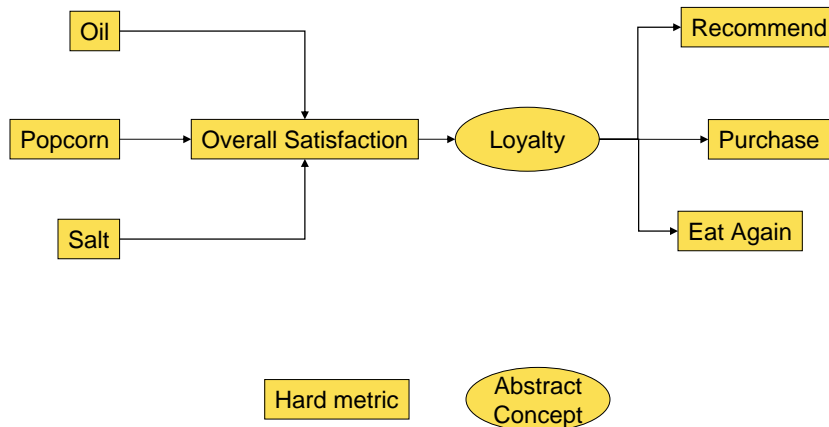
Popcorn Experiment

Goals

1. Pretend: Identify drivers of loyalty for popcorn customers
2. Real: Figure out how I like my popcorn



Hypothetical Popcorn Customer Loyalty Model





Factors



Factor A: Popcorn



Factor B: Oil



Factor C: Salt

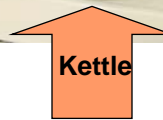
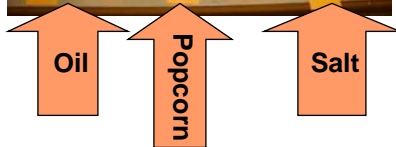


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Popcorn DoE-3



Physical Setup



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Popcorn DoE-4



Experimental Layout

C:\Documents and Settings\Administrator\My Documents\Popcorn DoE\ASQ popcorn.dx7 - Design-Expert 7.1.5

Notes for ASQ popcorn.dx7

Design (Actual)

- Summary
- Graph Columns
- Evaluation
- Analysis
 - Salt
 - Oil
 - Popcorn
 - Experience (Analyze)
 - Purchase (Analyze)
 - Recommend (Analyze)
 - EatAnother (Analyze)
- Optimization
 - Numerical
 - Graphical
 - Point Prediction

Design Summary

Study Type: Factorial
 Initial Design: 2 Level Factorial
 Center Points: 0
 Design Model: 3FI

3 Experimental Factors

Factor	Name	Units	Type	Low Actual	High Actual
A	Popcorn		Categoric	Store Brand	Gourm
B	Oil		Categoric	Store Brand	Gourm
C	Salt		Categoric	Regular	Popcorn

7 Response Variables (Likert)

Response	Name	Units	Obs	Analysis	Low Actual	High Actual	Std. Dev.	Ratio	Trans	N
Y1	Salt	Likert	16	Factorial	-1	2	0.9375	0.826797	-2	None
Y2	Oil		16	Factorial	-1	2	0.9375	0.826797	-2	None
Y3	Popcorn		16	Factorial	-3	2	-0.4375	1.65713	-0.666667	None
Y4	Experience		16	Factorial	-3	2	-0.125	1.61536	-0.666667	None
Y5	Purchase		16	Factorial	-3	2	-0.4375	1.69443	-0.666667	None
Y6	Recommend		16	Factorial	-3	2	-0.8125	1.66654	-0.666667	None
Y7	EatAnother		16	Factorial	-3	2	-0.5625	1.65713	-0.666667	None



Design Assessment

VIFs & R² are perfect for designed experiments

Power should be considered; it's ok for us

Power at 5% alpha level to detect signal noise ratios of

Term	StdErr ^{AA}	VIF	Ri-Squared	0.5 Std. Dev.	1 Std. Dev.	2 Std. Dev.
A	0.25	1.00	0.0000	14.3 %	42.1 %	93.7 %
B	0.25	1.00	0.0000	14.3 %	42.1 %	93.7 %
C	0.25	1.00	0.0000	14.3 %	42.1 %	93.7 %
AB	0.25	1.00	0.0000	14.3 %	42.1 %	93.7 %
AC	0.25	1.00	0.0000	14.3 %	42.1 %	93.7 %
BC	0.25	1.00	0.0000	14.3 %	42.1 %	93.7 %
ABC	0.25	1.00	0.0000	14.3 %	42.1 %	93.7 %





Run Experiment

Popcorn Experiment Data Sheet

ID # _____

Statement	Completely Disagree	Strongly Disagree	Disagree	Agree	Strongly Agree	Completely Agree
I like the salt						
I like the oil						
I like the popcorn itself						
I enjoyed the overall eating experience						
I would purchase this for my own use						
I would recommend this to others						
I would eat another bowl of this						

OLD MAIDS: _____

Comments:

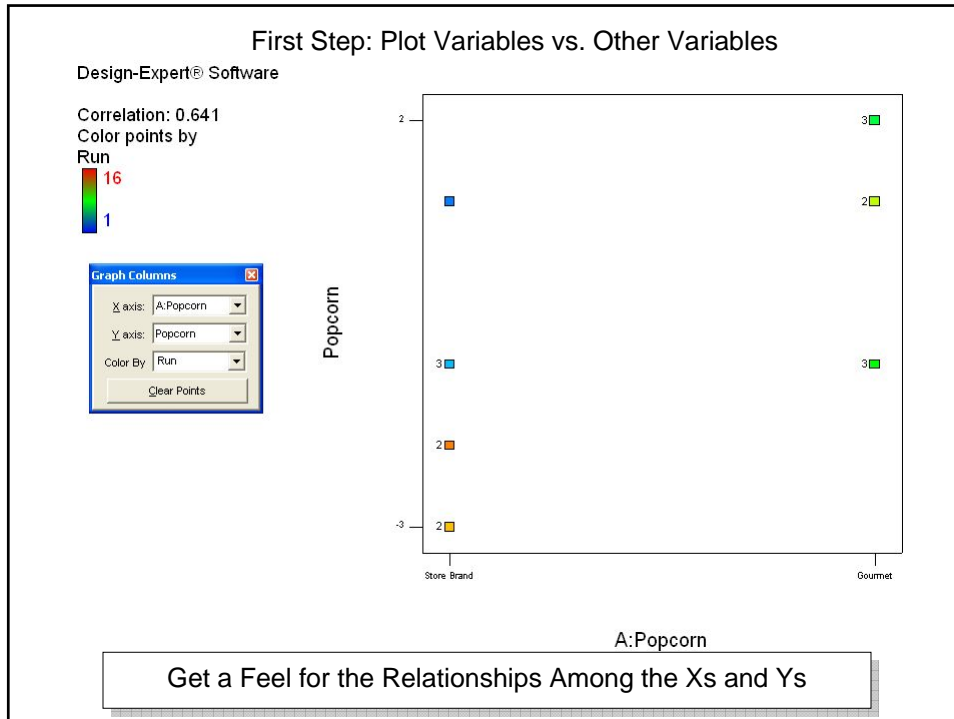



Representative Results



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Popcorn DoE-8

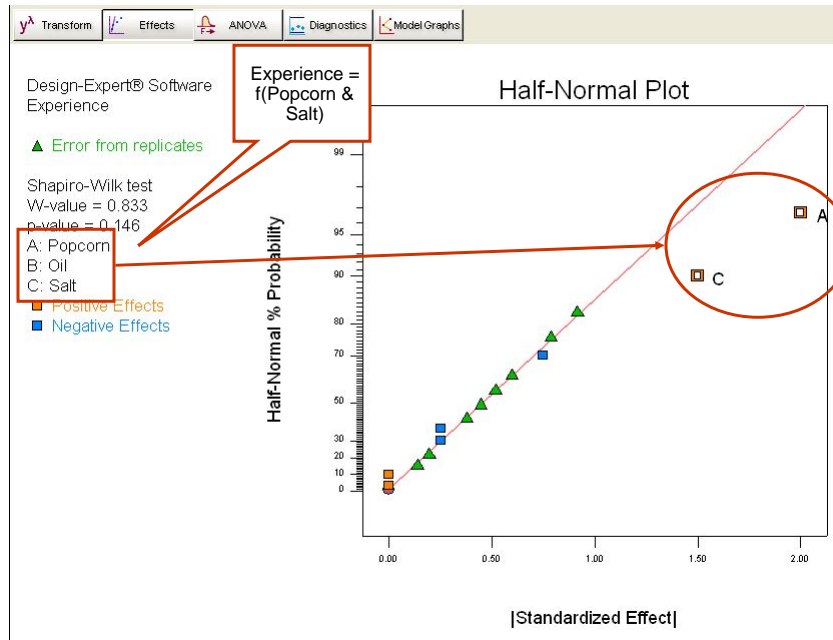



Analysis Process

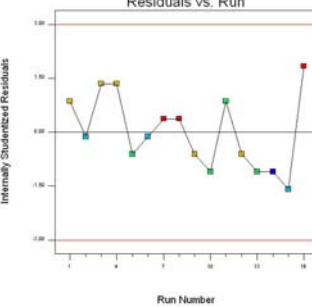
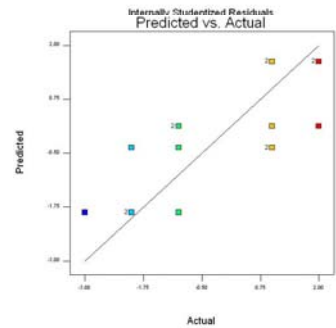
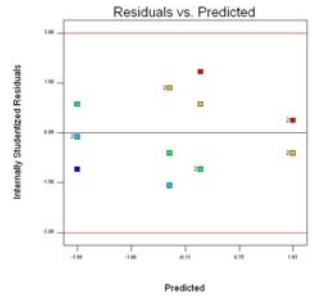
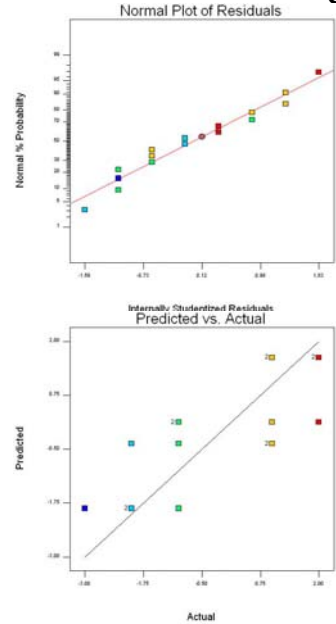
- Transform Ys if needed
- Choose significant effects from graph or list
- ANOVA: Analyze chosen model and view results
- Diagnostics: Analyze model fit graphically
- Use model: Create graphs from model and use to interpret and evaluate your model.

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Popcorn DoE-10

Response: Overall Experience



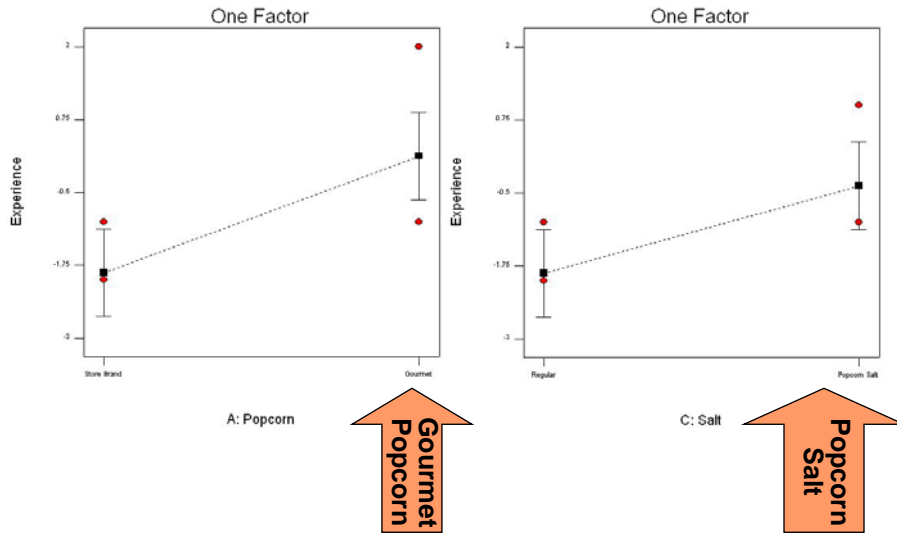
Diagnostics (Residuals)



Residuals Plots
All Look Good



Experience vs. Popcorn, Salt

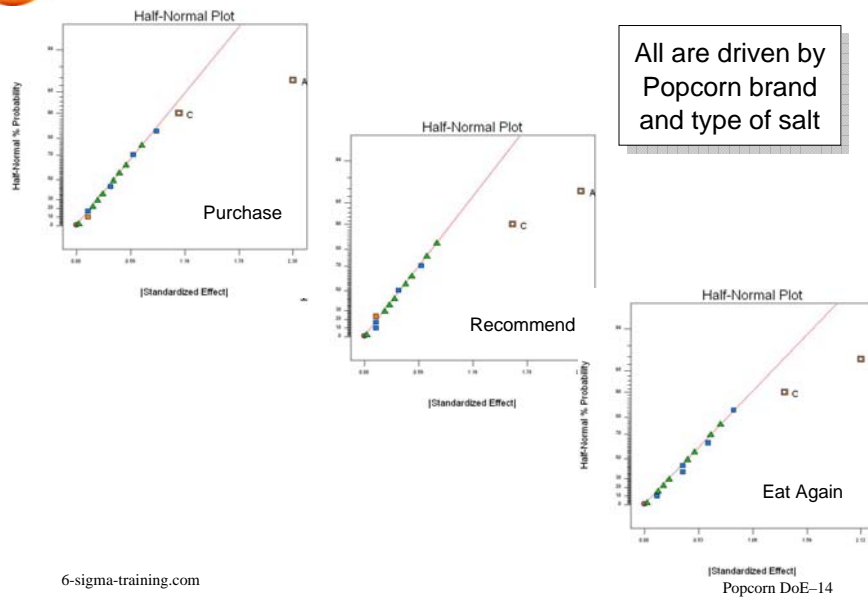


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Popcorn DoE-13



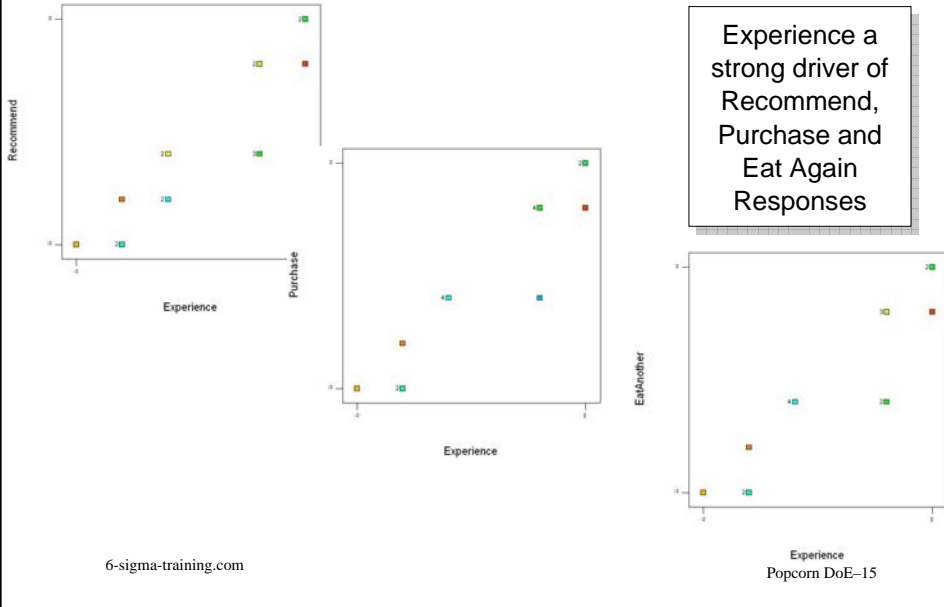
Purchase, Recommend, Eat Again



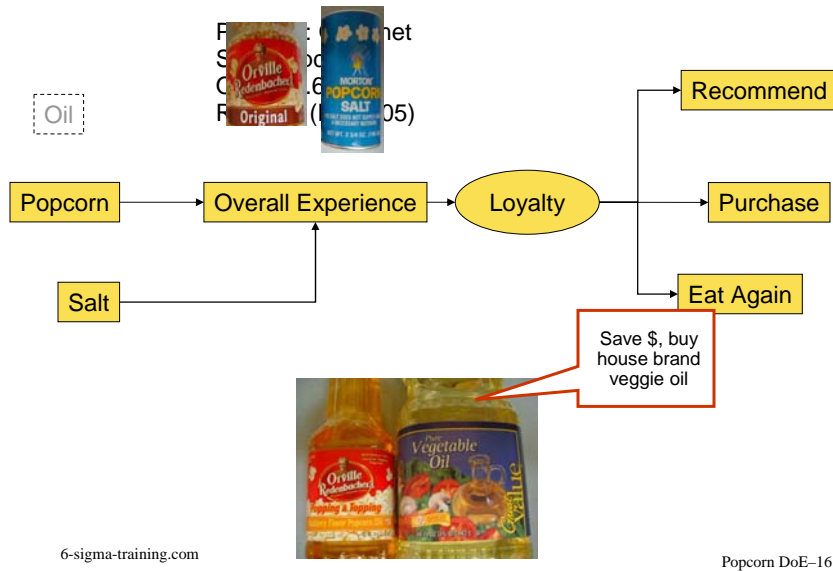
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Ys Vs. Experience



Final Popcorn Customer Loyalty Model



End

Q&A

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