

Évaluer la validité d'un index de repas

De la formule reproductible
à la mesure justifiée.

**Un calcul exact ne suffit pas
à valider ce qu'un score mesure.**

Audit du Nutrikom Index historique, examen critique des construits et programme de validation proposé pour un repas saisi.

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Synthèse en français · dossier scientifique en anglais

Propulsé par MedLab

L'essentiel

Ce que cette recherche permet de retenir

01 Un audit d'une version précise

Le rapport examine un instantané de code documenté. Il distingue les règles calculables de leur validité scientifique et ne démontre pas le comportement d'un déploiement réel. [S1-S7]

02 Trois composantes à réexaminer

Densité nutritionnelle et caractéristiques alimentaires sont à investiguer ou réviser. Les points liés au moment du repas sont différés. Les heuristiques lexicales ne constituent pas une classification NOVA validée. [Dossier 1, 4-8]

03 Le total sur 100 reste différé

Une somme compensatoire de règles ne démontre ni santé, équilibre, adéquation personnelle ni réponse physiologique. La composition estimée garde sa valeur descriptive. [Dossier 1, 9-12]

04 Une validation par étapes

Construits, données, critères indépendants, robustesse et compréhension doivent être précisés puis testés. Les comparateurs alimentaires ou journaliers ne valident pas automatiquement un nouvel index de repas. [Dossier 13-20, 25]

Portée et méthode

Revue critique ciblée, non exhaustive. Certaines sources ne sont accessibles que partiellement. La recherche documentaire et les conclusions n'ont pas été actualisées pour cette édition. Les propositions du dossier ne constituent ni une validation clinique de Nutrikom ni une recommandation personnelle.

Parcourir le rapport

Le dossier scientifique conserve sa pagination de référence : 01 à 25.
Les renvois internes désignent cette pagination, affichée en pied de page.

01-04 Question, données et audit du code

05-12 Composantes et limites du construit

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21-25 Méthode, références et décision

Édition publique

Cette édition ajoute une synthèse française et une navigation au dossier v1.0. La présentation est harmonisée ; les mentions d'outils et d'opérations internes sont retirées. Les données, références, niveaux d'accès aux sources et réserves scientifiques sont conservés. Les propositions décrivent l'état de la recherche à la date du dossier.

Nutrikom Index: construct and validation

A reproducible formula is not yet a validated meal-quality measure

Question ID: IDX01

Date: 11 October 2026 | **Version:** 1.0

Scope: generally healthy adults; one entered meal; the exact source snapshot registered for IDX01.

Overall disposition: DEFER the consumer score out of 100. Retain estimated meal composition descriptively. Investigate/revise the density and food-characteristics constructs; defer timing points. Adopt the interpretation boundaries and staged validation plan below for design review.

Component	Disposition	Defensible meaning now
Nutrient density /40	INVESTIGATE / REVISE	Agreement of selected nutrient-to-energy ratios with legacy rules. Retain the underlying amounts and explicit ratios descriptively, with provenance.
Food characteristics /40	INVESTIGATE / REVISE	A set of lexical and nutrient heuristics, not a validated NOVA classification or food-matrix measure. Defer numerical consumer display.
Meal timing /20	DEFER	A macro-weighted penalty attached to a selected slot. Retain the user's label/time as context, without a suitability rating.
Total /100	DEFER	A compensatory sum of the three rule outputs. No demonstrated scale of personal health, balance, adequacy or physiological response.

Decisive source finding

The pinned real-meal pathway already withholds the food-characteristics component because authentic ingredient lists and food categories are absent. It therefore withholds the total. Complete nutrient fields can admit density and timing calculations, but do not establish their scientific validity. This is a source audit, not evidence that a particular production deployment behaves this way. [S1-S7]

This review builds on DAY01, REC01, REF01 and MEAL01 v1.0. A meal is not a day or usual diet; intake confirmation, nutrient-data coverage and sampling representativeness remain separate. No code change, runtime meal verification, executed test, deficiency diagnosis or personal-response validation is claimed. [D1-D4]

Exact source and audit boundary

Register: rnd/nutrition-evidence-20261011/REGISTRE_EXPLORATION.md

Register commit: f43855cd050435b2958cd675e169ee65b54f57eb

Algorithm snapshot selected by that register:

58600f1756a2f48b864dc58a056f385350275e81

The six files below were read at the algorithm snapshot; their returned Git blob identifiers matched the register. A register update and an algorithm commit are different objects. The latest repository state, legacy archive and current deployment are not substituted for this snapshot.

Source ID / file relative to plugin/src/	Blob SHA / role
S2 Domain/Scoring/LegacyCompatibilityProfileV1.php	aba6e5e092fd688fc3e360c4b344dbd710751be8 Constants, aliases, lexical tokens and legacy lineage.
S3 Domain/Scoring/MealComponentProfileV2.php	c3aaed00bc357016296498c7028729bc68b9c336 V2 inherits coefficients; disables total-sugars fallback.
S4 Domain/Scoring/NutrikomIndexCalculator.php	b018c93ea8d68fb77669e46cf2b60dd60126cb92 Density, matrix, timing and aggregate formulas.
S5 Domain/Scoring/NutrikomIndexInputNormalizer.php	79f610c8429ad00c96aa90dad730c4f3ccfab326 Aliases, field states, energy fallback and slot mapping.
S6 WordPress/AI/MealComponentAdmission.php	00d9eccb7b259cb0136a1ec0eea73b0b7d52de4d Component-specific dependencies and admission gates.
S7 WordPress/AI/RealMealData.php	a9262b3ed67cea4a64fab1bdd25977a6a72328f5 Real-meal contract, totals, coverage and local cards.

Profiles and claim status

The real-meal admission path explicitly uses **MEAL_COMPONENT_PROFILE_V2, version 2.0.0**, algorithm status DETERMINISTIC_COMPONENT_GATED_BEHAVIOR. Its scientific status remains **NOT_VALIDATED**. The calculator's generic default is LEGACY_COMPATIBILITY_PROFILE_V1, version 1.0.0. V1 can substitute total sugars for absent/zero added sugars; V2 cannot. [S2-S6]

A profile fingerprint identifies a manifest; it is not a scientific certification. Legacy archive hashes establish software lineage, not the origin or validity of nutritional weights. Future coefficient, reference or classification changes need a new, explicitly versioned profile; preserve the historical one for reproducibility. This recommendation authorizes no runtime change.

Density: exact formula and reference values

For positive energy E , let $k = 2000 / E$. Each nutrient amount refers to the same entered portion. Let $\text{cap}(x) = \min(\max(x, 0), 1)$. The implemented density is:

$$D = \text{clamp}[5 \times \sum \text{cap}(k \times n / R) - 13.3333333333 \times \sum \text{cap}(k \times l / L), 0, 40].$$

The first sum has eight nutrients to encourage; the second has three nutrients to limit. [S2-S5]

Term	Reference in code	Maximum contribution
Protein	50 g	+5
Fibre	28 g	+5
Vitamin A	900 µg; FDA counterpart is µg RAE	+5
Vitamin C	90 mg	+5
Vitamin D	20 µg	+5
Calcium	1300 mg	+5
Iron	18 mg	+5
Potassium	4700 mg	+5
Saturated fat	20 g	-13.3333333333
Added sugars	50 g	-13.3333333333
Sodium	2300 mg	-13.3333333333

These eleven numbers match the FDA's current label Daily Values. This is a numerical provenance match; the code does not document a derivation from the FDA or from individual requirements. The FDA table is an original institutional source for the values, not a validation of this scoring formula. [1,19]

The internal names `NEGATIVE_UL` and `negativeUpperLimits` must not become a clinical "upper limit" label. These are limiting-nutrient label reference values in this formula, not three tolerable upper intake levels. EFSA could not establish a UL for dietary sugars; a 50 g added-sugar denominator is not a toxicity boundary. [1,20]

Density: what the arithmetic can represent

Energy normalization has a narrow meaning

D describes selected nutrient ratios after scaling the composition to a hypothetical 2000 kcal. It does not describe how much of a day's requirement the actual meal supplies. The 2000 kcal constant is not this person's energy requirement. Uniformly scaling energy and all nutrient amounts leaves D unchanged before rounding. A small taste and a very large portion can therefore receive the same density score. [S2-S5]

Design choice	Scientific issue / implication
Eight equal positive weights	Equal 5-point maxima are normative choices. The set omits many nutrients and food-group attributes; it is not a comprehensive adequacy measure. Protein quantity does not assess protein quality or bioavailability.
Three larger negative weights	One fully capped negative term offsets about 2.67 fully capped positive terms. No endpoint or preference study establishes this exchange rate.
Caps at normalized ratio 1	More of a positive nutrient stops helping; more of a limiting nutrient stops changing its penalty. Different compositions become tied. Positive-nutrient excess is not evaluated.
Floor at zero	Different negative balances collapse to the same $D = 0$. The result cannot distinguish their underlying nutrient amounts or prove danger.
Common 2000 kcal projection	Ratios become sensitive to energy mismatch and very low energy. Water has no positive energy denominator; this is "not applicable", not poor nutrition.
Reference framework	US label constants are not silently interchangeable with EU label NRVs, EFSA AR/PRI/AI or ANSES references. A European redesign needs explicit selection, unit conversion and a new version, following REF01.
Units and definitions	μg vitamin A RAE cannot be replaced by generic μg RE or IU without food/form-specific information. Sodium is not salt; added sugars are not total or free sugars. Aliases alone do not perform these conversions.

Interpretive traps inside the output

The code flags a limiting nutrient as "critical" at an uncapped normalized ratio ≥ 0.75 . This is an undocumented algorithmic trigger, not a clinical threshold. At 500 kcal it would flag 431.25 mg sodium by arithmetic alone. "Missing positive nutrients" also includes raw zero values; a confirmed zero is not missing composition. Do not expose these internal names as health findings. [S4]

NRF research supports studying nutrient-density constructs, but its evidence does not transfer automatically to this different eight-plus-three formula, weighting, normalization, truncation or single-meal interpretation. [3-5]

Food characteristics: exact rule and failure modes

M = clamp(40 - 20U - 15L + 10W, 0, 40). U is a binary “UPF” heuristic; L a liquid heuristic; W a whole-food heuristic, forced false whenever U is true. The numerical deductions are fixed; no dose or meal share enters the rule. [S4]

Flag	Implemented rule	Why it is not the claimed construct
U: ingredient count	More than five non-empty comma-separated parts, OR a listed substring, OR fibre/carbohydrate <0.1 when carbohydrate >0.	Six minimally processed recipe ingredients can trigger it. Commas inside subingredients alter counts. A fibre ratio is not a manufacturing-process classification.
U: text markers	French/English industrial tokens; examples: hydrogenated, emulsifier, color, sweetener, e322. Lowercase substring search.	No function/context verification or word boundaries. “Multicolor” contains “color”; accents, language and spelling change detection. A missing marker is not proof of absence.
L: liquid	Category contains boisson/beverage/drink or serving unit contains ml/fl oz/oz, subject to water/tea/black-coffee name exceptions.	Mass ounces can identify a solid as liquid. Preparation, viscosity and mixed solid-liquid structure are not measured. A categorical liquid penalty has no universal physiological magnitude.
W: whole food	If not U: a single ingredient, selected category substrings, or a small exact English name list.	One ingredient is not necessarily an intact food. Cultural vocabulary and metadata quality alter the flag; joining meal names is not an ingredient list.

U	L	W when allowed	M
0	0	0 or 1	40
0	1	0	25
0	1	1	35
1	0	0	20
1	1	0	5

The +10 whole-food bonus has no effect for non-liquids because the base is already 40; it only raises an eligible non-UPF liquid from 25 to 35. The reachable rule outputs are 5, 20, 25, 35 and 40, not a continuous measurement of food structure. These are deductions from the formula, not executed tests.

Food characteristics: evidence and cultural fit

Processing, food structure and nutrient composition are different attributes

NOVA's original definition concerns the nature, purpose and industrial formulation of foods. It does not define every low-fibre carbohydrate food or every six-ingredient recipe as ultra-processed. The Nutrikom rule must not be displayed as an established NOVA assignment. [8]

The $\leq 10:1$ total-carbohydrate:fibre criterion was studied as a way to select grain products: Mozaffarian and colleagues compared 545 products from two Boston supermarket chains. It separated several label nutrient characteristics, not human health outcomes or manufacturing categories. Applying it to milk, fruit, all dishes or a carbohydrate field on an incompatible basis exceeds that evidence. [9]

Evidence supports investigation	It does not support
Whole-food structure can matter. In 18 healthy adults, isocaloric whole apple, puree and juice had different MRI gastric half-emptying times and appetite ratings. [17]	A universal -15 for all liquids, a +10 for every whole-food category, or a predicted personal digestion time.
Controlled dietary interventions have compared high-UPF with minimally processed patterns and found differences in energy intake or weight. [11,12]	A -20 value for any meal with a marker, a causal effect of one additive, or equivalent effects across all UPF foods.
Food-classification reproducibility is empirically testable. Braesco et al. found only modest multi-rater agreement in their NOVA exercise. [10]	That all NOVA coding is unusable, or that a keyword proxy solves disagreements. Training, detail and adjudication can change agreement.
Missing recipe/product information is a real limitation. The pinned real-meal gate recognizes this. [S6]	Treating unknown metadata as "unprocessed", assigning full points, or inferring an ingredient list from a display name.

Minimum defensible redesign to investigate

Keep per-food identity, recipe hierarchy, ingredient-list source and version, preparation/physical form, and classification uncertainty. Evaluate food-level classifications before considering how to aggregate a mixed meal; an "any item" penalty makes a trace ingredient equivalent to a dominant component. Preserve quantities if an exposure share is studied.

Validate French accented terms, English synonyms and the intended users' foods, brands and recipes. Legumes, fermented foods, breads, traditional mixed dishes and fortified products need explicit treatment. Category words, database coverage and meal customs must not become unrecognized cultural penalties. These are design proposals, not validated replacement rules.

Timing: a slot coefficient, not circadian measurement

Let $Q = 4P + 4C + 9F$; $c = 4C/Q$, $f = 9F/Q$ and $p = 4P/Q$. For $Q > 0$, $r = a_c c + a_f f + a_p p$ and $T = \text{clamp}(20 - 40(r - 1), 0, 20)$. [S2,S4]

Slot	Coefficients C / F / P	Equivalent expression	50% C, 30% F, 20% P
Morning	1.0 / 1.0 / 1.0	20 for every macro mix	20.0 /20
Midday	1.2 / 1.1 / 1.0	$20 - 8c - 4f$	14.8 /20
Evening	1.5 / 1.2 / 1.1	$20 - 20c - 8f - 4p$	6.8 /20

The example changes only the slot and uses shares of Q , not necessarily reported total energy. It is a transparent algebraic illustration, not an executed runtime result. The coefficient label “risk factors” is not an estimated relative risk or probability.

What human studies establish

Primary study / population	Measured comparison / result	Limit for Nutrikom
Morris 2015 [16]; 14 healthy adults, controlled crossover laboratory protocols.	Biological evening vs morning: postprandial glucose about 17% higher; 12-hour circadian misalignment independently increased glucose AUC about 6% ($P=0.0003$ for misalignment).	Internal phase and behaviour were distinguished experimentally. No carbohydrate/fat/protein coefficient table, meal-quality points or personal correction factor was validated.
Gu 2020 [15]; 20 healthy volunteers, randomized crossover, dinner at 18:00 vs 22:00; sleep 23:00-07:00.	Late-dinner glucose peak 150.3 ± 5.6 vs 127.0 ± 4.5 mg/dL (means $\pm$ SEM), about 18% higher. Metabolic outcomes and habitual sleep timing mattered.	Acute group effect under controlled dinner/snack/sleep schedules; not all evening meals, not an individual prediction, and not proof of chronic harm from one meal.

Clock time is absent from the scoring formula; a slot is not circadian phase, time since waking, prior intake, activity or proximity to sleep. Morning always receiving full marks and evening protein being favoured over carbohydrate are not derived from these trials. Keep timing context descriptive and defer T . [D4]

The total does not yet have a defensible construct

$I = \text{clamp}(D + M + T, 0, 100)$. The nominal weights are 40:40:20. They define exchange rates among unlike concepts, not measured contributions to one health outcome. In the generic all-component formula, M is at least 5; a stated 0-100 range should not be mistaken for a calibrated percentile or probability. [S2,S4]

Construct question	Finding / consequence
What is being measured?	At present: compliance with this profile's chosen nutrient and heuristic rules for the entered meal. "Healthiness", "balance" and "metabolic suitability" remain undefined or unvalidated outcomes.
Formative or reflective?	The score combines chosen attributes to form an index. They need not be interchangeable manifestations of one latent trait. A high Cronbach alpha, factor fit or correlation is neither necessary nor sufficient validation.
Can strengths offset weaknesses?	Yes. The additive total lets points in one component compensate for another. A 20-point processing deduction can be offset by changing timing or nutrient ratios, without evidence of an equivalent health trade-off.
Are components independent?	No. Fibre adds density points and affects the processing proxy. Macronutrients influence energy normalization and timing; saturated fat overlaps with total fat. Double counting can amplify an implicit preference.
Does the score assess portion size?	Uniformly doubling all amounts leaves D and T unchanged, and M unchanged if metadata is unchanged. It cannot judge absolute energy burden or whether the portion fits a person's needs.
Does aggregation preserve meaning?	Scoring the combined meal is generally different from averaging food scores because of ratios, caps and Boolean flags. Summing or averaging meal scores does not create a validated daily or usual-diet index.
Does more complete data validate it?	No. Better coverage removes one source of computational uncertainty; it cannot justify nutrient selection, coefficients, cut points, intended use or interpretation.

Composite-indicator methodology calls for an explicit conceptual framework and examination of normalization, weighting, aggregation and sensitivity. OECD/JRC guidance is methodological context, not a nutrition trial or endorsement of Nutrikom. [18]

Do not interpret 80/100 as "80% healthy", 20 points short of adequacy, an 80th percentile, or a 20% risk. No reference distribution, interval-scale interpretation, meaningful difference or outcome calibration is established here.

Three distinct gates: correctness, data, validity

Gate	What it establishes	What it cannot establish
Software correctness	The pinned profile is selected; typed values and units are handled correctly; formulas and states reproduce the specification; revisions invalidate stale results.	That the formula represents nutritional quality, predicts a response or benefits users. This report reads code; it does not certify test coverage.
Input adequacy	Required fields have known values on compatible bases; matching and portion assumptions are visible; metadata are suitable for the requested calculation.	That an entered amount was consumed, that unknown nutrients are zero, or that a complete record is accurate.
Scientific validity	Evidence supports a precisely stated construct, unit of analysis, population and use, with known uncertainty and limitations.	Automatic transfer to different populations, meals, references, endpoints, languages, modified weights or UI interpretations.

Pinned real-meal admission rules

Density requires complete energy plus all eleven scoring nutrients and positive reported energy. Timing requires complete protein, carbohydrate and fat with $Q > 0$. Both are blocked if an item reports zero energy with positive macros. Matrix requires carbohydrate and fibre but is **always unavailable in this pathway** because food categories and real ingredient lists are not supplied. The total is retained only when all three components are admissible; partial scores are not rescaled to 100. [S6,S7]

RealMealData accepts 1-30 items with the full set of fifteen keys, each a finite nonnegative numeric value or null, subject to engineering maxima and one-decimal precision. It computes nutrient-specific coverage and known sums. Its displayed “ingredients” are joined names of at most four foods, not product recipes. A free-text portion and complete nutrient fields do not verify edible quantity or food matching. [S7]

Do not confuse the generic domain with this guarded pathway

The generic normalizer retains absent/null/zero state metadata but uses zero values in arithmetic, can infer energy from macros, and defaults an absent slot to lunch. The generic timing function returns 20 when macros are missing. Real-meal gates prevent these defaults from becoming admitted components there. A new caller must not bypass admission or use a default as evidence. [S4-S6]

“Not clinically validated” is a useful disclosure, but cannot repair a misleading score title or traffic-light verdict. Conversely, “not scored because nutrient values are missing” is inaccurate when the actual blocker is ingredient metadata or unsupported interpretation. Show the specific reason.

Sensitivity to ordinary input uncertainty

Perturbation	Expected vulnerability	Required investigation / display response
Uniform portion scaling	Density and timing are invariant before rounding; absolute energy changes.	State portion and amounts separately. Do not market the score as a portion-suitability measure.
Selective omission of oil, sauce or drink	Energy, limiting nutrients and macro shares can change differently; direction of score error is not fixed.	Compare observed/weighed reference meals with typical omissions; preserve omitted/unreported as distinct from zero.
Raw/cooked or edible-weight mismatch	Water content, yield and nutrient density can change independently of the entered number.	Use documented matching/preparation assumptions; perturb realistic alternatives and inspect rank changes.
Missing micronutrient values	Zero-filling depresses positive points; missing limiting nutrients could inflate the score.	Current real-meal density must remain unavailable if required values are missing. Do not impute without a separate validated method.
Different composition database / food match	All fields may be complete but use different food definitions, analytical data, fortification or imputation.	Version sources; compare plausible matches and provenance. "Complete" is not an accuracy certificate.
Unit or nutrient-form mismatch	mg/μg, salt/sodium, RE/RAE, total/available carbohydrate or total/added sugars alter ratios.	Semantic validation before numeric calculation; aliases cannot establish equivalence.
Rounding / item splitting	One-decimal item values and rounded sums can change small nutrient totals, flags and ties.	Compare split/merged equivalent inputs and retain appropriate internal precision in any future contract.
Very low positive energy	Absolute errors become large normalized-ratio errors and quickly hit caps.	Inspect denominator stability; do not assign a made-up cutoff in this report.
Ingredient punctuation / category language	Binary M flags can change abruptly for identical food.	Test semantic equivalents, accents, translations and nested recipes; report classification uncertainty.
Minor flagged ingredient	An OR rule can penalize the whole meal irrespective of dose.	Evaluate ingredient-share aggregation against the declared construct; do not assume a trace and a main dish are equivalent.
Meal label / slot change	T can move substantially with no composition or actual clock-time change.	Display actual user context; test mappings separately from any timing hypothesis.
Later edits / duplicate entry	Score and explanation can become stale; proportional duplicates may not alter D/T.	Invalidate by meal revision; show changed amounts even if an experimental score stays the same.

A confidence interval cannot be invented from "estimated portion". Use measured error distributions or transparent scenario ranges; distinguish measurement uncertainty, missing information and uncertainty about the model itself.

Primary evidence: nutrient-profile validation

Access: F = full original text or targeted full-text sections retrieved; A = original abstract/record retrieved, full methods not fully inspected. Statistics below describe those studies, not Nutrikom.

Study / population / access	Comparator and finding	Limit for this index
Fulgoni et al. 2009 [3]; foods and dietary records from US NHANES 1999-2002. A.	NRFn.3 variants scored foods per 100 kcal or customary serving and regressed energy-weighted person-level scores against HEI. Six or nine positive nutrients performed best; more vitamins/minerals did not consistently improve agreement.	Original NRF family, not this eight-plus-three formula. Shared nutrient inputs with HEI limit independence. Diet-level association does not validate one meal, caps or timing points. No individual-error estimate extracted.
Sluik et al. 2015 [4]; 2,106 Dutch adults, national survey 2007-2010. F.	Fifteen NRF variants vs Dutch Healthy Diet index; the 100-kcal NRF9.3 had the strongest reported association, explaining about 34% of index variation.	Cross-sectional, overlapping diet information, no clinical meal endpoint; model differences were not large. National food patterns/reference choices matter.
Murakami et al. 2019 [5]; 242 Japanese adults aged 31-81, 121 women and 121 men. F.	Diet-history questionnaires vs 16 days of weighed dietary records across seasons; NRF9.3/HEI ranking correlations about 0.37-0.61, reproducibility ICCs about 0.53-0.77. Absolute individual agreement was poor.	Shows why ranking and group agreement differ from individual precision. Both sides are dietary assessment tools, with shared composition limitations; no biomarker gold standard.
Reedy et al. 2018 [6]; four exemplary menus, NHANES 2011-2012 (7,935, includes children), NIH-AARP (422,928 adults). A plus accessible indexed original sections.	HEI-2015 assessed multiple validity/reliability dimensions, energy association and mortality relationships. Exemplary menus scored 87.8-100; Cronbach alpha was 0.67.	Validation is a programme, not one correlation. HEI is a dietary-pattern measure aligned with US guidance; alpha is not a pass criterion for Nutrikom's formative components.
Deschasaux et al. 2020 [7]; EPIC, 501,594 adults, ten European countries; median follow-up 17.2 years. F.	Higher energy-weighted FSAm-NPS dietary index (less favourable profile): highest vs lowest fifth all-cause mortality HR 1.07, 95% CI 1.03-1.10.	Observational association, residual confounding and dietary measurement error. It concerns a different algorithm and habitual dietary pattern, not one entered meal or a modified Nutri-Score version.

The disagreement is informative: useful relative ranking can coexist with weak absolute individual agreement, and a diet-level outcome association can coexist with no validated meal-level decision rule. Neither null disagreement nor strong concordance with another score is sufficient on its own.

Primary evidence: processing and structure

Study / population / access	Comparator / outcome / uncertainty	Transfer limit
Hall et al. 2019 [11]; 20 weight-stable adults, mean age 31.2 years, BMI 27; inpatient randomized crossover, two weeks per diet. F.	Ad-libitum ultra-processed vs unprocessed diets: intake $+508 \pm 106$ kcal/day (SEM, $P=0.0001$); weight $+0.9 \pm 0.3$ vs -0.9 ± 0.3 kg. Presented diets were matched on several nutrients.	Diet packages differed in properties including non-beverage energy density and eating rate. This does not isolate an additive or validate a fixed meal penalty. Short, controlled setting; limited generalizability.
Dicken et al. 2025 [12]; 55 adults in England, BMI ≥ 25 to <40 and habitual UPF $\geq 50\%$ energy; 50 in ITT. F.	Eight-week MPF vs UPF diets, both following Eatwell guidance: weight change -2.06% vs -1.05% ; difference -1.01 percentage points, 95% CI -1.87 to -0.14 . Both groups lost weight.	Overweight/obesity sample is indirect for unrestricted healthy adults. Free-living intake was not directly measured; order, adherence and dropout matter. Food-pattern comparison does not justify -20 points.
Braesco et al. 2022 [10]; food/nutrition specialists classifying marketed/generic foods. F.	Fleiss kappa 0.32 for marketed foods (159 evaluators) and 0.34 for generic foods (177 evaluators). Outcome: agreement in NOVA coding, not health.	Task, information and rater training affect agreement. No claim that trained adjudication cannot improve it. Several authors disclosed consultancy/industry-linked interests.
Krishnasamy et al. 2020 [17]; 18 healthy adults, randomized three-way crossover, 178-kcal apple forms. A.	Whole apple/puree/juice gastric half-emptying: 65 ± 3.3 / 41 ± 2.8 / 38 ± 2.9 minutes (SEM); $P<0.0001$. Whole apple increased subjective fullness/satiety vs juice.	A specific matched-food experiment; half-emptying is not total digestion, and appetite is not later energy intake. No basis for one liquid coefficient across foods.

Active disagreement should remain visible

Critics of the 2025 trial questioned attributing effects to processing independently of nutritional/physical differences. The authors' 2026 reply argues that energy density and texture are part of the real-world food package, reports sensitivity analyses for missingness, and acknowledges residual carryover cannot be excluded. This is a dispute about causal attribution and policy interpretation, not evidence that Nutrikom's heuristic is validated. The critique's full text was inaccessible here; its publisher summary and the full accepted reply were accessible. [13,14]

Hall was NIH-funded and disclosed an author's industry relationships. Dicken disclosed book/consultancy and pharmaceutical relationships among authors. These disclosures warrant transparent appraisal, not automatic dismissal or a claim that all evidence is independent. [11,12]

Validation plan: define the claim before optimizing

Proposed programme, not performed research. Start with a descriptive meal-composition construct. A health-quality construct needs a written definition specifying which attributes count, why, and at what unit of analysis. Personal health/physiology prediction is a separate, later programme.

Stage	Work and evidence to produce	Decision enabled
0. Freeze the object	Archive source commit, profile manifest/fingerprint, dependencies, input dictionary, food-source versions and display texts. Specify entered meal vs consumed meal; distinguish food-level and meal-level rules. Document real-path and generic-path behaviour.	A reproducible object exists. Software verification may proceed; scientific claims remain restricted.
1. Content validity	Independent nutrition scientists, dietitians, measurement experts and culturally diverse intended users review nutrient selection, reference framework, omissions, energy basis, caps, penalties and compensability. Record rationale and disagreements, not just a consensus score.	A proposed construct and transparent normative choices. Decide whether timing or food processing belongs in this index at all.
2. Analytic correctness	Use hand-derived fixtures, metamorphic checks, version checks, alias/unit/state checks and admission boundaries. Compare calculation with the locked specification; inspect numerical precision and stale results.	Correct implementation of the chosen formula. Passing does not establish that the formula is useful or valid.
3. Input robustness	Build an independently curated meal corpus spanning intended foods, portion sizes, recipes, low-energy entries, brands and incomplete records. Use observed/weighed portions and documented recipes where feasible; quantify matching and composition uncertainty separately.	Sensitivity of components, total and availability to realistic errors; identify unstable rankings, floor/ceiling effects and systematic cultural/data-coverage bias.
4. Construct evaluation	Preregister expected patterns on defined, comparable meal contrasts. Use independent reference information and blinded assessments. Compare component ablations, alternative weights and normalization choices; reserve an untouched external evaluation set.	Evidence for the stated descriptive construct, including where it fails. No automatic health-outcome claim.
5. User understanding	Evaluate whether users distinguish composition, data completeness, experimental arithmetic and health predictions. Compare neutral amounts and explanations with candidate displays; include low numeracy and accessibility needs.	Whether the presentation communicates the intended claim without a health halo or false precision.

Recruitment and sample planning follow the desired precision, expected disagreement/error, diversity of foods/users, clustering and decision consequences. This report does not invent participant counts, required days or pass thresholds.

Independent comparators: useful and unsuitable

Comparator	Appropriate use	Avoid circular validation
Observed / weighed prepared meals; recipe audit	Check entered portions, omitted foods, cooking yields and ingredient identities. Laboratory analysis of selected meals can assess composition error when warranted.	Observed intake is not a gold standard for healthiness. Weighed amounts plus a food database still share composition error.
Blinded independent dietitian/panel assessment	Evaluate a prespecified single-meal construct with explicit criteria, multiple raters and documented uncertainty. Use different source information from the tested heuristic.	Do not ask whether a meal “looks like a high Nutrikom score”. Panel agreement is content/construct evidence, not clinical truth.
Original NRF variants	Convergent nutrient-density analysis with matched nutrient definitions and scoring basis; explain design differences. [3,4]	Do not validate a modified NRF-like formula by sharing the same nutrient table and calling correlation an independent endpoint.
HEI / dietary-pattern indices	At diet level, examine associations if a separately defined diet-level measure is eventually proposed. [6]	Do not apply usual-diet criteria to each meal, or require every meal to contain all food groups. No universal recording-day gate.
Versioned Nutri-Score / other food profiles	Food-level convergent/divergent checks only where category rules and purpose apply. Preserve the exact version and policy purpose. [7]	Agreement with another composite is not proof of personal adequacy, chronic benefit or equivalence to that branded algorithm.
NOVA classifications from authentic data	Food-level coding by trained independent raters, blinded to Nutrikom; adjudicate disagreements and retain unknowns. Report class-specific errors, agreement and missingness. [8,10]	The current text rule must not be its own reference standard. Kappa depends on class prevalence; report the confusion matrix and uncertainty too.
Recovery biomarkers	Can support selected exposure estimates on their appropriate time scale, e.g. dietary assessment research described in REC01.	No biomarker measures “overall meal quality”. Daily energy expenditure or nutrient excretion is not a universal single-meal score target.
Glucose, insulin, appetite, gastric emptying	Only for a separate prespecified physiological endpoint and suitable measurement protocol. [D4,15-17]	One endpoint cannot stand in for another. A lower glucose curve is not synonymous with greater satiety, lower insulin or a healthier meal.

The strongest comparator is independent of the index’s inputs for the particular claim being tested. Where independence is impossible, describe shared errors and triangulate across methods rather than asserting a gold standard.

Robustness, uncertainty and endpoint validation

Robustness analysis to preregister

Use error ranges estimated from the intended workflow, not arbitrary $\pm 10\%$ perturbations treated as truth. Vary portion and matching errors jointly where correlated; separately examine random missingness and realistic missingness concentrated in particular foods or nutrients. Quantify score shifts, rank reversals, availability, cap/floor frequencies and the identity of dominant terms. Report distributions and uncertainty, including by cuisine, food source and meal size.

Compare equivalent split/merged recipes, alternative naming/units, neutral label changes and uniform portion scaling. Analyse both full-data meals and naturally incomplete meals; studying only complete records can conceal a coverage bias. Cluster analyses by person, recipe or food family as appropriate. Keep any redesigned coefficients locked before external evaluation.

Individual error must remain visible

A correct group mean or high rank correlation can coexist with wide individual errors. Report absolute error, signed bias, agreement limits or prediction intervals appropriate to the endpoint; investigate calibration and heterogeneous performance. Do not present a confidence interval for a mean as an interval for a user. [5]

If a future claim is proposed	Additional validation required
"Predicts your glucose response"	Define peak, incremental AUC, time window or another endpoint; specify baseline, measurement method and food/context inputs. Train and externally validate against measured individual responses, with calibration, errors and prediction uncertainty.
"Predicts insulin / satiety / digestion"	Measure the specific endpoint: insulin assays, time-anchored subjective appetite or later intake, gastric retention/half-emptying, etc. Validate each separately. A glucose model or macro ratio does not validate these.
"Higher scores improve health"	Specify outcome, exposure period and intended causal/associational claim. A single-meal rule needs a defensible link to sustained exposure; longitudinal or interventional evidence must match the claim.
"Provides a better decision than amounts alone"	Demonstrate incremental comprehension or decision value and potential harms of the display. Separate preference/satisfaction from correct understanding and from health benefit.

Choose sample size and acceptance criteria prospectively from clinically or practically meaningful error, confidence-interval precision, outcome variability, subgroup scope and decision consequences. Use pilot estimates transparently; do not select thresholds after seeing favourable results. This report supplies no numerical pass criterion.

Proposed English display and explanation contract

UX proposals: the wording below operationalizes evidence boundaries; its comprehension and usefulness require user study. The useful default is an amount/contributor view, with cause-specific missing-data messages, rather than a consumer /100 rating.

Situation	Defensible short wording
Default meal view	"Estimated meal composition" / "These estimates describe the foods and portions you entered."
Density explanation without points	"Nutrients relative to energy" / "This compares selected nutrient amounts with the meal's estimated energy. It does not assess your daily needs."
Private research component, if retained	"Experimental formula result: {value}/40" / "Calculated using profile {version}. This value has not been validated as a measure of meal quality or personal health."
Metadata missing	"Food characteristics not scored" / "Ingredient lists and food categories are not available. Food names alone cannot establish processing."
Nutrient value missing	"Nutrient estimate incomplete" / "Some selected foods have no {nutrient} value. Missing data do not mean zero."
Clock / slot	"Meal context" / "You labelled this meal {label} at {time}. This information alone does not show how it fits your sleep, activity or eating pattern."
Total withheld	"Index not available" / "A total is not shown. The experimental components do not yet support a validated meal-quality rating."
Optional idea	"Food idea" / "If it suits your preferences, you could explore {food}. {Evidence-linked property explanation}." No guaranteed score/health benefit or invented contribution.

Server facts remain authoritative; AI is optional

A proposed explanation object contains a brief title, one or two sentences, optional food idea, referenced fact IDs and evidence IDs, explicit conditions, meal revision, source/profile version and availability reasons. The server supplies and checks figures, units, provenance and permitted facts; AI cannot calculate a score, invent ingredients, fill unknown nutrients, alter weights or convert a lexical flag into a diagnosis. Recompute facts after edits and reject stale explanations. A local template must remain useful without AI. [D4]

Do not use red/green bands, "deficit", "perfect", "balanced", "premium medical-grade", remaining-to-100 advice, a health percentile or reward streaks tied to this total. A disclaimer beside an authoritative-looking number may still mislead; that is a user-understanding hypothesis to test, not a solved issue.

Claims and release eligibility

Claim	Current disposition	What would be needed
"This formula gives X for these inputs"	Conditional, private audit/research only.	Correct profile, complete compatible inputs, deterministic verification, explicit experimental meaning and no implied health ranking.
"This meal has more fibre per kcal than that meal"	Retain descriptively when supported.	Comparable amounts/energy basis, coverage, food-source and rounding checks; disclose estimation. Not a claim of overall superiority.
"This is NOVA 4 / ultra-processed"	Current heuristic insufficient.	Authentic food-level metadata and a validated classification workflow; distinguish processing from nutrient quality and uncertainty.
"This is a good/bad time to eat these macros"	Defer.	Defined timing construct, relevant sleep/wake and prior-intake context, and evidence matching the endpoint. Merely adding clock time cannot validate current coefficients.
"A higher Index means a healthier/balanced meal"	Defer.	Defined content/construct, justified aggregation, independent evaluation and demonstration users understand the scope.
"You have a deficiency / adequate nutrition"	Prohibited from this meal index.	Clinical deficiency and personal adequacy require different data and methods; a future meal-score study cannot by itself authorize these claims.
"This prevents a spike / predicts fullness / digestion"	Prohibited with current inputs and model.	Endpoint-specific individual validation; see MEAL01. Conditional words such as "may" cannot rescue an unsupported personal prediction.
"Consume X more to reach 100"	Prohibited.	The scale is not an intake target. No amount-to-target conversion or supplement recommendation is established.
"Complete data, therefore reliable/validated score"	Prohibited.	Coverage, input accuracy, reproducible calculation, scientific validity and user interpretation must be reported separately.

Proposed release gate

Adopt the descriptive interpretation contract now for design review. Keep the legacy profile immutable for audit. Any replacement score requires a new construct specification, versioned evidence/parameter provenance, independently evaluated performance and tested display wording. Admission can remain strict without implying scientific endorsement. No data-completeness counter, successful package build or single study automatically unlocks consumer health claims.

Excluded claims include pregnancy/lactation, children, clinical diabetes management, renal or digestive disease and therapeutic diets unless separately scoped and evaluated. Generally healthy adults are not physiologically interchangeable.

Proposed verification cases: arithmetic and data

Not executed. These cases specify expected behaviour or a property to investigate. “Expected formula” is derived from source inspection, not a reported runtime test result.

ID / setup	Expected check and interpretation
V01 - Pinned profile	Record commit, V2 version and manifest fingerprint. A changed profile must not silently reuse old interpretations or cached results.
V02 - Proportional scaling	Double energy and every nutrient amount without changing metadata. D and T should be invariant before rounding; raw amounts should double. Never conclude equal portion suitability.
V03 - Known sodium change	500 kcal; change sodium from 300 to 600 mg with other terms fixed and uncapped/floor-free. Sodium penalty rises from about 6.96 to 13.33 points; additional amounts beyond the cap stop increasing that term.
V04 - All normalized reference ratios = 1	Eight positive terms sum to 40; three penalties sum to approximately 40 (floating-point precision applies). D is approximately zero, not “all requirements met” or a diagnosis.
V05 - Positive cap	Increase one positive nutrient beyond normalized ratio 1. Its points remain 5. Verify uncapped amount remains available descriptively; do not imply excess safety.
V06 - Zero-energy water	Complete zero macros and calories. Real-meal density and timing unavailable for lack of denominator; no poor-quality verdict for water.
V07 - Contradictory energy	One item has zero calories but positive protein/carbohydrate/fat. Real admission blocks density and timing, even if meal sums have positive energy.
V08 - Missing iron only	A null iron value on one item makes density unavailable; known macro data may still admit timing computationally. Total remains unavailable. Unknown iron is not zero.
V09 - Confirmed zero vitamin D	Known zero can be complete data. The internal “missing_positive_nutrients” list may include it; user wording must not claim missing composition or deficiency.
V10 - Total vs added sugars	Total sugars present; added sugars null. V2 does not substitute total sugars; real-meal density remains unavailable. Confirm legacy V1 behaviour is separately identified.
V11 - Unit/form substitution	Change a source from vitamin A RAE to RE/IU or sodium to salt while retaining its numeric value. Semantic checks should reject an unconverted comparison, even when values are typed numbers.
V12 - Rounding and splitting	Compare one item with equivalent split portions, including small vitamin D/iron values. Quantify changes caused by one-decimal inputs; do not claim exact scale invariance after rounding.

Proposed verification cases: metadata and timing

Not executed. V13-V19 concern generic/hypothetical matrix inputs. The current real-meal path blocks matrix scoring, so these are not claims that its consumer screen currently shows such scores.

ID / setup	Expected check and interpretation
V13 - Six whole ingredients	A six-part comma-separated recipe can set U true by count. This must not be displayed as proof of ultra-processing.
V14 - Punctuation variant	Use semicolons instead of commas for the identical recipe. Count/classification can change. Flag parser sensitivity and preserve true ingredient structure in a redesign.
V15 - Low-fibre milk	A milk example with positive carbohydrate, zero fibre and liquid unit meets the fibre-ratio rule; U=1, L=1, M=5 in the generic formula. Do not label all milk ultra-processed.
V16 - Solid in ounces	Same solid food described in g vs oz. The unit substring can change L and deduct 15 points; mass ounces are not fluid ounces.
V17 - "Multicolor" / accents	A text containing "multicolor" matches "color"; accented French variants may fail unaccented markers. Test word context and equivalent language forms.
V18 - Whole-food bonus cap	Non-UPF non-liquid with W=0 or W=1 gives M=40. Non-UPF liquid changes 25 to 35. Confirm that "whole" is not claimed to add 10 points in every case.
V19 - Black-coffee exception	"Black coffee with sugar" matches the early black-coffee name exception in the generic liquid logic. Do not infer no additions from a name.
V20 - All nutrients complete	Real-meal nutrients complete but authentic categories/ingredients absent. Matrix and total still unavailable; state the metadata reason, not missing nutrient values.
V21 - Same macro shares, three slots	For 50% C / 30% F / 20% P of Q, expected T: 20 / 14.8 / 6.8. This illustrates a rule effect, not measured changes in health.
V22 - Missing slot / free-text trap	Generic absent slot defaults to lunch/midday; "ham snack" contains "am" and maps morning. Real-meal input permits only morning/midday/evening. Keep the two pathways distinct.
V23 - Missing macros	Generic T has a 20-point fallback; real-meal admission must block missing/nonpositive macro basis. No favourable rating from absent data.
V24 - Snack at 15:00	Clock time alone cannot identify sleep phase, prior food or activity. No "unsuitable afternoon snack" verdict or inferred insulin/glucose response.

Proposed verification cases: interpretation and robustness

Not executed. These checks cover the boundary between an accurate calculation and a misleading conclusion.

ID / setup	Expected check and interpretation
V25 - Energy denominators differ	Include alcohol, fibre or polyols, or inconsistent total carbohydrate definitions. D uses reported E while T uses 4/4/9 Q. Disclose the basis; complete fields do not prove compatible energy shares.
V26 - Trace versus dominant marker	Vary the share of a flagged ingredient in a mixed meal. Generic Boolean U may remain identical; evaluate whether this matches the proposed construct before aggregation.
V27 - Similar macros, different structure	Whole fruit vs pureed/liquid form, or differently prepared starch with similar totals. No personal glycaemic/satiety equivalence or fixed digestion time is inferred from equal D/T.
V28 - Food-source replacement	Replace a matched food with another plausible database record, preserving the user's portion. Recalculate, attribute changes and report match uncertainty; do not claim health improved because the database changed.
V29 - Duplicate entire meal	Duplicate all items with metadata preserved. Total amounts change while ratios can stay constant. Detect/report duplicate intake; a stable score is not evidence the record is correct.
V30 - Meal aggregation	Compare score of combined foods with average component food scores. Differences from nonlinear rules are expected; do not silently average meal scores into a day-quality claim.
V31 - Missing negative vs positive data	Compare an omitted added-sugar field and an omitted potassium field. Both block density in the guarded pathway; neither may be treated as favourable absence or deficiency.
V32 - Score near display boundary	If future bands are proposed, perturb realistic amounts around each boundary. Assess stability and user inference before release; no traffic-light threshold is endorsed here.
V33 - User comprehension	Ask whether an experimental 80/100 means 80% of needs, safe glucose, no deficiency or good portion size. Those interpretations are errors even if the arithmetic is correct.
V34 - Later edit / stale AI	Edit portion, preparation, match or slot. Invalidate cached figures and explanation; reject fact IDs from an older revision. Local amount view remains available.
V35 - Owner-discussion inputs	581 kcal, 92.2 g carbohydrate, about 63% carbohydrate energy, Snack at 15:00 are supplied illustrative facts only. Insufficient to calculate full D/M/T or total: protein/fat split and other required facts are absent. No newly verified runtime meal is claimed.

A verification suite can establish specified software behaviour and communication rules. Content/construct evaluation and user studies remain necessary even if every case passes. Conversely, an unstable or culturally biased heuristic is a design problem to investigate, not merely a test fixture to preserve forever.

Reproducible search and appraisal method

Search date/cutoff: 11 October 2026. Targeted critical evidence review with a pinned-source audit; not a registered systematic review or exhaustive meta-analysis. No language filter was deliberately imposed, but searches and accessible extraction were mainly English, with French institutional/source context. No new human data were collected.

Route	Queries / procedure actually used
Index	“nutrient rich foods index validation NRF9.3 healthy eating index human:true”; “meal timing circadian glucose tolerance healthy adults crossover human:true”; “Nutrikom Index validation”. Earlier targeted searches covered NRF, ultra-processed feeding trials and HEI. Relevant NRF, HEI and feeding-trial records were fetched before use.
Primary-source web verification	Exact titles and identifiers for Fulgoni 19549759; Sluik 10.1017/jns.2015.4; Murakami 10.3390/nu11102540; Reedy “Evaluation of the Healthy Eating Index-2015”; “Hall Ultra-Processed Diets PMC 2019 508”; “Dicken 2025 ultraprocessed minimally processed diets randomized crossover 03842 Nature Medicine”.
Targeted limitations / disagreement	“Ultra-processed foods: how functional is the NOVA system” and DOI; “Identifying whole grain foods 545 10.1017”; “Dicken Reply to processing 2026 Nature Medicine”; “Metabolic Effects of Late Dinner 150.3”; “Morris 2015 25870289 circadian misalignment glucose tolerance 17 6”; “Deschasaux m3173 1.07”.
Original institutions	FDA Daily Value table and added-sugars page; EFSA DRV topic/principles and sugars UL opinion; OECD/EU/JRC composite-indicator handbook. Checked identity, framework and version rather than blending reference values.
Code / continuity	Read S1 register, then S2-S7 at its exact algorithm commit; matched blob IDs. Retrieved DAY01, REC01, REF01 and MEAL01 v1.0 for established boundaries. No production or database access was needed.

Selection, extraction and limits

Prioritized original human studies evaluating nutrient profiles, independent dietary comparators, controlled processing/structure or timing comparisons; included original methodological/institutional sources for definitions. Excluded animal mechanisms and secondary commentary as proof of coefficients. Clinical or selected overweight/obesity samples are labelled indirect where applicable. Abstract-only evidence is not silently treated as full-methods appraisal.

Extracted population, design, comparator, unit of analysis, measured endpoint, estimate/uncertainty when accessible, access level and transfer limitations. Ranked discovery results are truncated; no exhaustive hit count, PRISMA flow, pooled estimate or formal risk-of-bias grade is claimed. Searches did not identify a validation study for the exact Nutrikom profile. This limited negative finding is not proof that none exists; the pinned source itself declares NOT_VALIDATED.

Bibliography: definitions and nutrient profiles

[1] FDA. Daily Value on the Nutrition and Supplement Facts Labels. Current institutional table, accessed 11 October 2026.

<https://www.fda.gov/food/nutrition-facts-label/daily-value-nutrition-and-supplement-facts-labels>

F. Label values and units; no clinical population or Nutrikom validation. Used to identify the eleven numerical constants, including vitamin A in µg RAE.

[2] EFSA NDA Panel (2010). Scientific Opinion on principles for deriving and applying Dietary Reference Values. EFSA Journal 8:1458.

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Institutional guidance; original abstract/record plus current DRV topic page. Defines assessment/reference concepts, not single-meal score weights. Current overview: <https://www.efsa.europa.eu/en/topics/topic/dietary-reference-values>

[3] Fulgoni VL III, Keast DR, Drewnowski A (2009). Development and validation of the nutrient-rich foods index: a tool to measure nutritional quality of foods. J Nutr 139:1549-1554.

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PMID 19549759. A. NHANES/HEI validation of NRF variants; original full methods and funding not fully inspected here. Not the Nutrikom formula.

[4] Sluik D et al. (2015). Evaluation of a nutrient-rich food index score in the Netherlands. J Nutr Sci 4:e14.

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PMID 26097700; PMCID PMC4462757. F + fetched record. Dutch adult cross-sectional comparison with a diet-quality index; overlapping measurement and national-pattern limits.

[5] Murakami K et al. (2019). Reproducibility and relative validity of the Healthy Eating Index-2015 and Nutrient-Rich Food Index 9.3 estimated by comprehensive and brief diet history questionnaires in Japanese adults. Nutrients 11:2540.

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PMID 30146073; PMCID PMC6718954. A plus accessible indexed original sections; the indexed record lacked an abstract. Multiple populations, including children in NHANES; dietary-pattern validation, not a single-meal criterion.

[7] Deschasaux M et al. (2020). Association between nutritional profiles of foods underlying Nutri-Score front-of-pack labels and mortality: EPIC cohort study in 10 European countries. BMJ 370:m3173.

<https://doi.org/10.1136/bmj.m3173>

PMID 32938660; PMCID PMC7491938. F. Large adult prospective observational study of an energy-weighted dietary index. Residual confounding, dietary error and algorithm-version limits apply.

References identify original evidence and access achieved in this review. "F" does not mean every supplement or raw dataset was reanalysed. DOI links resolve to the original record; access conditions can change. Study details and effect estimates are in pages 7, 11 and 12.

Bibliography: processing, structure and timing

[8] Monteiro CA et al. (2019). Ultra-processed foods: what they are and how to identify them. Public Health Nutr 22:936-941.

<https://doi.org/10.1017/S1368980018003762>

PMID 30744710; PMCID PMC10260459. F. Original NOVA definition/commentary, not a clinical trial or a validated ingredient-count algorithm.

[9] Mozaffarian RS et al. (2013). Identifying whole grain foods: a comparison of different approaches for selecting more healthful whole grain products. Public Health Nutr 16:2255-2264.

<https://doi.org/10.1017/S1368980012005447>

PMCID PMC4486284. F/targeted original sections. US grain-product audit, no human response endpoint; total-carbohydrate:fibre criterion cannot be generalized to all-food processing.

[10] Braesco V et al. (2022). Ultra-processed foods: how functional is the NOVA system? Eur J Clin Nutr 76:1245-1253.

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PMID 35314769. F. Specialist classification exercise; agreement depends on task and information. Disclosed industry/consultancy relationships; not a health-outcome study.

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[12] Dicken SJ et al. (2025). Ultraprocessed or minimally processed diets following healthy dietary guidelines on weight and cardiometabolic health: a randomized, crossover trial. Nat Med 31:3297-3308.

<https://doi.org/10.1038/s41591-025-03842-0>

PMID 40760353. F. Selected adults with overweight/obesity; eight-week dietary patterns, not fixed meal points. Published author disclosures and 2026 debate considered.

[13] Robinson E, Forde CG (2026). Concerns around evidence that food processing should be included in dietary guidance. Nature Medicine.

<https://doi.org/10.1038/s41591-025-04085-9>

Publisher title/summary accessible; full text blocked in this review. Original methodological critique, not new participant data; conclusions not expanded beyond the accessible argument.

[14] Dicken SJ, Brown A, Batterham RL (2026). Reply to Ludwig, D. S. et al.; Robinson, E. & Forde, C. G.; Wang, Z. & Peng, C. Nat Med 32:470-471.

<https://doi.org/10.1038/s41591-025-04089-5>

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<https://doi.org/10.1210/clinem/dgaa354>

PMID 32525525; PMCID PMC7337187. F targeted publisher text. Healthy adults, acute glucose/metabolic outcomes; controlled sleep and meal schedule, no universal timing coefficients.

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PMID 25870289; PMCID PMC4418873. F/targeted original sections and abstract. Small healthy-adult laboratory crossover; phase/behaviour distinguished, not personalized meal scoring.

[17] Krishnasamy S et al. (2020). Processing apples to puree or juice speeds gastric emptying and reduces postprandial intestinal volumes and satiety in healthy adults. J Nutr.

<https://doi.org/10.1093/jn/nxaa191>

PMID 32805050. A, carried forward from MEAL01's verified primary record. Specific apple forms and MRI/appetite endpoints; no blanket liquid penalty or digestion-time forecast.

[18] OECD / European Union / European Commission, Joint Research Centre (2008). Handbook on Constructing Composite Indicators: Methodology and User Guide.

<https://doi.org/10.1787/9789264043466-en>

Original institutional handbook; publication overview accessible, full PDF retrieval unsuccessful in this session.

General composite-indicator methods, primarily country comparisons; cited as methodological context, not nutritional validation.

[19] FDA. Added Sugars on the Nutrition Facts Label. Institutional explanation, accessed 11 October 2026.

<https://www.fda.gov/food/nutrition-facts-label/added-sugars-nutrition-facts-label>

Original institutional source. 50 g label DV on a 2000 kcal reference; does not establish a personal meal target or toxicity threshold.

[20] EFSA NDA Panel (2022). Tolerable upper intake level for dietary sugars. EFSA Journal 20:7074.

<https://doi.org/10.2903/j.efsa.2022.7074>

Original scientific opinion, accessible record/targeted sections. No UL could be established; distinguishes added/free/total sugars and chronic risk evidence. Does not validate a 13.33-point penalty.

Prior Nutrikom evidence contracts

[D1] DAY01, single meal/day/repeated dietary observations, v1.0.

[D2] REC01_dietary_collection_method_and_Nutrikom_contract.pdf, v1.0.

[D3] REF01_nutrient_references_and_Nutrikom_interpretation_contract.pdf, v1.0.

[D4] MEAL01_single_meal_physiology_and_Nutrikom_explanation_contract.pdf, v1.0, 11 October 2026.

All four supplied project reports were retrieved for continuity. They are design evidence syntheses, not independent validation studies of the ledger or Index.

[S1] Register permalink:

[Pinned Nutrikom exploration register](#)

Register blob: bbcf48f085b315ee5ff3f2faf305e66fafd560de. Algorithm commit and six source blobs are on page 2.

Pinned source links and decision handoff

[S2] [Domain/Scoring/LegacyCompatibilityProfileV1.php](#)

[S3] [Domain/Scoring/MealComponentProfileV2.php](#)

[S4] [Domain/Scoring/NutrikomIndexCalculator.php](#)

[S5] [Domain/Scoring/NutrikomIndexInputNormalizer.php](#)

[S6] [WordPress/AI/MealComponentAdmission.php](#)

[S7] [WordPress/AI/RealMealData.php](#)

What is supported now

Nutrikom can report estimated nutrient amounts, contributors, compatible nutrient-to-energy ratios and user-entered context, while distinguishing missing values from zero and documenting uncertainty. An experimental calculation can be audited against a frozen formula. Neither statement establishes personal adequacy or a validated meal-quality scale.

Decision	Practical consequence
Retain descriptively	Meal amounts, food-source provenance, nutrient-specific coverage, supported preparation/structure facts, label and clock time, and short conditional educational explanations.
Investigate / revise	Density content and reference provenance; processing/structure metadata and classifications; weights, caps, aggregation and invariance; robustness to realistic input errors and cultural variation; consumer comprehension.
Defer	The current timing score and consumer total /100; health/balance grades, traffic-light bands and optimization advice; personal physiological predictions without endpoint-specific validation.

Evidence versus proposal

The formulas, defaults, input gates and blob identities are findings from the pinned source. Study populations, endpoints and estimates are findings from the cited literature. The dispositions, proposed field/display boundaries, validation stages and 35 verification cases are reasoned design recommendations. They are not executed tests, an accepted replacement algorithm or evidence of regulatory/clinical certification.

Question answered: the current experimental Index can defensibly represent only its own documented rule-based transformation of an entered meal. Its components provide hypotheses for investigation, while its underlying composition facts can remain educationally useful. A scientifically meaningful combined score requires a declared construct and evidence that matches the intended use.