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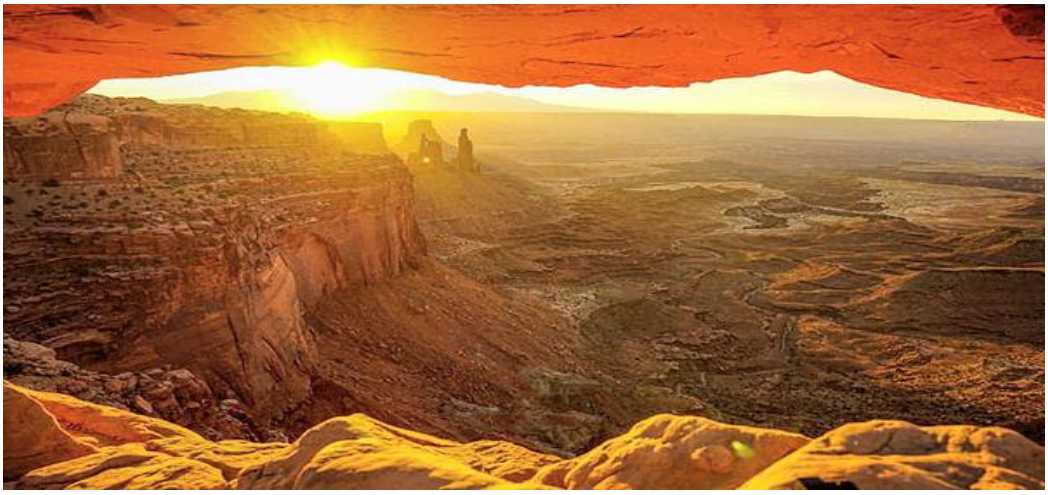
ARTIFICIAL INTELLIGENCE LARGE LANGUAGE MODEL INTERROGATION



REPRESENTATIONAL MEASUREMENT FAILURE IN HEALTH TECHNOLGY ASSESSMENT

AUSTRALIA: THE ABSENCE OF REPRESENTATIONAL MEASUREMENT AND THE LEEDER CENTRE FOR HEALTH POLICY, UNIVERSITY OF SYDNEY

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FOREWORD

HEALTH TECHNOLOGY ASSESSMENT: A GLOBAL SYSTEM OF NON-MEASUREMENT

The Leeder Centre for Health Policy is a multidisciplinary health policy research center focused on improving healthcare systems, healthcare delivery and population health through policy analysis, research and evidence-informed decision making. Building on the earlier work of the Menzies Centre for Health Policy, the Centre brings together researchers from public health, medicine, economics, epidemiology and health services research to address major challenges facing healthcare systems in Australia and internationally. Its work is directed toward informing healthcare reform, improving healthcare access and evaluating policies intended to improve health outcomes and system performance.

The Centre aims to contribute to the development of effective and sustainable healthcare policy through research in areas such as healthcare financing, chronic disease management, preventive health, healthcare quality, equity of access, healthcare utilization and health system performance. It also supports collaboration between universities, government agencies, healthcare providers and policy organizations in order to strengthen the translation of research into policy and practice. A major focus of the Centre is the use of data analysis, health services research and policy evaluation to guide healthcare planning and resource allocation. In this respect, the Centre occupies an important position within the broader Australian health policy and HTA-related research environment.

The objective of this study is to evaluate the extent to which the HTA-associated knowledge base of the Leeder Centre for Health Policy at the University of Sydney recognizes and applies the standards of representational measurement required to support meaningful quantitative claims in health policy, health technology assessment and outcomes research. Particular attention is given to whether the knowledge base demonstrates recognition of the requirement that measurement precede arithmetic, together with the scale properties necessary for admissible mathematical operations. The study also examines whether the knowledge base distinguishes between manifest and latent attributes and whether it recognizes the role of Rasch measurement in transforming subjective responses into measures.

The interrogation forms part of a broader international program of AI large language model assessments of HTA agencies, academic centers, public health schools, pharmacy programs and policy research organizations in Australia, the United States, the United Kingdom, Europe and New Zealand. Using a canonical set of 24 diagnostic statements, the study generates categorical endorsement probabilities and normalized logits to identify patterns of measurement recognition or measurement inversion. The broader objective is to determine whether the Leeder Centre HTA-associated framework supports empirically evaluable and falsifiable claims for healthcare policy and therapy impact or whether it reproduces the assumption-driven analytical structure characteristic of contemporary simulation-based HTA.

The interrogation of the Leeder Centre knowledge base demonstrates a profile consistent with the broader Australian and international HTA pattern of measurement inversion. While the knowledge base strongly reinforces conventional assumptions surrounding health policy analysis, utilities, QALYs, economic evaluation and simulation-based decision frameworks, there is little evidence that the foundational axioms of representational measurement are systematically recognized. Statements relating to unidimensionality, dimensional homogeneity, admissible arithmetic operations and the requirement that measurement precede arithmetic receive weak endorsement, while conventional HTA assumptions concerning preference scores, simulation modeling and cost-effectiveness analysis receive strong support.

The findings also demonstrate near complete absence of Rasch measurement principles within the Leeder Centre framework. Statements affirming the unique role of Rasch measurement in transforming subjective responses into measures consistently receive floor logits, indicating that latent trait measurement is effectively absent from the conceptual structure of the knowledge base. The overall profile therefore mirrors the broader international HTA and HEOR environment in which arithmetic operations are routinely applied to non-measured constructs. The result is a closed analytical framework centered on simulation, preference-based composites and assumption-driven numerical outputs rather than empirically evaluable and falsifiable claims for healthcare policy and therapy impact.

The modern application of this principle can be traced to Stevens' seminal 1946 paper, which introduced the typology of nominal, ordinal, interval, and ratio scales [1]. Stevens made explicit what physicists, engineers, and psychologists already understood: different kinds of numbers permit different kinds of arithmetic. Ordinal scales allow ranking but not addition; interval scales permit addition and subtraction but not multiplication; ratio scales alone support multiplication, division, and the construction of meaningful ratios. Utilities derived from multiattribute preference exercises, such as EQ-5D or HUI, are ordinal preference scores; they do not satisfy the axioms of interval measurement, much less ratio measurement. Yet HTA has, for forty years, treated these utilities as if they were ratio quantities, multiplying them by time to create QALYs and inserting them into models without the slightest recognition that scale properties matter. Stevens' paper should have blocked the development of QALYs and cost-utility analysis entirely. Instead, it was ignored.

The foundational theory that establishes *when* and *whether* a set of numbers can be interpreted as measurements came with the publication of Krantz, Luce, Suppes, and Tversky's *Foundations of Measurement* (1971) [2] . Representational Measurement Theory (RMT) formalized the axioms under which empirical attributes can be mapped to numbers in a way that preserves structure. Measurement, in this framework, is not an act of assigning numbers for convenience, it is the discovery of a lawful relationship between empirical relations and numerical relations. The axioms of additive conjoint measurement, homogeneity, order, and invariance specify exactly when interval scales exist. RMT demonstrated once and for all that measurement is not optional and not a matter of taste: either the axioms hold and measurement is possible, or the axioms fail and measurement is impossible. Every major construct in HTA, utilities, QALYs, DALYs, ICERs, incremental ratios, preference weights, health-state indices, fails these axioms. They lack unidimensionality; they violate independence; they depend on aggregation of heterogeneous attributes; they collapse under the requirements of additive conjoint measurement. Yet HTA

proceeded, decade after decade, without any engagement with these axioms, as if the field had collectively decided that measurement theory applied everywhere except in the evaluation of therapies.

Whereas representational measurement theory articulates the axioms for interval measurement, Georg Rasch's 1960 model provides the only scientific method for transforming ordered categorical responses into interval measures for latent traits [3]. Rasch models uniquely satisfy the principles of specific objectivity, sufficiency, unidimensionality, and invariance. For any construct such as pain, fatigue, depression, mobility, or need, Rasch analysis is the only legitimate means of producing an interval scale from ordinal item responses. Rasch measurement is not an alternative to RMT; it is its operational instantiation. The equivalence of Rasch's axioms and the axioms of representational measurement was demonstrated by Wright, Andrich and others as early as the 1970s. In the latent-trait domain, the very domain where HTA claims to operate; Rasch is the only game in town [4].

Yet Rasch is effectively absent from all HTA guidelines, including NICE, PBAC, CADTH, ICER, SMC, and PHARMAC. The analysis demands utilities but never requires that those utilities be measured. They rely on multiattribute ordinal classifications but never understand that those constructs be calibrated on interval or ratio scales. They mandate cost-utility analysis but never justify the arithmetic. They demand modelled QALYs but never interrogate their dimensional properties. These guidelines do not misunderstand Rasch; they do not know it exists. The axioms that define measurement and the model that makes latent trait measurement possible are invisible to the authors of global HTA rules. The field has evolved without the science that measurement demands.

How did HTA miss the bus so thoroughly? The answer lies in its historical origins. In the late 1970s and early 1980s, HTA emerged not from measurement science but from welfare economics, decision theory, and administrative pressure to control drug budgets. Its core concern was *valuing health states*, not *measuring health*. This move, quiet, subtle, but devastating, shifted the field away from the scientific question "What is the empirical structure of the construct we intend to measure?" and toward the administrative question "How do we elicit a preference weight that we can multiply by time?" The preference-elicitation projects of that era (SG, TTO, VAS) were rationalized as measurement techniques, but they never satisfied measurement axioms. Ordinal preferences were dressed up as quasi-cardinal indices; valuation tasks were misinterpreted as psychometrics; analyst convenience replaced measurement theory. The HTA community built an entire belief system around the illusion that valuing health is equivalent to measuring health. It is not.

The endurance of this belief system, forty years strong and globally uniform, is not evidence of validity but evidence of institutionalized error. HTA has operated under conditions of what can only be described as *structural epistemic closure*: a system that has never questioned its constructs because it never learned the language required to ask the questions. Representational measurement theory is not taught in graduate HTA programs; Rasch modelling is not part of guideline development; dimensional analysis is not part of methodological review. The field has been insulated from correction because its conceptual foundations were never laid. What remains is a

ritualized practice: utilities in, QALYs out, ICERs calculated, thresholds applied. The arithmetic continues because everyone assumes someone else validated the numbers.

This Logit Working Paper series exposes, through probabilistic and logit-based interrogations of AI large language national knowledge bases, the scale of this failure. The results display a global pattern: true statements reflecting the axioms of measurement receive weak endorsement; false statements reflecting the HTA belief system receive moderate or strong reinforcement. This is not disagreement. It is non-possession. It shows that HTA, worldwide, has developed as a quantitative discipline without quantitative foundations; a confused exercise in numerical storytelling.

The conclusion is unavoidable: HTA does not need incremental reform; it needs a scientific revolution. Measurement must precede arithmetic. Representational axioms must precede valuation rituals. Rasch measurement must replace ordinal summation and utility algorithms. Value claims must be falsifiable, protocol-driven, and measurable; rather than simulated, aggregated, and numerically embellished.

The global system of non-measurement is now visible. The task ahead is to replace it with science.

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DISCLAIMER

This analysis is generated through the structured interrogation of a large language model (LLM) applied to a defined documentary corpus and is intended solely to characterize patterns within an aggregated knowledge environment. It does identify, assess, or attribute beliefs, intentions, competencies, or actions to any named individual, faculty member, student, administrator, institution, or organization. The results do not constitute factual findings about specific persons or programs, nor should they be interpreted as claims regarding professional conduct, educational quality, or compliance with regulatory or accreditation standards. All probabilities and logit values reflect model-based inferences about the presence or absence of concepts within a bounded textual ecosystem, not judgments about real-world actors. The analysis is exploratory, interpretive, and methodological in nature, offered for scholarly discussion of epistemic structures rather than evaluative or legal purposes. Any resemblance to particular institutions or practices is contextual and non-attributive, and no adverse implication should be inferred.

1. INTERROGATING THE LARGE LANGUAGE MODEL

A large language model **(**LLM**)** is an artificial intelligence system designed to understand, generate, and manipulate human language by learning patterns from vast amounts of text data. Built on deep neural network architectures, most commonly transformers, LLMs analyze relationships between words, sentences, and concepts to produce contextually relevant responses. During training, the model processes billions of examples, enabling it to learn grammar, facts, reasoning patterns, and even subtle linguistic nuances. Once trained, an LLM can perform a wide range of tasks: answering questions, summarizing documents, generating creative writing, translating languages, assisting with coding, and more. Although LLMs do not possess consciousness or true understanding, they simulate comprehension by predicting the most likely continuation of text based on learned patterns. Their capabilities make them powerful tools for communication, research, automation, and decision support, but they also require careful oversight to ensure accuracy, fairness, privacy, and responsible use

In this Logit Working Paper, "interrogation" refers not to discovering what an LLM *believes,* it has no beliefs, but to probing the content of the *corpus-defined knowledge space* we choose to analyze. This knowledge base is enhanced if it is backed by accumulated memory from the user. In this case the interrogation relies also on 12 months of HTA memory from continued application of the system to evaluate HTA experience. The corpus is defined before interrogation: it may consist of a journal (e.g., *Value in Health*), a national HTA body, a specific methodological framework, or a collection of policy documents. Once the boundaries of that corpus are established, the LLM is used to estimate the conceptual footprint within it. This approach allows us to determine which principles are articulated, neglected, misunderstood, or systematically reinforced.

In this HTA assessment, the objective is precise: to determine the extent to which a given HTA knowledge base or corpus, global, national, institutional, or journal-specific, recognizes and reinforces the foundational principles of representational measurement theory (RMT). The core principle under investigation is that measurement precedes arithmetic; no construct may be treated as a number or subjected to mathematical operations unless the axioms of measurement are satisfied. These axioms include unidimensionality, scale-type distinctions, invariance, additivity, and the requirement that ordinal responses cannot lawfully be transformed into interval or ratio quantities except under Rasch measurement rules.

The HTA knowledge space is defined pragmatically and operationally. For each jurisdiction, organization, or journal, the corpus consists of:

- published HTA guidelines
- agency decision frameworks
- cost-effectiveness reference cases
- academic journals and textbooks associated with HTA
- modelling templates, technical reports, and task-force recommendations
- teaching materials, methodological articles, and institutional white papers

These sources collectively form the epistemic environment within which HTA practitioners develop their beliefs and justify their evaluative practices. The boundary of interrogation is thus

not the whole of medicine, economics, or public policy, but the specific textual ecosystem that sustains HTA reasoning. . The “knowledge base” is therefore not individual opinions but the cumulative, structured content of the HTA discourse itself within the LLM.

THE LEEDER CENTRE KNOWLEDGE BASE

The Leeder Centre for Health Policy at the University of Sydney, formerly the Menzies Centre for Health Policy, represents a major Australian health policy and health services research institution with strong links to healthcare evaluation, healthcare system reform and evidence-informed policy development. The Centre operates within an interdisciplinary framework bringing together expertise from medicine, public health, epidemiology, economics, health services research and healthcare policy. Its activities focus on the evaluation of healthcare systems, healthcare delivery, health outcomes and healthcare financing within the Australian healthcare environment.

A major feature of the Leeder Centre knowledge base is its emphasis on policy-oriented research intended to guide healthcare decision making and resource allocation. Research themes include healthcare quality, healthcare access, preventive health, chronic disease management, healthcare utilization, healthcare system performance and healthcare equity. The Centre also supports analysis of healthcare interventions and policy reforms using statistical modeling, outcomes analysis and healthcare evaluation techniques. This places the Centre within the broader Australian HTA-associated research environment even where HTA itself is not always identified as the exclusive focus of activity.

The knowledge base associated with the Centre reflects many of the dominant assumptions of contemporary health policy and HTA research. These include the use of preference-based outcomes, quality-of-life measures, simulation frameworks, economic evaluation and comparative effectiveness analysis in supporting healthcare policy decisions. Like many modern health policy environments, the analytical emphasis is placed on modeling, evidence synthesis, healthcare utilization analysis and policy forecasting. The framework therefore aligns closely with broader Australian and international HTA conventions centered on cost-effectiveness, healthcare value assessment and evidence-based policy.

The Centre also maintains strong engagement with government agencies, healthcare organizations and policy institutions. Its research activities are intended to contribute directly to healthcare planning, healthcare reform and national policy development. Consequently, the knowledge base extends beyond academic research into the practical environment of healthcare governance and healthcare decision making. The assumptions embedded within the framework therefore influence not only research and teaching but also broader policy interpretation and healthcare resource allocation.

Within this environment, quantitative evaluation is treated as a central component of healthcare policy analysis. Statistical modeling, outcomes research, healthcare utilization analysis and policy simulation are routinely employed to support claims regarding healthcare effectiveness and healthcare system performance. However, as demonstrated by the interrogation, the conceptual structure of the knowledge base exhibits little systematic recognition of the representational

measurement requirements necessary to support these arithmetic operations as scientifically meaningful quantitative claims.

The knowledge base also reflects the broader transition within Australian health policy toward value-oriented healthcare evaluation and evidence-driven policy development. This includes reliance upon quality-of-life measures, healthcare outcome metrics and simulation-based forecasting in healthcare planning and policy assessment. Yet the interrogation suggests that the prior issue of whether these constructs satisfy the conditions required for lawful measurement is largely absent from the analytical structure itself.

The result is a highly developed policy and healthcare evaluation environment operating within the dominant assumptions of contemporary HTA and health services research. The Leeder Centre knowledge base strongly reinforces the legitimacy of economic evaluation, simulation-based policy analysis and preference-driven healthcare assessment while exhibiting little recognition of representational measurement theory, Rasch measurement principles or the requirement that measurement precede arithmetic. In this respect, the Centre mirrors the broader Australian and international HTA environment: methodologically sophisticated and institutionally influential, yet fundamentally disconnected from the measurement principles required to support meaningful quantitative science.

CATEGORICAL PROBABILITIES

In the present application, the interrogation is tightly bounded. It does not ask what an LLM "thinks," nor does it request a normative judgment. Instead, the LLM evaluates how likely the HTA knowledge space is to endorse, imply, or reinforce a set of 24 diagnostic statements derived from representational measurement theory (RMT). Each statement is objectively TRUE or FALSE under RMT. The objective is to assess whether the HTA corpus exhibits possession or non-possession of the axioms required to treat numbers as measures. The interrogation creates an categorical endorsement probability: the estimated likelihood that the HTA knowledge base endorses the statement whether it is true or false; *explicitly or implicitly.*

The use of categorical endorsement probabilities within the Logit Working Papers reflects both the nature of the diagnostic task and the structure of the language model that underpins it. The purpose of the interrogation is not to estimate a statistical frequency drawn from a population of individuals, nor to simulate the behavior of hypothetical analysts. Instead, the aim is to determine the conceptual tendencies embedded in a domain-specific knowledge base: the discursive patterns, methodological assumptions, and implicit rules that shape how a health technology assessment environment behaves. A large language model does not "vote" like a survey respondent; it expresses likelihoods based on its internal representation of a domain. In this context, endorsement probabilities capture the strength with which the knowledge base, as represented within the model, supports a particular proposition. Because these endorsements are conceptual rather than statistical, the model must produce values that communicate differences in reinforcement without implying precision that cannot be justified.

This is why categorical probabilities are essential. Continuous probabilities would falsely suggest a measurable underlying distribution, as if each HTA system comprised a definable population of

respondents with quantifiable frequencies. But large language models do not operate on that level. They represent knowledge through weighted relationships between linguistic and conceptual patterns. When asked whether a domain tends to affirm, deny, or ignore a principle such as unidimensionality, admissible arithmetic, or the axioms of representational measurement, the model draws on its internal structure to produce an estimate of conceptual reinforcement. The precision of that estimate must match the nature of the task. Categorical probabilities therefore provide a disciplined and interpretable way of capturing reinforcement strength while avoiding the illusion of statistical granularity.

The categories used, values such as 0.05, 0.10, 0.20, 0.50, 0.75, 0.80, and 0.85, are not arbitrary. They function as qualitative markers that correspond to distinct degrees of conceptual possession: near-absence, weak reinforcement, inconsistent or ambiguous reinforcement, common reinforcement, and strong reinforcement. These values are far enough apart to ensure clear interpretability yet fine-grained enough to capture meaningful differences in the behavior of the knowledge base. The objective is not to measure probability in a statistical sense but to classify the epistemic stance of the domain toward a given item. A probability of 0.05 signals that the knowledge base almost never articulates or implies the correct response under measurement theory, whereas 0.85 indicates that the domain routinely reinforces it. Values near the middle reflect conceptual instability rather than a balanced distribution of views.

Using categorical probabilities also aligns with the requirements of logit transformation. Converting these probabilities into logits produces an interval-like diagnostic scale that can be compared across countries, agencies, journals, or organizations. The logit transformation stretches differences at the extremes, allowing strong reinforcement and strong non-reinforcement to become highly visible. Normalizing logits to the fixed ±2.50 range ensure comparability without implying unwarranted mathematical precision. Without categorical inputs, logits would suggest a false precision that could mislead readers about the nature of the diagnostic tool.

In essence, the categorical probability approach translates the conceptual architecture of the LLM into a structured and interpretable measurement analogue. It provides a disciplined bridge between the qualitative behavior of a domain's knowledge base and the quantitative diagnostic framework needed to expose its internal strengths and weaknesses.

The LLM computes these categorical probabilities from three sources:

1. **Structural content of HTA discourse**
   If the literature repeatedly uses ordinal utilities as interval measures, multiplies non-quantities, aggregates QALYs, or treats simulations as falsifiable, the model infers high reinforcement of these false statements.
2. **Conceptual visibility of measurement axioms**
   If ideas such as unidimensionality, dimensional homogeneity, scale-type integrity, or Rasch transformation rarely appear, or are contradicted by practice, the model assigns low endorsement probabilities to TRUE statements.
3. **The model's learned representation of domain stability**
   Where discourse is fragmented, contradictory, or conceptually hollow, the model avoids

assigning high probabilities. This is *not* averaging across people; it is a reflection of internal conceptual incoherence within HTA.

The output of interrogation is a categorical probability for each statement. Probabilities are then transformed into logits [ln(p/(1–p)], capped to ±4.0 logits to avoid extreme distortions, and normalized to ±2.50 logits for comparability across countries. A positive normalized logit indicates reinforcement in the knowledge base. A negative logit indicates weak reinforcement or conceptual absence. Values near zero logits reflect epistemic noise.

Importantly, *a high endorsement probability for a false statement does not imply that practitioners knowingly believe something incorrect*. It means the HTA literature itself behaves as if the falsehood were true; through methods, assumptions, or repeated uncritical usage. Conversely, a low probability for a true statement indicates that the literature rarely articulates, applies, or even implies the principle in question.

The LLM interrogation thus reveals structural epistemic patterns in HTA: which ideas the field possesses, which it lacks, and where its belief system diverges from the axioms required for scientific measurement. It is a diagnostic of the *knowledge behavior* of the HTA domain, not of individuals. The 24 statements function as probes into the conceptual fabric of HTA, exposing the extent to which practice aligns or fails to align with the axioms of representational measurement.

INTERROGATION STATEMENTS

Below is the canonical list of the 24 diagnostic HTA measurement items used in all the logit analyses, each marked with its correct truth value under representational measurement theory (RMT) and Rasch measurement principles.

This is the definitive set used across the Logit Working Papers.

Measurement Theory & Scale Properties

1. Interval measures lack a true zero — TRUE
2. Measures must be unidimensional — TRUE
3. Multiplication requires a ratio measure — TRUE
4. Time trade-off preferences are unidimensional — FALSE
5. Ratio measures can have negative values — FALSE
6. EQ-5D-3L preference algorithms create interval measures — FALSE
7. The QALY is a ratio measure — FALSE
8. Time is a ratio measure — TRUE

Measurement Preconditions for Arithmetic

9. Measurement precedes arithmetic — TRUE
10. Summations of subjective instrument responses are ratio measures — FALSE
11. Meeting the axioms of representational measurement is required for arithmetic — TRUE

Rasch Measurement & Latent Traits

12. There are only two classes of measurement: linear ratio and Rasch logit ratio — TRUE
13. Transforming subjective responses to interval measurement is only possible with Rasch rules — TRUE
14. Summation of Likert question scores creates a ratio measure — FALSE

Properties of QALYs & Utilities

15. The QALY is a dimensionally homogeneous measure — FALSE
16. Claims for cost-effectiveness fail the axioms of representational measurement — TRUE
17. QALYs can be aggregated — FALSE

Falsifiability & Scientific Standards

18. Non-falsifiable claims should be rejected — TRUE
19. Reference-case simulations generate falsifiable claims — FALSE

Logit Fundamentals

20. The logit is the natural logarithm of the odds-ratio — TRUE

Latent Trait Theory

21. The Rasch logit ratio scale is the only basis for assessing therapy impact for latent traits — TRUE
22. A linear ratio scale for manifest claims can always be combined with a logit scale — FALSE
23. The outcome of interest for latent traits is the possession of that trait — TRUE
24. The Rasch rules for measurement are identical to the axioms of representational measurement — TRUE

AI LARGE LANGUAGE MODEL STATEMENTS: TRUE OR FALSE

Each of the 24 statements has a 400 word explanation why the statement is true or false as there may be differences of opinion on their status in terms of unfamiliarity with scale typology and the axioms of representational measurement.

The link to these explanations is: https://maimonresearch.com/ai-llm-true-or-false/

INTERPRETING TRUE STATEMENTS

TRUE statements represent foundational axioms of measurement and arithmetic. Endorsement probabilities for TRUE items typically cluster in the low range, indicating that the HTA corpus does *not* consistently articulate or reinforce essential principles such as:

- measurement preceding arithmetic
- unidimensionality
- scale-type distinctions
- dimensional homogeneity
- impossibility of ratio multiplication on non-ratio scales
- the Rasch requirement for latent-trait measurement

Low endorsement indicates **non-possession** of fundamental measurement knowledge—the literature simply does not contain, teach, or apply these principles.

INTERPRETING FALSE STATEMENTS

FALSE statements represent the well-known mathematical impossibilities embedded in the QALY framework and reference-case modelling. Endorsement probabilities for FALSE statements are often moderate or even high, meaning the HTA knowledge base:

- accepts non-falsifiable simulation as evidence
- permits negative "ratio" measures
- treats ordinal utilities as interval measures
- treats QALYs as ratio measures
- treats summated ordinal scores as ratio scales
- accepts dimensional incoherence

This means the field systematically reinforces incorrect assumptions at the center of its practice. *Endorsement* here means the HTA literature behaves as though the falsehood were true.

2. SUMMARY OF FINDINGS FOR TRUE AND FALSE ENDORSEMENTS: LEEDER CENTRE, UNIVERSITY OF SYDNEY

Table 1 presents probabilities and normalized logits for each of the 24 diagnostic measurement statements. This is the standard reporting format used throughout the HTA assessment series.

It is essential to understand how to interpret these results.

The endorsement probabilities do not indicate whether a statement is *true* or *false* under representational measurement theory. Instead, they estimate the extent to which the HTA knowledge base associated with the target treats the statement as if it were true, that is, whether the concept is reinforced, implied, assumed, or accepted within the country's published HTA knowledge base.

The logits provide a continuous, symmetric scale, ranging from +2.50 to –2.50, that quantifies the degree of this endorsement. the logits, of course link to the probabilities (p) as the logit is the natural logarithm of the odds ratio; logit = ln[p/1-p].

- Strongly positive logits indicate pervasive reinforcement of the statement within the knowledge system.
- Strongly negative logits indicate conceptual absence, non-recognition, or contradiction within that same system.
- Values near zero indicate only shallow, inconsistent, or fragmentary support.

Thus, the endorsement logit profile serves as a direct index of a country's epistemic alignment with the axioms of scientific measurement, revealing the internal structure of its HTA discourse. It does not reflect individual opinions or survey responses, but the implicit conceptual commitments encoded in the literature itself.

LEEDER CENTRE : THE ABSENCE OF REPRESENTATIONAL MEASUREMENT AND THE ENDORSEMENT OF FALSE MEASUREMENT

The Leeder Centre for Health Policy at the University of Sydney, formerly the Menzies Centre for Health Policy, occupies a prominent position within Australian health policy and health technology assessment research. The Centre has historically combined health services research, healthcare financing, policy evaluation, outcomes research and healthcare system reform within an interdisciplinary policy-oriented framework. Although not exclusively identified as an HTA research center, its involvement in healthcare evaluation, policy analysis, resource allocation and evidence-based decision making places it firmly within the broader Australian HTA and health economics knowledge infrastructure.

TABLE 1: ITEM STATEMENT, RESPONSE, ENDORSEMENT AND NORMALIZED LOGITS LEEDER CENTRE

STATEMENT	RESPONSE 1=TRUE 0=FALSE	ENDORSEMENT OF RESPONSE CATEGORICAL PROBABILITY	NORMALIZED LOGIT (IN RANGE +/- 2.50)
INTERVAL MEASURES LACK A TRUE ZERO	1	0.30	-0.85
MEASURES MUST BE UNIDIMENSIONAL	1	0.25	-1.10
MULTIPLICATION REQUIRES A RATIO MEASURE	1	0.15	-1.75
TIME TRADE-OFF PREFERENCES ARE UNIDIMENSIONAL	0	0.80	+1.40
RATIO MEASURES CAN HAVE NEGATIVE VALUES	0	0.80	+1.40
EQ-5D-3L PREFERENCE ALGORITHMS CREATE INTERVAL MEASURES	0	0.70	+0.85
THE QALY IS A RATIO MEASURE	0	0.55	+0.20
TIME IS A RATIO MEASURE	1	0.85	+1.75
MEASUREMENT PRECEDES ARITHMETIC	1	0.20	-1.40
SUMMATIONS OF SUBJECTIVE INSTRUMENT RESPONSES ARE RATIO MEASURES	0	0.75	+1.10
MEETING THE AXIOMS OF REPRESENTATIONAL MEASUREMENT IS REQUIRED FOR ARITHMETIC	1	0.20	-1.40
THERE ARE ONLY TWO CLASSES OF MEASUREMENT LINEAR RATIO AND RASCH LOGIT RATIO	1	0.05	-2.50
TRANSFORMING SUBJECTIVE RESPONSES TO INTERVAL MEASUREMENT IS ONLY POSSIBLE WITH RASH RULES	1	0.05	-2.50
SUMMATION OF LIKERT QUESTION SCORES CREATES A RATIO MEASURE	0	0.75	+1.10
THE QALY IS A DIMENSIONALLY HOMOGENEOUS MEASURE	0	0.50	0.00
CLAIMS FOR COST-EFFECTIVENESS FAIL THE AXIOMS OF REPRESENTATIONAL MEASUREMENT	1	0.15	-1.75
QALYS CAN BE AGGREGATED	0	0.45	-0.20

NON-FALSIFIABLE CLAIMS SHOULD BE REJECTED	1	0.60	+0.40
REFERENCE CASE SIMULATIONS GENERATE FALSIFIABLE CLAIMS	0	0.75	+1.10
THE LOGIT IS THE NATURAL LOGARITHM OF THE ODDS-RATIO	1	0.75	+1.10
THE RASCH LOGIT RATIO SCALE IS THE ONLY BASIS FOR ASSESSING THERAPY IMPACT FOR LATENT TRAITS	1	0.05	-2.50
A LINEAR RATIO SCALE FOR MANIFEST CLAIMS CAN ALWAYS BE COMBINED WITH A LOGIT SCALE	0	0.80	+1.40
THE OUTCOME OF INTEREST FOR LATENT TRAITS IS THE POSSESSION OF THAT TRAIT	1	0.05	-2.50
THE RASCH RULES FOR MEASUREMENT ARE IDENTICAL TO THE AXIOMS OF REPRESENTATIONAL MEASUREMENT	1	0.05	-2.50

The interrogation of the HTA-associated knowledge base of the Leeder Centre demonstrates a profile entirely consistent with the broader pattern observed across Australian HTA agencies, university centers, public health programs and international HTA institutions. The results indicate systematic measurement inversion: the routine assumption that arithmetic operations may be applied to utilities, preference scores, simulation outputs and composite healthcare constructs without prior demonstration that the underlying quantities satisfy the conditions required for meaningful measurement.

The importance of the Leeder Centre interrogation lies precisely in its policy orientation. Unlike narrowly technical economics units, the Centre positions itself as contributing directly to healthcare decision making, policy formation and healthcare reform. Consequently, the assumptions embedded within its knowledge base are not isolated academic abstractions. They form part of the intellectual framework through which healthcare policy and evidence evaluation are interpreted within Australia.

The first striking feature of the interrogation is the weak endorsement of foundational propositions from representational measurement theory. Statements such as “Measurement precedes arithmetic,” “Measures must be unidimensional” and “Meeting the axioms of representational measurement is required for arithmetic” all receive strongly negative normalized logits. These results indicate that the Leeder Centre knowledge base demonstrates little systematic recognition of the formal conditions required before arithmetic operations may legitimately be performed.

This issue is not methodological nuance. Representational measurement theory addresses the prior question of whether empirical observations possess the structural properties necessary to support

quantitative operations. Without satisfaction of those conditions, arithmetic manipulation cannot generate meaningful measurement regardless of statistical sophistication or computational complexity. The interrogation suggests that within the Leeder Centre framework, this distinction is either weakly represented or absent.

The weak endorsement of the proposition that multiplication requires a ratio measure is especially significant. Modern HTA depends extensively upon multiplication and division operations, particularly in the construction of QALYs and cost-effectiveness ratios. Yet multiplication is only admissible where the quantities involved possess true zeroes and invariant ratio properties. Utilities derived from preference algorithms fail these conditions. Consequently, QALY construction lacks lawful quantitative foundations from the outset. The Leeder Centre profile suggests that these restrictions are not embedded within its conceptual framework.

The interrogation also reveals strong reinforcement of conventional HTA assumptions regarding utilities, preference scores and simulation modeling. Statements rejecting the interval properties of EQ-5D preference algorithms and the ratio properties of QALYs receive positive logits, indicating that the knowledge base behaves as though these critiques are false or irrelevant. This mirrors the broader international HTA literature where utilities are routinely treated as though they possess interval or ratio properties despite persistent objections from representational measurement theory.

The proposition “The QALY is a dimensionally homogeneous measure” receives effectively neutral endorsement, reflecting the ambiguity that surrounds this construct within HTA discourse. Yet dimensional homogeneity is not optional within quantitative science. Quantities lacking compatible dimensions cannot legitimately be combined through arithmetic operations. The implication is clear: the problem with QALYs is not uncertainty regarding parameter estimates but the absence of lawful measurement structure itself. The interrogation indicates that this issue is not systematically recognized within the Leeder Centre knowledge base.

One of the most striking findings is the near total absence of Rasch measurement principles. Statements affirming the role of Rasch transformation in converting subjective responses into measures consistently receive floor logits of -2.50. This pattern is identical to that observed across virtually all Australian and international HTA interrogations. Rasch measurement is effectively absent from the conceptual structure of the Leeder Centre framework.

This omission has profound implications. Contemporary HTA and health policy increasingly rely upon patient-reported outcomes, quality-of-life measures and subjective preference instruments to support claims regarding therapy impact and healthcare value. Yet without Rasch transformation and fit testing, ordinal responses remain ordinal classifications rather than measures. Arithmetic operations on such structures are therefore scientifically indefensible. The interrogation suggests that the Leeder Centre knowledge base reproduces the broader HTA assumption that arithmetic legitimacy can be assumed independently of measurement transformation.

The interrogation also demonstrates strong endorsement of the proposition that reference case simulations generate falsifiable claims. This reflects the close alignment of the Centre’s knowledge base with contemporary simulation-based policy evaluation frameworks. Yet models constructed

upon non-measured quantities cannot generate empirically evaluable outputs. Their conclusions are determined by assumptions rather than lawful measurement relationships. Consequently, they cannot participate meaningfully in the evolution of objective knowledge through replication and falsification.

This directly undermines the scientific standing of cost-effectiveness analysis itself. The interrogation demonstrates weak endorsement of the proposition that claims for cost-effectiveness fail the axioms of representational measurement. Yet where neither utilities nor composite outcomes satisfy ratio-scale requirements, the resulting cost-effectiveness ratios cannot possess lawful quantitative interpretation. There is no hidden "true" cost-effectiveness quantity to which current HTA models approximate. The construct itself lacks existence as a measurable entity.

The Leeder Centre profile therefore exemplifies the broader crisis confronting Australian HTA and health policy research. The problem is not disagreement among alternative methodological schools. The problem is that arithmetic operations are routinely performed on constructs that do not satisfy the conditions required for meaningful measurement. The interrogation indicates that this inversion is embedded within the Centre's conceptual structure.

This finding is particularly important in the Australian context because the Leeder Centre sits within a policy environment closely linked to PBAC methodologies and broader Australian HTA conventions. The interrogation therefore reinforces the conclusion emerging from earlier assessments of Australian HTA agencies and research groups: the Australian HTA framework has institutionalized numerical procedures independently of representational measurement standards.

At the same time, the interrogation demonstrates that transition toward a measurement-based framework is conceptually straightforward. Once representational measurement principles are imposed, the analytical architecture simplifies substantially. Manifest attributes such as hospitalizations, treatment persistence, medication possession or healthcare resource utilization can be evaluated using linear ratio measures. Latent constructs such as therapy burden, need fulfillment or patient satisfaction require Rasch logit ratio measurement following appropriate instrument development and validation.

Beyond these categories, many conventional HTA constructs collapse because they fail lawful measurement requirements. Utilities, QALYs and simulation-derived cost-effectiveness claims become mathematically indefensible because the underlying quantities themselves do not exist as admissible measures.

The implications for teaching and research within the Leeder Centre framework are unavoidable. Current approaches emphasize:

- policy evaluation
- economic modeling
- healthcare system analysis
- simulation-based forecasting
- value-oriented healthcare assessment

Yet the interrogation indicates that the prior issue of measurement validity is largely absent from the conceptual structure supporting these activities. Consequently, students and researchers are exposed to analytical procedures that assume rather than demonstrate the legitimacy of quantitative operations.

This is not a marginal concern. HTA and health policy frameworks increasingly influence:

- healthcare reimbursement
- formulary access
- technology adoption
- resource allocation
- national healthcare priorities

Yet if the underlying quantitative structures fail representational measurement requirements, the resulting claims cannot possess scientific legitimacy regardless of analytical sophistication. The interrogation strongly suggests that the Leeder Centre reproduces precisely this broader international pattern.

Importantly, however, the interrogation also points toward reconstruction rather than merely criticism. By reorganizing HTA around representational measurement principles, healthcare evaluation could shift from assumption-driven simulation toward empirically evaluable and falsifiable claims. Quantitative science would once again require:

- admissible scale structure
- dimensional homogeneity
- unidimensionality
- measurement before arithmetic

rather than numerical manipulation justified solely by convention.

The Leeder Centre assessment therefore contributes to a growing body of evidence indicating that modern HTA has reached a methodological dead end. The issue is no longer whether current methods can be incrementally refined. The issue is whether a framework built upon non-measured constructs can continue to claim scientific legitimacy. The interrogation strongly suggests that it cannot.

At the same time, the results also demonstrate the possibility of transition toward a genuinely scientific framework for therapy assessment. Once quantitative claims are restricted to:

- linear ratio measures for manifest attributes
- Rasch logit ratio measures for latent traits

it becomes possible to establish empirically evaluable and falsifiable claims regarding therapy impact and healthcare outcomes.

The Leeder Centre therefore represents both the sophistication and the limitations of contemporary Australian health policy research. It embodies a highly developed analytical and policy-oriented framework operating within assumptions that systematically neglect the axioms of representational measurement. In this respect, it mirrors the broader Australian and international HTA environment: technically sophisticated, numerically elaborate and institutionally influential, yet fundamentally disconnected from the measurement principles required to support meaningful quantitative science.

III. THE TRANSITION TO MEASUREMENT IN HEALTH TECHNOLOGY ASSESSMENT

THE IMPERATIVE OF CHANGE

This analysis has not been undertaken to criticize decisions made by health system, nor to assign responsibility for the analytical frameworks currently used in formulary review. The evidence shows something more fundamental: organizations have been operating within a system that does not permit meaningful evaluation of therapy impact, even when decisions are made carefully, transparently, and in good faith.

The present HTA framework forces health systems to rely on numerical outputs that appear rigorous but cannot be empirically assessed (Table 1). Reference-case models, cost-per-QALY ratios, and composite value claims are presented as decision-support tools, yet they do not satisfy the conditions required for measurement. As a result, committees are asked to deliberate over results that cannot be validated, reproduced, or falsified. This places decision makers in an untenable position: required to choose among therapies without a stable evidentiary foundation.

This is not a failure of expertise, diligence, or clinical judgment. It is a structural failure. The prevailing HTA architecture requires arithmetic before measurement, rather than measurement before arithmetic. Health systems inherit this structure rather than design it. Manufacturers respond to it. Consultants reproduce it. Journals reinforce it. Universities promote it. Over time it has come to appear normal, even inevitable.

Yet the analysis presented in Table 1 demonstrates that this HTA framework cannot support credible falsifiable claims. Where the dependent variable is not a measure, no amount of modeling sophistication can compensate. Uncertainty analysis cannot rescue non-measurement. Transparency cannot repair category error. Consensus cannot convert assumption into evidence.

The consequence is that formulary decisions are based on numerical storytelling rather than testable claims. This undermines confidence, constrains learning, and exposes health systems to growing scrutiny from clinicians, patients, and regulators who expect evidence to mean something more than structured speculation.

The imperative of change therefore does not arise from theory alone. It arises from governance responsibility. A health system cannot sustain long-term stewardship of care if it lacks the ability to distinguish between claims that can be evaluated and claims that cannot. Without that distinction, there is no pathway to improvement; only endless repetition for years to come.

This transition is not about rejecting evidence. It is about restoring evidence to its proper meaning. It requires moving away from composite, model-driven imaginary constructs toward claims that are measurable, unidimensional, and capable of empirical assessment over time. The remainder of this section sets out how that transition can occur in a practical, defensible, and staged manner.

MEANINGFUL THERAPY IMPACT CLAIMS

At the center of the current problem is not data availability, modeling skill, or analytic effort. It is the nature of the claims being advanced. Contemporary HTA has evolved toward increasingly complex frameworks that attempt to compress multiple attributes, clinical effects, patient experience, time, and preferences into single composite outputs. These constructs are then treated as if they were measures. They are not (Table 1).

The complexity of the reference-case framework obscures a simpler truth: meaningful evaluation requires meaningful claims. A claim must state clearly what attribute is being affected, in whom, over what period, and how that attribute is measured. When these conditions are met, evaluation becomes possible. When they are not complexity substitutes for clarity. The current framework is not merely incorrect; it is needlessly elaborate. Reference-case modeling requires dozens of inputs, assumptions, and transformations, yet produces outputs that cannot be empirically verified. Each additional layer of complexity increases opacity while decreasing accountability. Committees are left comparing models rather than assessing outcomes.

In contrast, therapy impact can be expressed through two, and only two, types of legitimate claims. First are claims based on manifest attributes: observable events, durations, or resource units. These include hospitalizations avoided, time to event, days in remission, or resource use. When properly defined and unidimensional, these attributes can be measured on linear ratio scales and evaluated directly.

Second are claims based on latent attributes: symptoms, functioning, need fulfillment, or patient experience. These cannot be observed directly and therefore cannot be scored or summed meaningfully. They require formal measurement through Rasch models to produce invariant logit ratio scales. These two forms of claims are sufficient. They are also far more transparent. Each can be supported by a protocol. Each can be revisited. Each can be reproduced. Most importantly, each can fail. But they cannot be combined. This is the critical distinction. A meaningful claim is one that can be wrong.

Composite constructs such as QALYs do not fail in this sense. They persist regardless of outcome because they are insulated by assumptions. They are recalculated, not refuted. That is why they cannot support learning. The evolution of objective knowledge regarding therapy impact in disease areas is an entirely foreign concept. By re-centering formulary review on single-attribute, measurable claims, health systems regain control of evaluation. Decisions become grounded in observable change rather than modeled narratives. Evidence becomes something that accumulates, rather than something that is re-generated anew for every submission.

THE PATH TO MEANINGFUL MEASUREMENT

Transitioning to meaningful measurement does not require abandoning current processes overnight. It requires reordering them. The essential change is not procedural but conceptual: measurement must become the gatekeeper for arithmetic, not its byproduct.

The first step is formal recognition that not all numerical outputs constitute evidence. Health systems must explicitly distinguish between descriptive analyses and evaluable claims. Numbers that do not meet measurement requirements may inform discussion but cannot anchor decisions.

The second step is restructuring submissions around explicit claims rather than models. Each submission should identify a limited number of therapy impact claims, each defined by attribute, population, timeframe, and comparator. Claims must be unidimensional by design.

Third, each claim must be classified as manifest or latent. This classification determines the admissible measurement standard and prevents inappropriate mixing of scale types.

Fourth, measurement validity must be assessed before any arithmetic is permitted. For manifest claims, this requires confirmation of ratio properties. For latent claims, this requires Rasch-based measurement with demonstrated invariance.

Fifth, claims must be supported by prospective or reproducible protocols. Evidence must be capable of reassessment, not locked within long-horizon simulations designed to frustrate falsification.

Sixth, committees must be supported through targeted training in representational measurement principles, including Rasch fundamentals. Without this capacity, enforcement cannot occur consistently.

Finally, evaluation must be iterative. Claims are not accepted permanently. They are monitored, reproduced, refined, or rejected as evidence accumulates.

These steps do not reduce analytical rigor. They restore it.

TRANSITION REQUIRES TRAINING

A transition to meaningful measurement cannot be achieved through policy alone. It requires a parallel investment in training, because representational measurement theory is not intuitive and has never been part of standard professional education in health technology assessment, pharmacoeconomics, or formulary decision making. For more than forty years, practitioners have been taught to work within frameworks that assume measurement rather than demonstrate it. Reversing that inheritance requires structured learning, not informal exposure.

At the center of this transition is the need to understand why measurement must precede arithmetic. Representational measurement theory establishes the criteria under which numbers can legitimately represent empirical attributes. These criteria are not optional. They determine whether addition, multiplication, aggregation, and comparison are meaningful or merely symbolic. Without this foundation, committees are left evaluating numerical outputs without any principled way to distinguish evidence from numerical storytelling.

Training must therefore begin with scale types and their permissible operations. Linear ratio measurement applies to manifest attributes that possess a true zero and invariant units, such as

time, counts, and resource use. Latent attributes, by contrast, cannot be observed directly and cannot be measured through summation or weighting. They require formal construction through a measurement model capable of producing invariant units. This distinction is the conceptual fulcrum of reform, because it determines which claims are admissible and which are not.

For latent trait claims, Rasch measurement provides the only established framework capable of meeting these requirements. Developed in the mid–twentieth century alongside the foundations of modern measurement theory, the Rasch model was explicitly designed to convert subjective observations into linear logit ratio measures. It enforces unidimensionality, tests item invariance, and produces measures that support meaningful comparison across persons, instruments, and time. These properties are not approximations; they are defining conditions of measurement.

Importantly, Rasch assessment is no longer technically burdensome. Dedicated software platforms developed and refined over more than four decades make Rasch analysis accessible, transparent, and auditable. These programs do not merely generate statistics; they explain why items function or fail, how scales behave, and whether a latent attribute has been successfully measured. Measurement becomes demonstrable rather than assumed.

Maimon Research has developed a two-part training program specifically to support this transition. The first component provides foundational instruction in representational measurement theory, including the historical origins of scale theory, the distinction between manifest and latent attributes, and the criteria that define admissible claims. The second component focuses on application, detailing claim types, protocol design, and the practical use of Rasch methods to support latent trait evaluation.

Together, these programs equip health systems, committees, and analysts with the competence required to enforce measurement standards consistently. Training does not replace judgment; it enables it. Without such preparation, the transition to meaningful measurement cannot be sustained. With it, formulary decision making can finally rest on claims that are not merely numerical, but measurable.

A NEW START IN MEASUREMENT FOR HEALTH TECHNOLOGY ASSESSMENT

For readers who are looking for an introduction to measurement that meets the required standards, Maimon Research has just released two distance education programs. These are:

- Program 1: Numerical Storytelling – Systematic Measurement Failure in HTA.
- Program 2: A New Start in Measurement for HTA, with recommendations for protocol-supported claims for specific objective measures as well as latent constructs and manifested traits.

Each program consists of five modules (approx. 5,500 words each), with extensive questions and answers. Each program is priced at US$65.00. Invitations to participate in these programs will be distributed in the first instance to 8,700 HTA professionals in 40 countries.

More detail on program content and access, including registration and on-line payment, is provided with this link: https://maimonresearch.com/distance-education-programs/

DESIGNED FOR CLOSURE

For those who remain unconvinced that there is any need to abandon a long-standing and widely accepted HTA framework, it is necessary to confront a more fundamental question: why was this system developed and promoted globally in the first place?

The most plausible explanation is administrative rather than scientific. Policy makers were searching for an assessment framework that could be applied under conditions of limited empirical data while still producing a determinate conclusion. Reference-case modeling offered precisely this convenience. By constructing a simulation populated with assumptions, surrogate endpoints, preference weights, and extrapolated time horizons, it became possible to generate a numerical result that could be interpreted as decisive. Once an acceptable cost-effectiveness ratio emerged, the assessment could be declared complete and the pricing decision closed. This structure solved a political and administrative problem. It allowed authorities to claim that decisions were evidence-based without requiring the sustained empirical burden demanded by normal science. There was no requirement to formulate provisional claims and subject them to ongoing falsification. There was no obligation to revisit conclusions as new data emerged. Closure could be achieved at launch, rather than knowledge evolving over the product life cycle.

By contrast, a framework grounded in representational measurement would have imposed a very different obligation. Claims would necessarily be provisional. Measurement would precede arithmetic. Each therapy impact claim would require a defined attribute, a valid scale, a protocol, and the possibility of replication or refutation. Evidence would accumulate rather than conclude. Decisions would remain open to challenge as real-world data emerged. From an administrative standpoint, this was an unreasonable burden. It offered no finality.

The reference-case model avoided this problem entirely. By shifting attention away from whether quantities were measurable and toward whether assumptions were plausible, the framework replaced falsification with acceptability. Debate became internal to the model rather than external to reality. Sensitivity analysis substituted for empirical risk. Arithmetic proceeded without prior demonstration that the objects being manipulated possessed the properties required for arithmetic to be meaningful.

Crucially, this system required no understanding of representational measurement theory. Committees did not need to ask whether utilities were interval or ratio measures, whether latent traits had been measured or merely scored, or whether composite constructs could legitimately be multiplied or aggregated. These questions were never posed because the framework did not require

them to be posed. The absence of measurement standards was not an oversight; it was functionally essential.

Once institutionalized, the framework became self-reinforcing. Training programs taught modeling rather than measurement. Guidelines codified practice rather than axioms. Journals reviewed technique rather than admissibility. Over time, arithmetic without measurement became normalized as "good practice," while challenges grounded in measurement theory were dismissed as theoretical distractions. The result was a global HTA architecture capable of producing numbers, but incapable of producing falsifiable knowledge. Claims could be compared, ranked, and monetized, but not tested in the scientific sense. What evolved was not objective knowledge, but institutional consensus.

This history matters because it explains why the present transition is resisted. Moving to a real measurement framework with single, unidimensional claims does not merely refine existing methods; it dismantles the very mechanism by which closure has been achieved for forty years. It replaces decisiveness with accountability, finality with learning, and numerical plausibility with empirical discipline. Yet that is precisely the transition now required. A system that avoids measurement in order to secure closure cannot support scientific evaluation, cumulative knowledge, or long-term stewardship of healthcare resources. The choice is therefore unavoidable: continue with a framework designed to end debate, or adopt one designed to discover the truth.

Anything else is not assessment at all, but the ritualized manipulation of numbers detached from measurement, falsification, and scientific accountability.

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REFERENCES

[1] Stevens S. On the Theory of Scales of Measurement. *Science*. 1946;103(2684):677-80

[2] Krantz D, Luce R, Suppes P, Tversky A. Foundations pf Measurement Vol 1: Additive and Polynomial Representations. New York: Academic Press, 1971

[3] Rasch G, Probabilistic Models for some Intelligence and Attainment Tests. Chicago: University of Chicago Press, 1980 [An edited version of the original 1960 publication]

[4] Wright B. Solving measurement problems with the Rasch Model. *J Educational Measurement.* 1977;14(2):97-116