

Nutritional Optimization and Human Flourishing: From Reductionism to Integral Care

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Abstract

Contemporary nutritional science has undergone a radical transformation from a discipline oriented toward preventing deficiencies and promoting population health into a technology of individual perfection—physical, cognitive, and aesthetic—serving a global wellness economy valued at \$6.8 trillion. This paradigm, sustained by the ideologies of nutritionism and healthism, generates documented pathologies: orthorexia nervosa affects 27.5% of the general population and 34.5% of athletes; weight stigma produces depression, anxiety, and inflammation independently of actual body weight; and social media platforms amplify unattainable body ideals linked to muscle dysmorphia and disordered eating. Meanwhile, a \$193 billion supplement market operates without robust clinical evidence of benefit for healthy individuals. This article critically examines the optimization paradigm through an interdisciplinary lens, mapping its market dimensions, identifying its epistemological reductionisms, and documenting its anthropological, ethical, and social consequences. Against this backdrop, we propose “Expanded Nutrition” as an alternative framework grounded in three philosophical traditions: Benedict XVI’s Open Reason, which demands broadening rationality beyond empirical falsifiability; Wojtyła’s personalistic norm, which prohibits treating persons as means to ends; and the integral ecology of *Laudato Si’*, which links bodily acceptance to genuine ecological consciousness. Expanded Nutrition redefines optimization not as biometric maximization but as prudent ordering toward integral human goods—balancing physical health with community, cultural meaning, ecological sustainability, bodily dignity, and inner peace. Practical implications for clinical practice, professional education, and public policy are discussed.

1. Introduction: Nutritional Optimization as a Contemporary Problem

Contemporary nutritional science has experienced a radical transformation in its ends and methods. What historically constituted a body of knowledge oriented toward preventing deficiencies and promoting population health has been reconfigured as a technology of individual perfection—physical, cognitive, and aesthetic—serving what Byung-Chul Han terms the “achievement subject” who self-exploits through compulsive optimization (Han 2015). This instrumentalization of nutrition operates simultaneously across four registers: as a global market exceeding \$6.8 trillion (Global Wellness Institute 2025); as an ideology that moralizes dietary choices (Askegaard et al. 2014); as an epistemological paradigm that reduces food to its biochemical components (Scrinis 2008); and as a cultural apparatus that stigmatizes bodies failing to conform to standards of thinness or muscularity (Durso and Latner 2025).

The present analysis critically examines this phenomenon from an interdisciplinary perspective. First, we map the current trends in the nutritional optimization market—biohacking, functional foods, performance supplementation, AI-personalized nutrition—documenting their economic magnitude and promises. Second, we identify the pathologies this culture generates: orthorexia, muscle dysmorphia, weight stigma, and food moralization. Third, we analyze the underlying epistemological reductionisms—nutritionism and healthism—and their anthropological consequences. Finally, we propose an alternative

grounded in the tradition of Benedict XVI's Open Reason, philosophical personalism, and integral ecology, articulating the concept of "Expanded Nutrition" as a practical science of integral human care.

This contribution responds to Food Ethics' mission as a trans- and interdisciplinary forum by bringing nutritional science into dialogue with philosophical anthropology, bioethics, and theology—not as decorative additions but as structural requirements of the discipline itself when it confronts questions that exceed its methodological boundaries.

2. The Optimization Paradigm: Markets and Trends

2.1 Macroeconomic Context

The global wellness economy reached \$6.8 trillion in 2024, growing 7.9% over the previous year with projections placing it at \$9.8 trillion by 2029 (Global Wellness Institute 2025). Within this ecosystem, nutritional optimization constitutes one of the most dynamic segments, articulated across multiple convergent industries sharing a common premise: the human body is a system susceptible to continuous improvement through precise technical interventions.

2.2 Functional and High-Protein Foods

The functional foods market reached approximately \$332 billion in 2024 with projections of \$586 billion by 2030 at a CAGR of 8.6% (Global Market Insights 2025; Grand View Research 2024). High-protein foods represent a segment of \$51 billion in 2025, projected to reach more than \$105 billion by 2034 (Fortune Business Insights 2025). According to Euromonitor (2026), high-protein foods, beverages, and supplements generated over \$3 trillion in global retail sales in 2025, with global protein demand projected to grow 11% between 2024 and 2029.

These figures reveal more than market growth: they document the cultural normalization of food as a vehicle for bodily optimization rather than nourishment, pleasure, or communion.

2.3 Biohacking and Nootropics

The biohacking market reached \$24.8 billion in 2024, projected to reach \$69.1 billion by 2030 at a CAGR of 19% (Grand View Research 2025a). Nootropics—substances oriented toward cognitive optimization—reached \$5.2 billion in 2025, projected to reach \$13.3 billion by 2033 (Grand View Research 2025b). The adaptogens market stands at \$10.9 billion with sustained growth (Grand View Research 2025c).

Biohacking represents the most explicit manifestation of the optimization paradigm: the deliberate manipulation of one's own biology to enhance performance beyond normal parameters. Its nutritional dimension—nootropics for cognitive enhancement, adaptogens for stress resilience, precision supplementation guided by biomarkers—embodies what Han (2015) describes as the achievement subject's compulsive self-optimization. The body becomes simultaneously the raw material, the workshop, and the product of an endless optimization project.

2.4 Personalized Nutrition and Emerging Technologies

AI-powered personalized nutrition platforms were estimated at \$1.48–1.66 billion in 2024–2025, with explosive growth of 27–28% annually projecting toward \$7–19 billion over the next decade (Global Market Insights 2025b; Mordor Intelligence 2025). Precision nutrition wearable sensors reached \$2.8 billion in 2024 (Global Market Insights 2025c). Nutrigenomics stood at \$564 million with a CAGR of 17.1% (Polaris Market Research 2025). Food nanoencapsulation, enabling controlled nutrient release, represents a market of \$991 million projected to reach \$1.86 billion by 2030 (MarketsandMarkets 2025b).

These technologies promise to eliminate the uncertainty inherent in human eating by reducing the person to a data profile optimizable through algorithmic recommendations—a form of what we term “nutritional datafication.” The implicit anthropology is troubling: the person disappears behind their microbiome, glucose curves, and genetic variants.

2.5 GLP-1 Receptor Agonists and Cultural Reconfiguration

GLP-1 receptor agonists (semaglutide, tirzepatide) constitute perhaps the most significant disruption in the nutritional optimization landscape: a market of \$52–66 billion in 2024–2025 that could reach \$200 billion by 2030 (Grand View Research 2025d). Their impact transcends pharmacology.

Documented behavioral effects among GLP-1 users include consuming 55% more fruits and vegetables, 65% fewer sugary beverages, and 62% less alcohol (UC Davis 2025), displacing purchases from snacks and carbohydrates toward high-protein and nutrient-dense foods (Mancini et al. 2025).

While these behavioral changes may appear beneficial in isolation, they raise profound ethical questions. Is pharmacologically mediated appetite suppression a form of optimization or a new mode of bodily control? Does the pharmaceutical displacement of desire constitute authentic freedom or its chemical simulation? These questions cannot be answered by market data alone.

3. Epistemological Reductionisms: Nutritionism and Healthism

Behind the expansion of the nutritional optimization market operate two ideological frameworks that configure the contemporary understanding of the relationship between diet, body, and health: nutritionism and healthism. Both share a reductionist logic that fragments the alimentary experience and transfers responsibility for health to the isolated individual.

3.1 Nutritionism as Ideology

Gyorgy Scrinis coined the term “nutritionism” to designate the ideology whereby the nutri-biochemical level of engagement with food becomes the dominant mode of understanding the relationship between food and bodily health, at the expense of the cultural, social, and experiential dimensions of eating (Scrinis 2008). This reduction is not merely epistemological: Scrinis (2013) argues that the nutritionist

paradigm narrows and distorts our appreciation of food quality, promotes nutritional confusion and anxiety, and enables exploitation by the food industry through nutritionally modified products marketed with health claims. Food ceases to be a shared cultural good and becomes a vehicle for quantifiable nutrients. The meal disappears; the macronutrient ratio remains.

3.2 Healthism as Moralization

Robert Crawford coined the concept of “healthism” in 1980 to describe an ideology that situates health problems at the level of the individual, formulates solutions exclusively at that level, and by elevating health to a “super-value”—a metaphor for all that is good in life—reinforces the privatization of well-being and produces non-political and ultimately ineffective conceptions of health promotion (Crawford 1980). A central aspect of healthism is moralization: perceived responsibility mediates the tendency to moralize about health and behavior, creating frameworks of blame where illness signals moral failure (Wills 2019). The person who falls ill—or who simply does not conform to aesthetic standards associated with “health”—is judged not merely as unfortunate but as negligent, undisciplined, or morally deficient.

3.3 The Gap Between Marketing and Evidence

The global dietary supplement market reaches \$193 billion (MarketsandMarkets 2025a), but operates under significant regulatory constraints. In the United States, manufacturers cannot legally claim their products prevent or treat diseases, limited to “structure/function” claims with mandatory FDA disclaimers. More fundamentally, as of 2016 no robust clinical data demonstrated that dietary supplementation produces more benefit than harm for healthy individuals consuming a reasonable diet. This gap between commercial promises and scientific evidence constitutes a first-order ethical problem: billions of dollars flow toward optimization products whose benefits remain undemonstrated for their primary market—healthy individuals seeking enhancement rather than treatment.

3.4 The Self-Exploiting Achievement Subject

Byung-Chul Han offers the most incisive philosophical framework for understanding the optimization paradigm as a cultural phenomenon. The contemporary individual does not perceive themselves as a subjected subject but as a project: “always refashioning and reinventing itself,” which amounts to a form of compulsion and constriction—a more efficient kind of subjectivation and subjugation. As a project that considers itself free from external limitations, the Self submits to internal limitations and self-constraints, which take the form of compulsive achievement and optimization (Han 2015). Nutritional biohacking is the alimentary expression of this logic: the body becomes simultaneously the raw material, the workshop, and the product of an endless optimization project.

4. Documented Pathologies of the Optimization Paradigm

The culture of nutritional optimization generates a spectrum of pathologies ranging from individual clinical disorders to systemic forms of social discrimination. These manifestations are not accidental

side effects but structural consequences of a paradigm that converts eating into an imperative of perfection.

4.1 Orthorexia Nervosa: Epidemiological Data

A 2023 meta-analysis encompassing 30,476 individuals across 18 countries found that the global proportion of orthorexia nervosa symptoms was 27.5% (95% CI = 23.5–31.6), with significantly higher rates among athletes and fitness practitioners (34.5%) (Martínez-González et al. 2023). Despite this considerable prevalence, orthorexia nervosa is not recognized by the American Psychiatric Association and remains absent from both the DSM and the ICD, due to unreliable measurement tools and wide variability in prevalence estimates. This diagnostic paradox—a disorder widely documented but officially nonexistent—reflects the difficulties of pathologizing behaviors that the dominant culture celebrates as virtuous.

4.2 Social Media as Amplifiers

A 2025 systematic review found that greater social media use is associated with higher symptoms of orthorexia nervosa and muscle dysmorphia, with specific content about nutrition, thinness, and exercise particularly linked to orthorexic tendencies (Grammatikopoulou et al. 2025). Platforms with weaker moderation allow the formation of toxic echo chambers that amplify pro-anorexia rhetoric (Levinson and Zvolensky 2024), while “clean eating” and “what I eat in a day” content normalizes restrictive behaviors under the wellness framework. The cultural celebration of these behaviors makes their pathological dimension invisible to both patients and clinicians.

4.3 Muscle Dysmorphia

A 2025 study found that greater frequency of viewing muscularity-oriented content on social media—muscular bodies, muscle-building supplements, muscle-building drugs—was associated with probable muscle dysmorphia in boys and men, independently of total time spent on social media (Griffiths et al. 2025). A review from Flinders University (2024) confirmed that exposure to idealized muscular male body images is directly linked to negative body image and higher likelihood of anabolic-androgenic steroid use (Flinders University 2024). These findings reveal the optimization paradigm operating not merely at the level of dietary choices but through the construction of unattainable corporeal ideals that generate chronic dissatisfaction.

4.4 Weight Stigma and Food Moralization

A 2024 scoping review found that internalized weight stigma is associated with depression, anxiety, disordered eating, decreased exercise, and physiological stress markers such as elevated cortisol and inflammation—independently of body mass index (Puhl et al. 2024). Weight stigma constitutes a deeply ingrained and widespread form of prejudice with profound consequences for mental health and well-being (Durso and Latner 2025). Critically, these harms occur independently of actual weight, demonstrating that the damage is caused by stigma itself, not by the physiological conditions it targets.

Askegaard et al. (2014) identify four moralities in contemporary food discourse: the “good” or “bad” nature of foods; the virtue of self-control and moderation; the management of body size; and the actions of market agents. Fielding-Singh (2019) demonstrates that adolescents associate healthy eating with both financial privilege and moral superiority, with middle- and upper-status youth representing their families as morally worthy through their dietary choices. This moral hierarchy—where “eating well” signals both class status and personal virtue—compounds inequities by converting access to food culture into a marker of character.

5. Philosophical Alternatives: Open Reason and Personalism

Against the technical-instrumental reductionism that dominates the nutritional optimization paradigm, the intellectual tradition of Open Reason—articulated by Benedict XVI and developed institutionally at centers such as the Universidad Francisco de Vitoria—offers an epistemological alternative that does not reject science but situates it within a broader horizon of understanding of what it means to be human.

5.1 The Broadening of Reason — Benedict XVI

In his celebrated 2006 Regensburg Address, Benedict XVI argued that modern reason has suffered a “self-limitation to the empirically falsifiable” and called for “broadening our concept of reason and its application,” insisting that philosophy and theology are legitimate sources of knowledge (Benedict XVI 2006). This is not an anti-scientific proposal but a critique of scientism: the reduction of all rationality to the empirical-positive method impoverishes the understanding of realities that exceed quantification—dignity, meaning, relationship, and the common good.

Applied to nutrition, Open Reason demands that the discipline acknowledge questions it cannot answer with its own methods yet cannot responsibly ignore: What constitutes a good life? What place does the body occupy in personal identity? How are responsibilities distributed between individuals, institutions, and markets? The Open Reason Institute at the Universidad Francisco de Vitoria, created with the Vatican Foundation Joseph Ratzinger-Benedict XVI, annually awards €100,000 to researchers who bring their science into dialogue with philosophy and theology, making the theory of open reasoning institutionally tangible (Universidad Francisco de Vitoria 2025).

5.2 The Personalistic Norm — Karol Wojtyła

Wojtyła’s philosophical personalism offers the fundamental anthropological principle for a non-instrumentalized nutrition: the person “does not admit of use and cannot be treated as an object of use and as such a means to an end” (Wojtyła 1960/1993). In its positive form, the personalistic norm confirms that the person is a good toward which the only proper and adequate attitude is love. Applied to nutrition, this principle excludes the reduction of the body to an optimization project and demands that every nutritional intervention respect the integrity of the person as a corporeal-spiritual-relational totality. It is not merely that instrumentalization is ethically problematic; it is that it is constitutively incompatible with what the person is.

5.3 Interpersonality and Embodied Dignity — Caritas in Veritate

Benedict XVI emphasized in Caritas in Veritate that “the human creature is defined through interpersonal relationships” and that authentic identity matures through relationship with others and with God, not through isolation (Benedict XVI 2009). This relational anthropology directly challenges the logic of individualist biohacking: human flourishing is not achieved through solitary self-optimization but through insertion into networks of mutual care where food recovers its convivial and communal dimension. The shared meal—not the optimized supplement stack—is the paradigmatic site of human nourishment.

5.4 Integral Ecology and Bodily Acceptance — Laudato Si’

Laudato Si’ critiques the “technocratic paradigm”—a reductive mentality that pits humans against nature in a relationship of manipulative domination and control—and rejects the imposition of this model upon all reality (Francis 2015; Crosby 2021). Integral ecology recognizes the interconnection and interdependence between human beings and the earth (USCCB 2025), extending this understanding to the body itself: “Learning to accept our body, to care for it and to respect its fullest meaning, is an essential element of any genuine human ecology” (LS 155). This perspective links bodily care with social justice, environmental sustainability, and inner peace, overcoming the fragmentation of the optimization paradigm that treats the body as an isolated machine disconnected from its relational, ecological, and spiritual context.

6. Toward “Expanded Nutrition”: Synthesis and Proposal

The convergence of the philosophical frameworks examined—Open Reason, personalism, the ethics of care, and integral ecology—permits the articulation of an alternative proposal we term “Expanded Nutrition.” This does not constitute a rejection of nutritional science but its relocation within an integral anthropological horizon that recognizes the irreducible multidimensionality of the alimentary act.

6.1 Redefining Optimization

From the perspective of Open Reason, nutritional optimization does not disappear but is redefined: it ceases to be the maximization of isolated biometric parameters and becomes a prudent ordering toward integral human goods. Prudence—the cardinal virtue of the Aristotelian-Thomistic tradition—operates as practical rationality that weighs multiple goods in tension: physical health, but also social communion, cultural meaning, ecological sustainability, bodily dignity, and inner peace. This prudent ordering is not quantifiable through AI algorithms nor reducible to biomarkers, though it can legitimately integrate the information these provide. The person who asks “what should I eat?” requires not merely biochemical knowledge but wisdom about what constitutes a good life.

6.2 Overcoming Reductionisms

Expanded Nutrition recognizes and overcomes the reductionisms identified in this analysis. Against nutritionism, which reduces food to nutrients (Scrinis 2008, 2013), it recovers the alimentary experience as a cultural, sensorial, and relational totality. Against healthism, which individualizes and moralizes health (Crawford 1980), it situates nutrition within the context of social determinants and structures of justice. Against commodification, which converts health into a consumer product (Global Wellness Institute 2025; MarketsandMarkets 2025a), it reaffirms food as a right and common good. Against datafication, which fragments the subject into metrics (Global Market Insights 2025b; Global Market Insights 2025c), it preserves the unity of the person as a totality irreducible to data.

6.3 Comparative Framework

Table 1
Contrast Between the Optimization Paradigm and Expanded Nutrition

Dimension	Optimization Paradigm	Expanded Nutrition
Epistemology	Nutritionism: food = nutrients (Scrinis 2008)	Open Reason: multiple levels of understanding (Benedict XVI 2006)
Anthropology	Self-exploiting achievement subject (Han 2015)	Relational person with intrinsic dignity (Wojtyla 1960/1993)
Ethics	Healthism: individual moralization (Crawford 1980)	Ethics of care: shared responsibility
Ecology	Body as optimizable machine	Integral ecology: body in relation to the earth (Francis 2015)
Finality	Maximization of biometric metrics	Prudent ordering toward integral goods
Sociality	Competitive individualism	Communion and alimentary conviviality

6.4 Practical Implications

Expanded Nutrition has concrete consequences for clinical practice, education, and public policy. In the clinical domain, it implies that nutritional consultation cannot be limited to prescribing macronutrients but must attend to the alimentary biography, family relationships around the table, cultural meanings of foods, and social pressures on body image. In education, it demands forming professionals capable of integrating biochemical knowledge with hermeneutic, ethical, and relational competencies. In public policy, it demands effective regulation of nutritional marketing claims, protection against weight stigmatization (Puhl et al. 2024; Durso and Latner 2025), and the promotion of food environments that facilitate conviviality and not merely “optimal nutrition.”

These implications converge on a single insight: the dominant metrics of nutritional optimization—macronutrient ratios, biomarkers, caloric balance, body composition indices—are necessary but radically insufficient for the practical science of human nourishment. They must be situated within, not substituted for, the richer rationality that Expanded Nutrition proposes.

7. Anthropological, Ethical, and Social Consequences

The analysis developed reveals that the instrumentalization of nutrition as an optimization technology is not a neutral phenomenon but produces profound transformations in human self-understanding, social relations, and structures of justice.

7.1 Anthropological Consequences

When the optimization paradigm becomes the dominant horizon, the human being understands itself as a permanent improvement project—“always refashioning and reinventing itself” (Han 2015)—losing the capacity to inhabit its corporeality with gratitude and acceptance. Orthorexia, with its 27.5% prevalence in the general population (Martínez-González et al. 2023), is not simply an individual disorder but the symptom of a culture that has converted food into a moral battlefield where every choice is an act of self-affirmation or self-sabotage. The integral ecology reminds us that “learning to accept our body” is a condition of all genuine ecology (Francis 2015).

The paradox is instructive: the optimization paradigm promises liberation from biological limitation but produces a more totalizing form of bodily surveillance. The biohacker who tracks every calorie, monitors their glucose response to each meal, and optimizes their sleep cycles for cognitive performance inhabits their body as a data-generating machine rather than as the irreplaceable locus of a personal history, relational life, and cultural belonging.

7.2 Ethical Consequences

Food moralization creates social hierarchies where dietary choices signal moral value (Askegaard et al. 2014; Fielding-Singh 2019), while weight stigma produces documented psychological suffering—depression, anxiety, disordered eating—independently of actual weight (Puhl et al. 2024). The gap between the supplement market’s promises (\$193 billion) and available clinical evidence (MarketsandMarkets 2025a) raises questions of distributive justice: massive resources are directed toward optimizing those who already enjoy health while structural food inequities persist.

The personalistic norm of Wojtyła (1960/1993) offers the foundational ethical response: every use of the person—including self-use in the form of compulsive optimization—violates the dignity that demands love, not exploitation. The nutritional consultation that reduces a patient to their macronutrient targets; the wellness industry that converts bodily dissatisfaction into a commercial resource; the social media platform that monetizes body-image anxiety: all instantiate the instrumentalization that the personalistic norm prohibits.

7.3 Social Consequences

The privatization of health that healthism promotes (Crawford 1980) erodes social solidarity and the understanding of food as a common good. Social media amplify unattainable body ideals (Grammatikopoulou et al. 2025; Griffiths et al. 2025; Flinders University 2024), generating cycles of

comparison, dissatisfaction, and consumption that benefit a \$6.8 trillion wellness industry (Global Wellness Institute 2025) but not necessarily persons. The relational anthropology of Benedict XVI (2009) offers the foundation for a food culture where eating together matters more than eating “optimally,” where the shared table recovers its function as a space of encounter, gratitude, and mutual care.

This is not a nostalgic or anti-technological position. It is the recognition that nutritional science, precisely when it reaches its methodological frontiers, discovers questions that require a broader rationality—the rationality that Open Reason names and Expanded Nutrition operationalizes.

8. Conclusions

Expanded Nutrition does not propose abandoning scientific knowledge about food and health but situating it within a richer understanding of what it means to be human: a corporeal, relational, vulnerable being called to flourish not through compulsive self-optimization but through reciprocal care in community.

The convergence of Open Reason, philosophical personalism, and integral ecology provides not merely an ethical corrective to the optimization paradigm but an epistemological expansion that enables nutritional science to address the questions its own practice generates yet its methods alone cannot resolve. When a patient asks “what should I eat?”, the answer requires not only biochemical knowledge but wisdom about what constitutes a good life—a question that demands the broadened rationality Benedict XVI advocated and that the Expanded Nutrition framework seeks to operationalize.

The practical implications are clear: professional formation must integrate hermeneutic and ethical competencies alongside technical knowledge; clinical practice must attend to the whole person rather than isolated biomarkers; and public policy must regulate commercial promises while protecting against bodily stigmatization. The shared meal—not the optimized nutrient delivery system—remains the paradigmatic site of human nourishment.

Future research should explore the empirical dimensions of Expanded Nutrition: How do convivial eating practices affect health outcomes? What pedagogical models effectively integrate ethical and technical competencies in nutrition education? How can public policy balance individual freedom with protection against commercial exploitation of nutritional anxiety? These questions require the interdisciplinary collaboration that Food Ethics champions—and that nutritional science, at its methodological frontiers, increasingly demands. The critical and normative analysis offered here constitutes a foundation for that research agenda.

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Consent to Participate

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Data Availability

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