

SSD Survey

Start of Block: Default Question Block

Q2 Supersaturated Design Survey

This short survey includes multiple choice and free response questions concerning the practice and theory of screening designs, particularly "supersaturated design". The purpose of this survey is to determine, among practitioners of experimental design, the current design and analysis methodologies for screening and sequential experimentation; awareness of supersaturated designs and their presence/absence in practice; and concerns about including supersaturated designs within a sequential experimentation framework.

Completing this survey should take less than 10 minutes. Your participation is voluntary, you may skip questions you do not want to answer, and you may stop at any time. This survey does not request information that would explicitly identify you. If you inadvertently include identifying information, such information will be removed from stored data. Only the researchers will have access to individual responses. Results of the survey will only be presented publicly as aggregate summaries.

If you have any questions about this research or you feel you need more information to complete this survey, you can Maria Weese at **weeseaml@miamioh.edu**.

If you have any questions or concerns about the rights of research subjects or the voluntariness of participation, you may contact the Research Ethics and Integrity Office at Miami University at either (513) 529 3600 or **humansubjects@miamioh.edu**.

Thank you for your participation.

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Q28 The first set of questions will gather some background information.

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Q3 What field do you work in?

- ☐ Agriculture, Food & Natural Resources (10)
 - ☐ Business, Management & Administration (11)
 - ☐ Communications & Information Systems (12)
 - ☐ Engineering, Manufacturing & Technology (13)
 - ☐ Health Science Technology (14)
 - ☐ Human Services (15)
 - ☐ Academic or Education (16)
 - ☐ Other. Please fill in below. (17)
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Q5 What is your highest **statistics** education level?

- ☐ No formal training, learned on the job (1)
 - ☐ Some undergraduate statistics courses in college (2)
 - ☐ Undergraduate Minor in Statistics (3)
 - ☐ BS in Statistics (4)
 - ☐ Master's in Statistics (5)
 - ☐ PhD in Statistics (6)
 - ☐ Some graduate statistics courses (8)
 - ☐ Other. Please fill in below. (9)
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Q8 What statistical software do you use for designed experiments? Please list multiple programs in order of how often you use them.

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Q9 Do you regularly read research articles about designed experiments?

☐ Yes (1)

☐ No (2)

Skip To: End of Block If Do you regularly read research articles about designed experiments? = No

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Q10 Please provide the name of the journals in which you read research articles about designed experiments.

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End of Block: Default Question Block

Start of Block: Block 1

Q21 The next set of questions will ask specifically about your experience with designed experiments.

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Q11 Which of the following experimental design techniques do you use on a regular basis? Check all that apply.

- ☐ Fractional factorials/Plackett Burman designs/Confounded block designs (1)
- ☐ Response surface methodology (2)
- ☐ Split plot designs (3)
- ☐ Computer experiments (4)
- ☐ Supersaturated designs (5)
- ☐ Definitive screening designs (6)
- ☐ Mixture experiments (7)
- ☐ Full factorial experiments (8)

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Q12 Which of the following analysis methods do you use to analyze your experimental data?
Check all that apply.

- ☐ Regression/ANOVA (1)
 - ☐ LASSO and/or other penalized regression techniques (2)
 - ☐ Gaussian process models (3)
 - ☐ Bayesian methods (4)
 - ☐ Other. Please fill in below. (5)
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Q13 When designing experiments, do you often start with a large number of factors that you have to narrow down prior to using a designed experiment? If so, please give a specific example simply stating the largest number of initial factors you started with and then ultimately reduced to. If not, please put "No" in the box below.

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Q14 What is the primary motivation for your choice of experimental design? Choose all that apply.

- ☐ Justification to upper management (1)
 - ☐ Forced protocol (2)
 - ☐ Use methods you are comfortable with (3)
 - ☐ Analysis possible with straightforward calculations (4)
 - ☐ Other. Please fill in below. (5)
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Q15 Have you continued a pursuit in further statistical training on newer methods?

☐ Yes (1)

☐ No (2)

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Q16 Are you familiar with supersaturated designs?

☐ Yes (1)

☐ No (2)

Skip To: Q18 If Are you familiar with supersaturated designs? = No

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Q17 Have you or a colleague ever performed an experiment using a supersaturated design?

☐ Yes (1)

☐ No (2)

Skip To: Q18 If Have you or a colleague ever performed an experiment using a supersaturated design? = No

Q27 Briefly explain the experimental process where you used a supersaturated design without giving too many details and indicate whether it was used successfully.

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Q18

Description of a Supersaturated Design

A two-level supersaturated experimental design considers more factors than available experimental runs. For example, one could use $n=18$ experimental runs to study $k=20$ factors. A typical application would be in the initial screening stages of experimentation where the goal is reduce the many factors to the important few.

Although one could consider a model matrix to be "supersaturated" if the number of regression parameters is larger than n , we are not considering that situation to be a supersaturated design. We are only considering the case where the number of factors is greater than n .

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Q19 Having read the brief description of supersaturated designs, which of the following concerns you the most about applying this type of design?

☐ Unreasonable assumptions (1)

☐ Complicated analysis (2)

☐ Neither (3)

☐ Other. Please fill in below. (4)

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Q20 Would you be interested in learning more about supersaturated designs?

- ☐ Yes (1)
- ☐ No, what they promise does not seem realistic (2)
- ☐ No, their construction and analysis are too complicated (3)
- ☐ No, it would be too difficult to convince management to let us perform them (4)

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