SensationResearch

Integrating qualitative and quantitative methods to build a dynamic narrative for product optimization

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INTRODUCTION/BACKGROUND

CPG companies conduct preference mapping to monitor competitors, guide product improvement, and identify innovation opportunities. In addition, learning from this research provides recommendations for quality and cost optimization. While original research encompassed all product attributes – appearance, flavor, and texture – this paper highlights only texture.

OBJECTIVES

- How do consumers talk about texture in the chocolate chip cookie category? How can that language be leveraged to build a more robust research design?
- Which sensory attributes drive consumer liking of chocolate chip cookie texture?
- How can multivariate methods integrate to provide clear guidance in optimizing product formula for cost reduction, quality improvement?

Multi-phase Approach For Drivers of Liking Research

Phase I Qualitative Focus Group Interviews
- Series of 4 focus groups conducted to identify potential product drivers and understand consumer terminology for product category
- Gained additional insight on usage, purchase behaviors, motivations, and attitudes for the category

Phase II Descriptive Analysis Mapping
- Highly trained sensory panel profiled 20 competitive samples resulting in a PCA map of product space
- Revealed the most differentiated products based on unique sensory characteristics that divide the product category

Phase III Consumer Drivers Of Liking CLT
- 15 representative profiles from descriptive analysis selected for Consumer Test using guidance from qualitative insights.
- Created predictive liking models using sensory profiles and consumer responses to understand performance of all products and guide future product development and optimization efforts
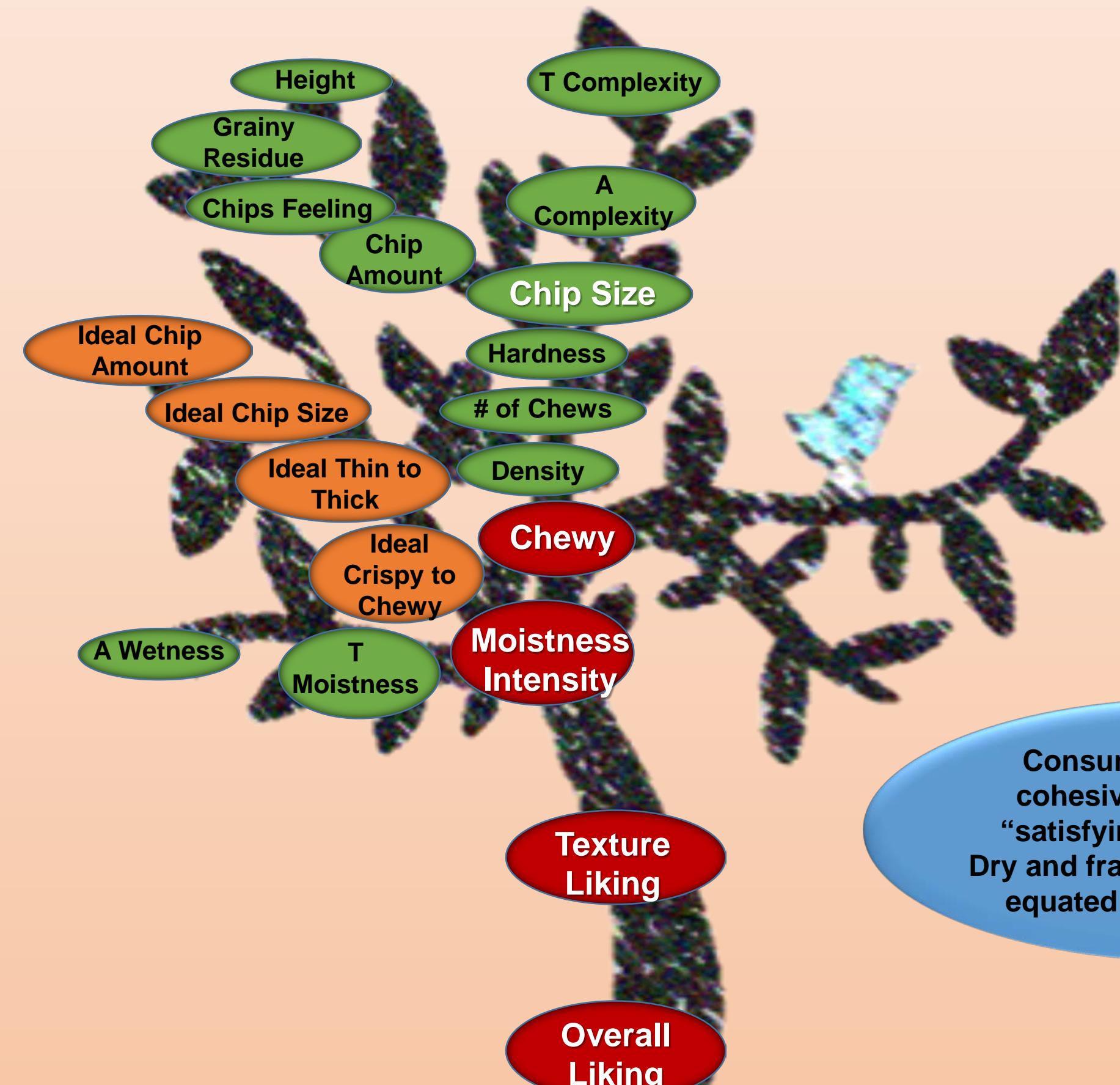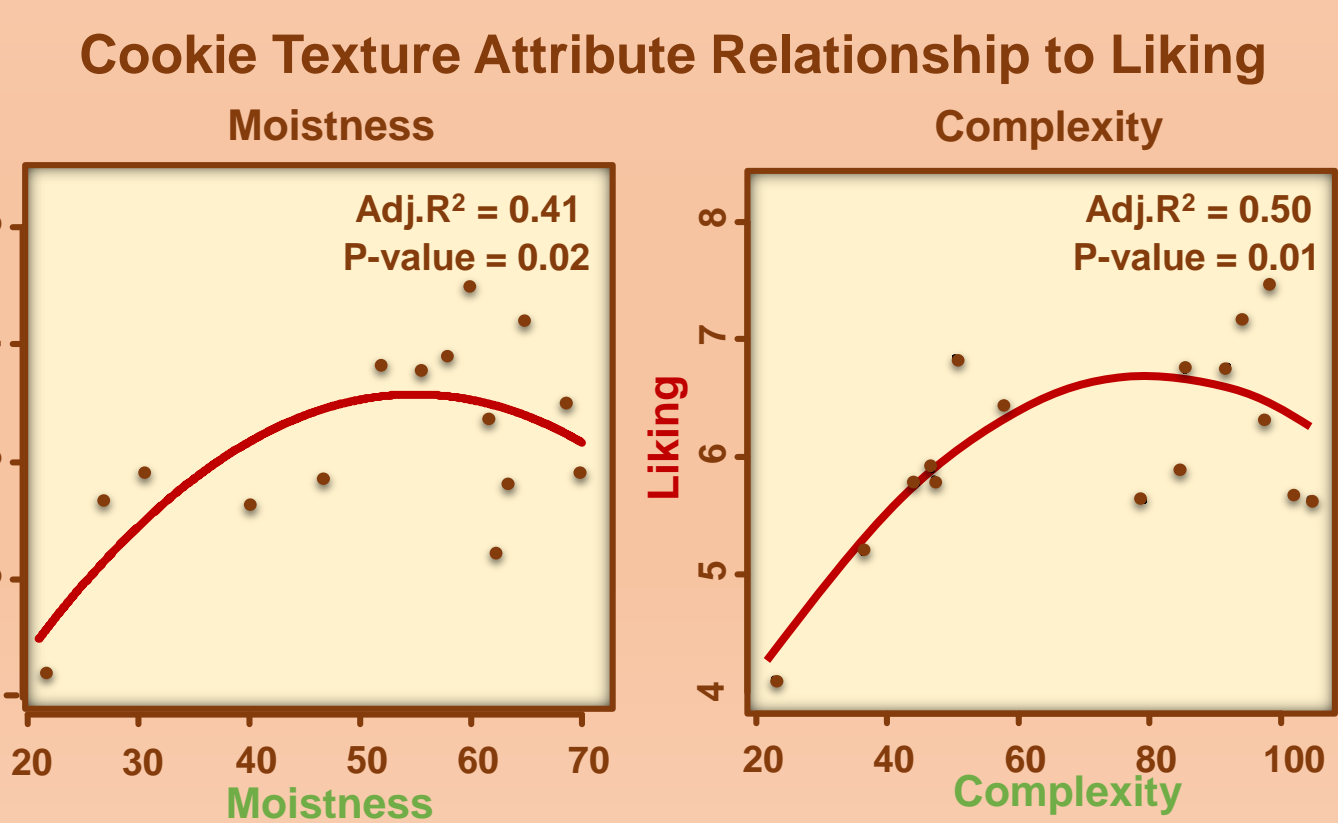
Consumers called dense, cohesive, complex texture "satisfying", "rich", "filling". Dry and fracturable cookies were equated with "eating sand".

Consumer Ideal Cookie Means

Light Brown — Dark Brown sd = 1.2
Dull — Shiny sd = 1.4
No Chips — Chips sd = 1.5
Small Chips — Large Chips sd = 2.0
Milk Choc. — Dark Choc. sd = 1.8
Mild — Intense sd = 1.8
Nuts — No Nuts sd = 1.2
Small — Big sd = 2.1
Thin — Thick sd = 1.9
Crispy — Chewy sd = 1.9
Hard — Soft sd = 1.5

Consumer Descriptions in Focus Groups support these findings: "An ideal cookie texture is soft, a little moist and gooey, a little chewy with thin crispy edges."

In the CLT study, consumers were asked to indicate their "ideal" cookie by selecting the appropriate categories between the dichotomous anchors.

Foundational Learnings from Focus Groups
How is quality defined?
How do consumers talk about cookies?
Is the category gold standard?
What is the category gold standard?
Homemade Refrigerated
Specialty Packaged
How broad is the category?

The Bayesian network between the research elements is depicted in this Chow and Liu diagram. It shows that liking is linked to consumer expressed "ideals" and descriptive analysis of texture. This analysis allowed for the relationships between the several types of research to be linked. On the tree, the closer an element is placed to the trunk, the stronger the relationship it has to liking.

PCA Relationship Between Texture and Cookie Products

This PCA shows that cookies are differentiated on high fracturability to greater cohesive structure where H is more fracturable and O is more dense and cohesive. As products move toward the top of the plot they become harder and more complex.

Relationship of Texture to Liking Multiple Factor Analysis

The MFA variables representation highlights the relationship between consumers' liking and the texture of the cookies. Most of the consumers prefer cookies that are chewier (higher number of chews), dense and cohesive with complexity in the cookie. Few consumers appreciate the dry, brittle, fracturable products that leave a grainy residue.

Consumer Liking Surface Response Plot from PrefMFA

Dim 1 (28%)
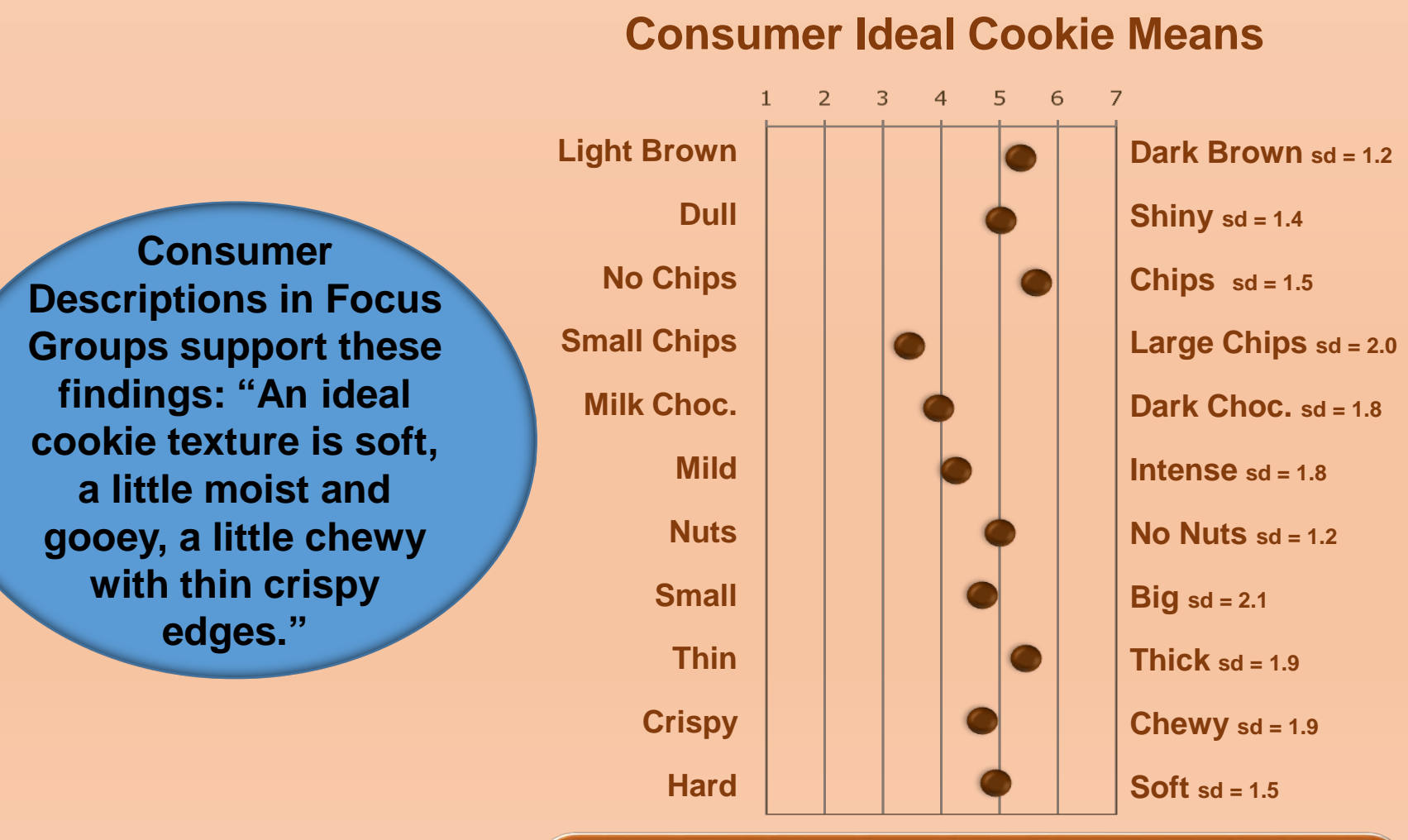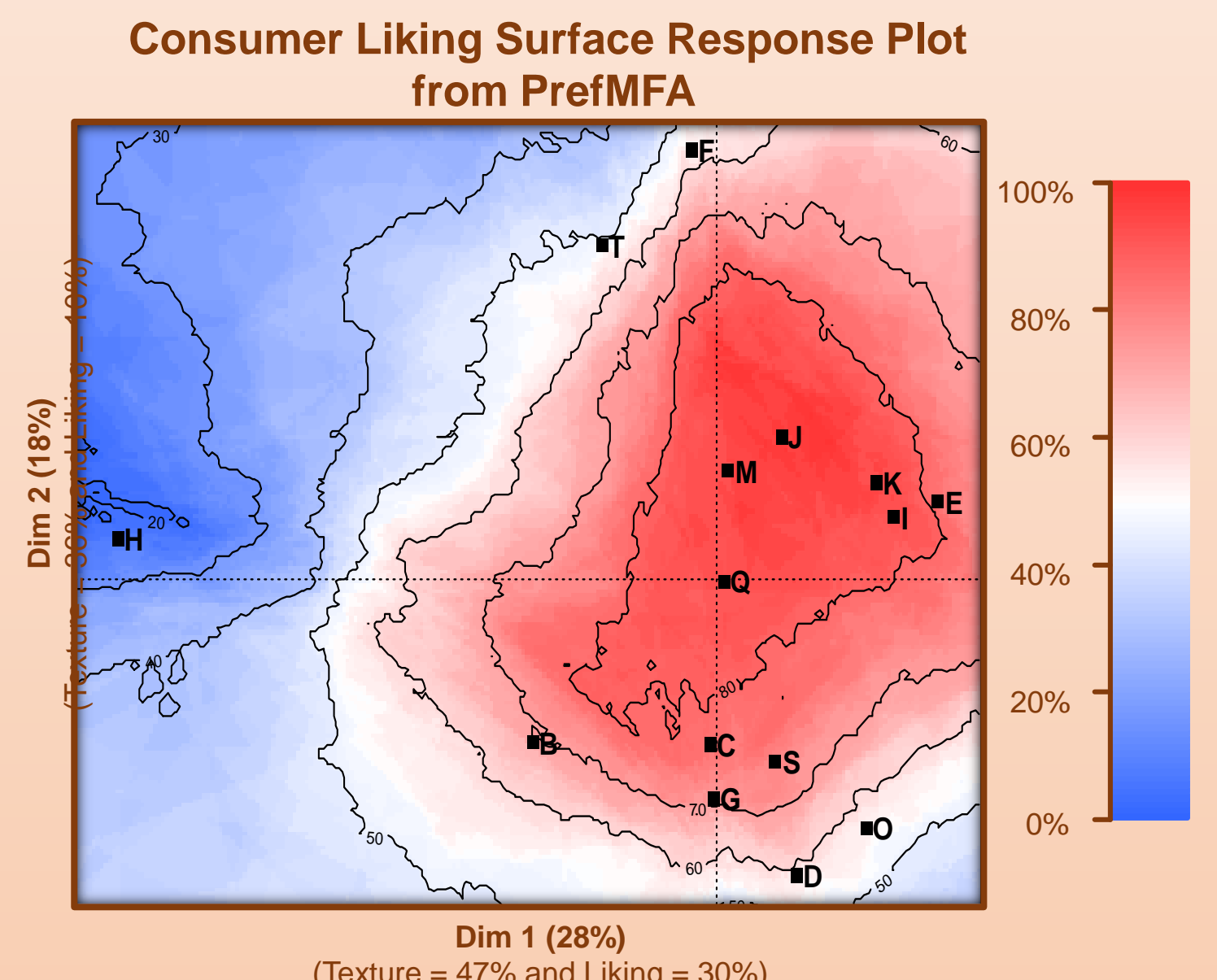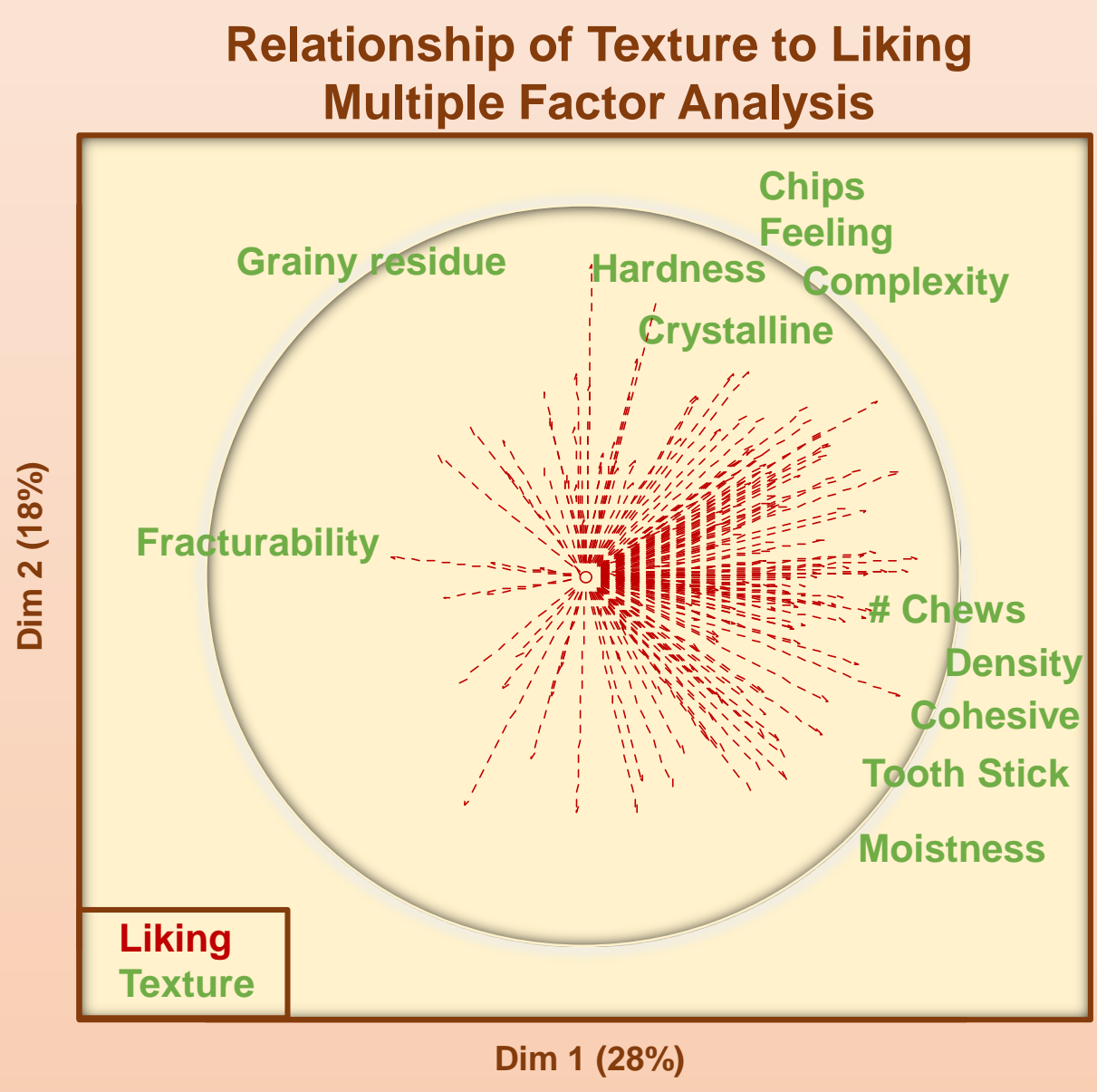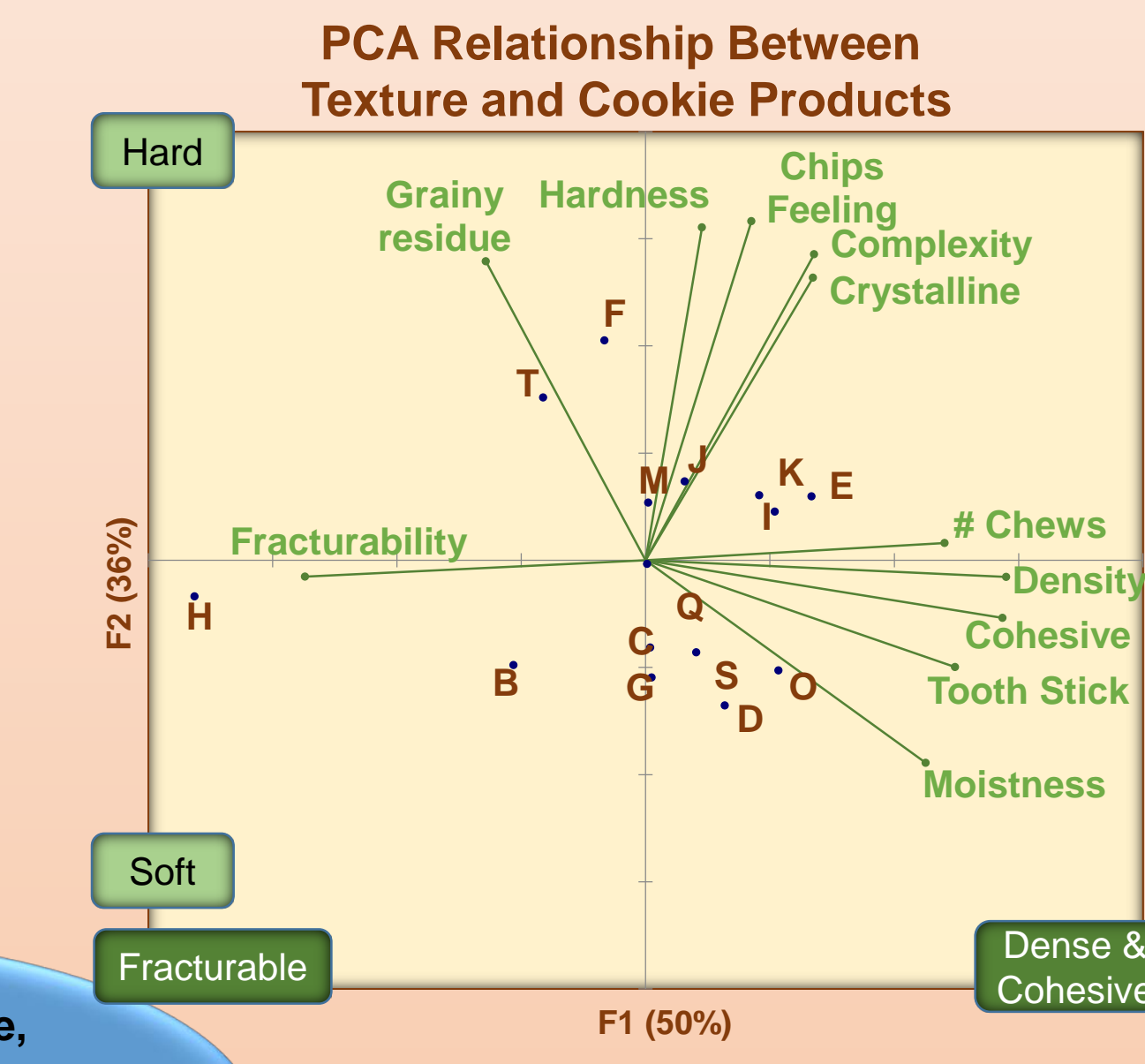(Texture = 47% and Liking = 30%)

The density of consumer liking is shown above. Products that plot in the cold area (blue gradients) are accepted by a low proportion of consumers while products projected in the hot area (red gradients) are accepted by a high proportion of consumers. In this plot, H is shown to be acceptable to only 20-30% of consumers while J is liked by over 80%.

Cookie Texture Attribute Relationship to Liking

Moistness: Adj.R² = 0.41, P-value = 0.02
Complexity: Adj.R² = 0.50, P-value = 0.01

Moistness and degree of complexity of the cookies are significant drivers of liking. For these attributes, the quadratic fit shows that as moisture and complexity increase, liking increases, however, at certain levels liking begins to decrease with the increase in intensity.

Ideal Estimated Cookie Product

The Ideal Product based on the models built between liking and texture profiling indicates that products should be complex in structure, with a moderate hardness, a dense cohesive first chew and a high amount of chips feeling.

Consumers want a moist cookie; not so moist that it falls apart in your hand. Complexity relates to crispy edges, moistness, denseness AND the amount of other ingredients added.

CONCLUSIONS

Statistical techniques employed include PCA, Bayesian modeling, and Preference Mapping with Multiple Factor Analysis (PrefMFA). The multivariate results coupled with consumers' ideal product plot and qualitative learning tell a rich story. This multifaceted research allowed the research team to optimize the texture of the product (as well as other attributes) which has led to improved products and an ability to match liking of market leaders with decreased cost formulas.