

Bayesian Networks for Beginners

Best Practices for a relevant analysis applied to product research

Why Bayesian Networks?

It maximizes return on consumer research investment: **get more for less!**

What is Bayesian Networks?

It is a tool that models and visualizes a great deal of consumer data into **actionable intelligence** for both: R&D and Marketing

How does it work?

Bayesian Networks analyzes data fully independent of other statistical approaches. It reveals relationships and factors within the data, it creates models showing, how to improve selected target criteria (e.g. overall liking, purchase intent) in order to finally identify the **best optimization scenario** for the success of your product.

UNSUPERVISED - LEARNING

SUPERVISED - LEARNING

Identify factors

Highlight relationships between factors and target

Quantify impact on target

Generate the best scenario optimizing target

FACTOR : « PACKAGING »	
Q3: Acceptance of product appearance	32%
Q9: Packaging size JAR	30%
Q6: Packaging color acceptance	23%
Q11: Packaging shape acceptance	15%
FACTOR : « AROMA »	
Q23: Aroma intensity JAR	62%
Q26: Natural aroma	38%

Contribution of the variable to the factor ↑

Before optimization	Reduction of bitter taste	Increase the overall taste intensity	Increase the packaging size
5,6 / 9 Inferior to competitor	6,5 / 9 At parity with competitor	6,8 / 9 At parity with competitor	7,0 / 9 Superior to competitor

- First step is the building of factors, which are defined by a group of variables containing common information.
- Each variable contributes to the respective factor, and Bayesian Networks quantifies its impact.

→ This allows us to see the tested products through the eyes of the consumer.

- Next step is to select a target from the variables, which shall be optimized, e.g. overall liking, purchase intent, specific association, etc.
- Bayesian Networks identifies and visualizes the relationships between factors and target criteria.

→ This allows us the understanding, how the target is dependent on certain factors, offering insights into an evident and precise modelling of target optimization.

- The third step quantifies the factor's and the variable's impact (can be interpreted as correlation) on the selected target.

→ This helps us to understand the impact of each and every criterion to the target optimization.

- In the fourth and final step, specific and relevant criteria are selected to build the desired optimization route.

→ Finally, Bayesian Networks gives us a company specific, tailored scenario to best optimize the selected product target.

When should it be used?

The most meaningful use is in the deeper analysis of any kind of consumer research with a great deal of data, especially acceptance measurement in order to better understand the overall context of consumers hedonic product-evaluation. Some examples

- To **reveal drivers** of hedonic targets e.g. overall liking, perceived naturalness, etc. with the ultimate purpose of **optimizing products or concepts**
- To reveal new and **more comprehensive findings** to already existing consumer research investments at a fraction of the cost.
- To **perform consumer segmentation** according to specific given criteria
- To **reduce a questionnaire**, focusing on those variables with the strongest impact to specific factors

The Bayesian Networks approach can be applied to all kinds of datasets, as long as there is a minimum of 500 data lines (consumers multiplied by products). It can deal with numerous variables and with different scales (acceptance score, agreement, JAR scales, CATA).

SAM Expertise

SAM Project Managers have dealt with Bayesian Networks for more than 4 years, maintaining state of the art data processing for consumer research projects.

SAM will support you!