

Interaction Structure in a Dish: Testing the Function of Relationships Between Components

A research protocol proposed by Ahmad Issam Maadarani

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This proposal changes the question of whether a component is necessary into a question about its relationship with another component. The point is not to call a dish a network because it has many elements: the effect of changing one element may depend on the presence of another. The protocol separates interaction from changes in mass or moisture caused by removal, and sensory description from a quality decision. No experimental results are presented.

1. Background and scope of the contribution

Taste-mixture interactions have already been studied, including work by Green and colleagues [G]. Interaction itself is therefore not presented as a new discovery. The proposed contribution is a small factorial comparison of a particular relationship in a

composite dish, linked to a declared culinary requirement. Earlier research does not establish this application's validity, and findings from solutions or mixtures cannot simply be transferred to every dish.

2. A testable question

Consider a hypothetical dish containing an acidic sauce and a crisp element. Does the sauce affect perceived textural contrast differently depending on whether the crisp element is present? The null hypothesis is no interaction under the tested conditions; the alternative is that one factor's effect depends on the other's level. Liking is a separate question. Increased contrast is not automatically an improvement unless it serves a defined, intelligible function in this task.

3. Defining factors without compromising comparison

Prepare four formulations representing the combinations of the two factor levels. Absence requires definition: removing sauce changes mass and moisture, while removing the crisp element changes bite composition. Choose between realistic removal, which tests a recipe change, and a controlled replacement intended to preserve incidental properties. These answer different questions. Changing sauce viscosity along with acidity prevents a claim that acidity alone was isolated.

4. Preparation and sampling

Produce independent preparation batches of all four formulations, specifying bite size, sampling location and serving time within written limits. Allocate tasting order and use coding that does not explain the hypothesis. Visible differences may remain, so describe blinding as partial where appropriate. Record batch, assessor and session separately. Multiple bites from one preparation do not compensate for insufficient independent preparations.

5. Appropriate analysis

Where the outcome scale supports difference analysis, examine how the first factor's effect changes between levels of the second. On an approximately interval scale, a contrast can be written as the combined-formulation mean minus each single-factor mean

plus the reference mean. This is a conditional analytical expression, not a quality equation. Ordinal scores require a model respecting their structure. Plan sample size and repeated-measure relationships with suitable design expertise.

6. What would challenge the proposal?

If the sauce's effect remains similar within uncertainty, there is no clear support for interaction in this case. A difference confined to one order or batch also needs re-examination. Failed control of incidental properties weakens inference. Report these cases rather than discarding them as unsuccessful trials. Absence of a clear difference cannot establish that interaction is absent in every recipe.

7. From research to a decision

A dish earns no credit merely for having an interaction. Assess whether the relationship fulfils the specified function and whether execution preserves it under serving conditions. A combined formulation can increase contrast while reducing liking, or matter to one subgroup but not another. A reference report provides formulations, procedures, data and boundaries, allowing another cook to repeat the question elsewhere without assuming the same result.

8. References and limits of source use

References support the stated background. Proposed protocols and hypothetical cases are not findings attributed to those studies.

[G] Green, B. G., Lim, J., Osterhoff, F., Blacher, K., & Nachtigal, D. (2010). Taste mixture interactions: suppression, additivity, and the predominance of sweetness. *Physiology & Behavior*, 101, 731-737.

<https://osuseafoodlab.oregonstate.edu/publication/taste-mixture-interactions-suppression-additivity-and-predominance-sweetness>

Source use: publication metadata and topic context; the full text was not reviewed for this version.

9. A concise working sheet

Field	Review question	What to record
Relationship	Does one factor depend on the other?	Four combinations and primary outcome.
Control	What changed with removal?	Mass, moisture, texture and replacement.
Decision	Does the effect serve its function?	Separate interaction, liking and professional scores.

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