



Article

Conceptual Inflation and Explanatory Entitlement: On the Limits of Construct Extension in Science

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Abstract

This article introduces explanatory entitlement as an epistemic category: the inferential right to deploy a construct as a basis for causal inference in a given domain. Drawing on Woodward's interventionist account and Cartwright's analysis of causal portability the article argues that this entitlement is conferred by demonstrated invariance and does not transfer automatically across levels or domains. When constructs are projected beyond their invariance conditions without bridging support, they undergo conceptual inflation: retention of explanatory authority without the evidential conditions that license it. The article formalizes this failure, distinguishes it from seven neighboring frameworks, and proposes a diagnostic structure.

Keywords: explanatory entitlement; conceptual inflation; invariance; construct extension; extrapolation; philosophy of science

1. Introduction

This article makes three contributions to the philosophy of science. First, it introduces explanatory entitlement as a new epistemic category: the inferential right to deploy a construct as a basis for counterfactual or causal inference in a given domain. Second, it identifies a previously under-theorized inferential failure, conceptual inflation, in which constructs retain explanatory authority despite losing the evidential conditions that originally licensed their use. Third, it provides a formal criterion for diagnosing this failure and a tiered diagnostic framework for evaluating explanatory claims involving construct extension.

The motivation is familiar. Constructs originating within bounded experimental paradigms are regularly deployed to explain phenomena at different levels of analysis, in different domains, and under different evidential conditions, without specification of the inferential steps that would justify the extension. The philosophical question is: what exactly has gone wrong? Several existing studies address parts of this question, external validity, extrapolation, transportability, construct validity, concept stretching, concept creep, the generalizability crisis, but, as Section 3 argues, none of these frameworks fully isolates the specific failure at issue: the unwarranted retention of explanatory entitlement after the invariance conditions that conferred it no longer obtain.

The article belongs to the philosophy of science, specifically to the post-interventionist debate on causal portability and construct extension. The article is grounded in Woodward's interventionist account of explanation [1] and Cartwright's analysis of causal portability [2]. It engages with challenges from pragmatist, model-based, and pluralist traditions (Section 2.6). It demonstrates the framework through heuristic cases from psychology, economics, and sociology (Section 4). It formalizes the inferential failure using semi-formal notation (Section 2.4),



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identifies four modes of inflation (Section 5), proposes a tiered diagnostic (Section 6), and develops consequences for the philosophy of science (Section 7).

A potential objection is that explanatory entitlement merely redescribes invariance in normative terms. The reduction should be resisted, since the two properties can come apart in practice. Scope, in Woodward's sense [1], is a descriptive property of a generalization. Explanatory entitlement, by contrast, concerns the epistemic licensing of a construct within an inferential context. Identical invariance profiles at the level of established evidence do not automatically confer identical entitlement statuses across domains: entitlement depends not only on what has been shown to be invariant, but on whether the conditions required for that invariance obtain in the context where explanation is attempted.

A simple case clarifies why explanatory entitlement cannot be reduced to invariance alone. Let a generalization G involving construct C be well established in a source domain D , with a clearly specified invariance profile $I(D)$. Within D , C is explanatorily entitled: interventions on the relevant variables behave in accordance with G under the conditions captured by $I(D)$. Now consider a target domain D' in which the observable variables retain the same formal structure and G appears descriptively applicable, but where the background conditions required for invariance are not satisfied and no bridging relation $B(D, D')$ has been specified. The invariance profile as established evidence remains unchanged, yet the entitlement status differs. In D , C is licensed to support causal inference; in D' , it is not, despite the superficial preservation of structure. The difference is not empirical scope as such, but the absence of a justified connection between the conditions under which invariance was demonstrated and those under which explanation is attempted. This shows that explanatory entitlement tracks not only invariance but the warranted transfer of invariance across domains. Without this distinction, cases in which constructs retain their formal profile while losing their inferential license cannot be adequately characterized.

A concrete illustration, due in essence to a referee for an earlier version of this article, helps fix ideas. Consider the generalization G that an after-lunch cigarette produces, in a particular agent, a state of mild relaxation. G holds across a wide range of normal background conditions: ordinary working days, ordinary stress levels, ordinary physiological background. Within this range G is fairly invariant and the agent is explanatorily entitled to G in accounting for post-lunch states of relaxation. Now consider the morning of a high-stakes examination. The agent has lunch and a cigarette and is, briefly, somewhat relaxed. To cite G to explain this state is defective: examination-stress is precisely the kind of background condition under which G is known to fail, and the explanation of any momentary relaxation must lie elsewhere. To deploy G regardless, without independently establishing that the mechanism underlying G operates under high-stress regimes, is to deploy a construct in inference where its established support does not, on its own, license the deployment. This is conceptual inflation in miniature; what Sections 2 and 3 render explicit is the structure of this kind of failure.

2. Explanatory Entitlement and Conceptual Inflation

2.1. Explanatory Entitlement as an Epistemic Category

The concept of explanatory entitlement names a property of a construct's inferential role that is not captured by existing categories in the philosophy of science. The closest concept is Woodwardian scope [1], the range of conditions under which a generalization is invariant. But scope is a descriptive property of a generalization: it characterizes what a generalization does. Explanatory entitlement is a normative property of a construct's inferential role: it characterizes what a construct is licensed to do within a scientific argument.

The distinction matters because scope and entitlement can come apart. A construct may retain the appearance of scope, its name, its narrative compressibility, its rhetorical

force, while having lost the invariance conditions that would warrant its use as a basis for causal inference. Without a concept that separates these properties, this specific failure cannot be precisely stated. Explanatory entitlement fills the gap.

Three exclusions clarify the concept. Explanatory entitlement is not mere descriptive applicability: a construct may apply descriptively in a new domain without being entitled to explain outcomes there (the term may apply; the generalization may not be invariant). It is not predictive success alone: a construct may predict an outcome without explaining it, if the conditions under which the prediction holds are not the conditions under which the construct's mechanism operates. And it is not rhetorical coherence: a construct may sound explanatory, its name may suggest a causal story, without the invariance conditions that would license causal inference.

2.2. *The Normative Status of Explanatory Entitlement*

A reviewer may ask: is explanatory entitlement a genuinely normative category, or merely a redescription of empirical scope? The answer is that entitlement is normative in a precise and epistemically binding sense.

The norm is epistemic, not methodological or conventional. It holds because deploying a construct in an explanatory role without demonstrated invariance in the target domain yields inferences whose evidential warrant has not been established. Such inferences may turn out to be true, but they are not known to be warranted by the available evidence. The norm is therefore a constraint on rational inference from evidence, not a procedural recommendation for good research practice. It is grounded in the same epistemic considerations that underwrite the distinction between warranted and unwarranted inference in general: the evidential conditions that confer the right to infer must obtain.

The normativity is binding in the following specific way. An inference that violates it, an explanatory claim made in a domain where invariance has not been established, is not thereby false. It is epistemically ungrounded: its truth, if it is true, is not secured by the evidence that is cited in its support. This is analogous to the way in which an inductive inference based on an unrepresentative sample may reach a true conclusion but is not thereby warranted. The norm identifies a defect in the inferential pathway, not a guarantee about the conclusion.

2.3. *Conceptual Inflation: Definition*

Conceptual inflation is the deployment of a construct in explanatory roles that exceed the conditions under which its central generalizations have demonstrated invariance, without specification of the bridging mechanisms, level-of-analysis constraints, or independent justificatory arguments required for such extension. The defect is inferential-epistemic: it concerns the licensing of explanatory inference under construct extension, not the semantic structure of the construct itself nor the sociology of its uptake. The key term is explanatory role. A construct undergoes inflation not when applied in classificatory, predictive, or heuristic uses, but when made to explain phenomena at a level or under conditions where its explanatory entitlement has not been established.

2.4. *Formal Criterion*

The criterion can be stated semi-formally. The following definitions make the structure of the failure explicit.

Notation. Let (C) be a scientific construct. Let (E) be an explanandum. Let $(G(C,E))$ be a generalization in which (C) is used to account for (E) . Let (D) be the source domain in which $(G(C,E))$ has been established. Let (I_D) denote the relevant range of interventions, perturbations, or variations against which the stability of $(G(C,E))$ is assessed in (D) . Let

(D') be a target domain. Let ($B(D, D')$) be a bridging relation specifying why the conditions that underwrite the invariance of ($G(C, E)$) in (D) should be expected to obtain in (D').

Definition 1 (Source-Domain Explanatory Entitlement). (C) has explanatory entitlement with respect to (E) in (D) iff there exists a generalization ($G(C, E)$) in which (C) figures non-redundantly and whose invariance across (I_D) is empirically supported.

Definition 2 (Direct Target-Domain Entitlement). (C) has direct explanatory entitlement with respect to (E) in (D') iff the invariance of a relevant generalization involving (C) and (E) has been independently demonstrated under the conditions of (D').

Definition 3 (Transferred Explanatory Entitlement). (C) has transferred explanatory entitlement with respect to (E) in (D') iff a bridging relation ($B(D, D')$) has been specified and independently supported, and there are no known differences between (D) and (D') that defeat the expected transfer of invariance.

Definition 4 (Conceptual Inflation). (C) is conceptually inflated in (D') iff it is used to support explanatory claims concerning (E) in (D') while possessing neither direct nor transferred explanatory entitlement in that domain.

This notation is semi-formal. Neither (I_D) nor ($B(D, D')$) can ordinarily be reduced to a finite set of logical conditions, because the identification of relevant invariance conditions and adequate bridging relations depends on empirical evidence and theoretical judgment. The notation is intended to make the structure of explanatory overextension explicit, not to mechanize its diagnosis. Section 2.7 develops the criterion through the worked case of loss aversion.

2.5. The Interventionist Basis

The formal criterion draws on Woodward's interventionist account [1]. A generalization G is explanatory with respect to Y insofar as G is invariant: it specifies how Y would change under interventions on the relevant variables, across some range of conditions. Extension beyond that range is not explanation but extrapolation. Cartwright's analysis [2] reinforces this: causal claims are ascriptions of capacities whose exercise depends on supporting factors. Findings from one context do not license explanatory conclusions about another without specification of the enabling conditions.

This grounding adds specificity to classical formulations. On Popper's account [3], overextended theories exclude fewer observations. On Lakatos's [4], extensions fail to generate novel predictions. On Meehl's [5], constructs are immunized through flexible reinterpretation. The interventionist framework adds a precise diagnostic: the inflated construct has been applied outside its range of invariance. The concept of explanatory entitlement adds a further specification: what is lost is not merely empirical support but the inferential right to explain.

2.6. Productive Extension and Challenges from Rival Traditions

Not all extension is pathological. The extension of natural selection to cultural evolution is a case where invariance has been progressively established through independent bridging arguments specifying how selection-like dynamics operate on cultural variants under specifiable conditions [6–8]. Conceptual inflation occurs not when a construct is extended speculatively, a necessary feature of scientific practice, but when the extension is treated as already explanatory. Three exclusions apply: transparent metaphor does

not constitute inflation; interdisciplinary extension with explicit bridging mechanisms is legitimate integration; popular simplification is not inflation merely because it is simplified.

Three challenges from rival traditions require explicit engagement. First, the pragmatist objection: if a construct is useful in a new domain, generating predictions, organizing research, informing policy, does it matter whether invariance has been demonstrated? The answer is that pragmatic utility and explanatory entitlement are distinct properties. A construct may be pragmatically useful where it is not entitled to explain. The framework does not deny the value of heuristic deployment; it requires that heuristic deployment be marked as such rather than presented as established explanation.

Second, the model-based science objection: scientific models routinely idealize, abstract, and extend beyond strict conditions of validity. The framework is compatible with this. Model-based extension becomes inflation only when the model's explanatory role in the new domain is presented as warranted rather than conjectural, when idealization is not acknowledged but concealed. The distinction between honest idealization (acknowledged departure from demonstrated invariance) and conceptual inflation (tacit assumption of invariance) is precisely the distinction the framework draws.

Third, the heuristic extension objection: extending constructs speculatively is how science progresses, and a norm against it would be stifling. This rests on a misreading. The framework does not prohibit speculative extension. It helps distinguish between conjectures to be tested (legitimate speculation, epistemic status transparent) and explanatory claims treated as established (potentially inflated, epistemic status opaque). The norm targets opacity, not ambition.

The framework can be further clarified by situating it within the philosophy of modeling. Scientific models routinely extend beyond the conditions under which their assumptions are strictly satisfied, trading off realism, generality, and precision [9]. On influential accounts, models function as mediating instruments between theory and world, enabling representation through idealization and abstraction [10]. Weisberg's analysis of representational similarity [11] likewise emphasizes that models need not mirror target systems in all respects to be explanatorily useful. The present account is compatible with these views, but identifies a distinct point of failure. Conceptual inflation does not arise from idealization as such, nor from the use of models outside their original domains, but from a failure to mark the limits of representational validity when explanatory claims are made. A model may legitimately idealize and still retain explanatory entitlement within a specified range of conditions. Inflation occurs when the conditions under which the model's representational adequacy has been established are no longer satisfied, yet the model is treated as if its explanatory authority persists unchanged. In this sense, conceptual inflation is best understood not as overextension per se, but as a breakdown in the explicit tracking of the relationship between representational validity and inferential use.

2.7. Loss Aversion as the Worked Case

The framework so far has been stated abstractly. Before turning to rival traditions and to the further illustrations of Section 4, it is useful to develop one case in depth, both to demonstrate the criterion and to display where invariance discourse alone is insufficient. The case is loss aversion [12,13]. It is chosen because it is well established within a clearly characterized laboratory regime, has been extended into domains where the bridging conditions are not always secured, and exhibits a gap between source-domain support and target-domain deployment that is sharp enough to display the inferential structure without entanglement in disputes specific to other contested studies.

Loss aversion (C) was established under laboratory gamble conditions (D): one-shot gambles, defined outcomes, immediate feedback. Within $I(D)$, the generalization proved

robust and explanatory entitlement was established. Extensions to the equity premium puzzle, voter behavior, and consumer resistance invoke C in domains (D') where $I(D)$ does not obtain: professional trading involves repeated transactions, institutional incentives, and organizational constraints. Recent work undermines the assumption that $\lambda \approx 2$ is context-invariant [14,15]. Benartzi and Thaler's "myopic loss aversion" model [16] specifies $B(D, D')$ explicitly: myopic evaluation periods and mental accounting as independently testable bridging conditions. This is what legitimate entitlement transfer looks like: B is specified, decomposable, and in principle falsifiable. The broader extensions that treat the parameter as universal exhibit the structure of Definition 3: C deployed in D' with neither (a) nor (b) satisfied.

The structure of this case can be made explicit using the formal framework introduced in Section 2.4. Let C be loss aversion and G the generalization that agents weigh losses more heavily than gains, often parameterized as $\lambda > 1$ in value functions. Let D be the laboratory domain of one-shot gambles with defined outcomes, immediate feedback, and minimal institutional mediation. The invariance set $I(D)$ includes conditions such as isolated choice, absence of learning across repeated trials, and controlled framing of gains and losses. Within D , G has been shown to be sufficiently stable for C to possess explanatory entitlement. Now consider a target domain D' such as professional financial markets or electoral behavior, where agents operate under repeated exposure, institutional constraints, strategic interaction, and dynamic feedback. In these settings, key elements of $I(D)$ do not obtain. If C is invoked to explain phenomena in D' without either (a) independent demonstration that G remains invariant under the conditions of D' or (b) specification and empirical support for a bridging relation $B(D, D')$ that accounts for how the mechanism underlying loss aversion is preserved under these altered conditions, then Definition 3 applies. C is used to support explanatory claims in D' while neither invariance in D' nor a justified bridge has been established. The construct may retain predictive or heuristic value, and its formal representation may remain unchanged, but its explanatory entitlement does not transfer. By contrast, the "myopic loss aversion" model provides a candidate $B(D, D')$ by introducing evaluation frequency and mental accounting as mediating variables that are independently testable. In this case, entitlement is not assumed but conditionally transferred. The contrast illustrates the difference between legitimate extension and conceptual inflation in strictly inferential terms.

3. Adjacent Literature and the Position of the Present Claim

Conceptual inflation occupies a specific position in a landscape of related concerns. Each of the following seven frameworks addresses a genuine problem. The question is whether, taken together, they render the concept of conceptual inflation unnecessary.

External validity concerns whether results generalize across settings. Extrapolation [17–19] asks whether causal relationships hold in new contexts. Transportability [20] formalizes conditions for transferring causal effects. Construct validity [21] asks whether a measure captures its intended attribute. Concept stretching [22] concerns classificatory extension. Concept creep [23] concerns extensional broadening. The generalizability crisis [24] concerns scope–claim mismatch.

These resources are jointly insufficient for the following structural reason. External validity, extrapolation, and transportability address the problem of transport: does the empirical relationship persist in a new setting? But conceptual inflation involves skipped transport: the construct arrives at its new explanatory station without any test of whether invariance conditions are met. Construct validity addresses measurement, not explanatory role. Concept stretching, creep, and generalizability address classificatory, extensional, and scope–claim failures, but a construct may be well-defined (no stretching), appropriately

extended (no creep), and scope-matched at its original level (no generalizability crisis) while being illegitimately projected into an explanatory role at a different level. What is lost in conceptual inflation is explanatory entitlement, the inferential right to explain, and existing frameworks do not, taken together, fully isolate this as an object of assessment. The present proposal is best understood as a precise extension of this lineage rather than a wholesale replacement of it.

4. Heuristic Illustrations

The following cases are offered as heuristic illustrations of the inferential pattern formalized in Section 2.4, not as adjudications of the empirical studies from which they are drawn. The claims are conditional: *if* the empirical evidence is as described, then the extensions exhibit the structure of conceptual inflation. The philosophical framework stands independently of any particular empirical verdict.

4.1. Implicit Bias

The Implicit Association Test (IAT) [25] measures automatic associations at the individual level (D). Meta-analytic evidence indicates modest predictive validity for individual behavior [26,27]. The inferential move at issue is the extension from this individual-level reaction-time measure to claims about institutional discrimination: it crosses both a level of analysis and a domain. Such extension to institutional discrimination (D') requires either demonstrated invariance of G at the institutional level or a specified $B(D, D')$ connecting individual associations to institutional patterns through organizational mechanisms. Neither has been supplied in the dominant explanatory claims [28,29]. The construct retains its name in D' but has lost its explanatory entitlement there. This analysis does not dispute the existence of implicit associations [30–32] in D .

4.2. Social Capital

Social capital [33–35] (C), operationalized through individual-level survey responses (D), has been deployed to explain macro-level governance variation (D'). This is a cross-level projection: individual measurements explain institutional outcomes without specified $B(D, D')$. Invariance of G at the individual level is not in question; entitlement to explain at the institutional level has not been established.

Taken together with the worked case of loss aversion developed in Section 2.7, these illustrations exhibit structurally distinct forms of inflation: regime-shift under altered institutional conditions (loss aversion), and cross-level projection (implicit bias and social capital).

5. Modes of Inferential Breakdown

Conceptual inflation can occur along four axes, corresponding to the structural dimensions of a causal explanation.

Level confusion [36,37]: C grounded at level L is deployed at level L' without specifying the connecting mechanisms. The implicit bias and social capital cases are paradigmatic.

Domain slippage: C remains at the same level but is projected from $I(D)$ to conditions $I(D')$ where invariance has not been established. Cognitive dissonance [38], formulated for counter-attitudinal behavior under free choice and low justification, invoked to explain belief persistence in general.

Normative overextension: a descriptive generalization generates normative conclusions without the required bridging premises. The failure is a shift in the kind of conclusion drawn.

Theoretical over-ascription [39–41]: a bounded finding bears the weight of an argument whose conclusions far exceed it through collapse of the inferential chain.

6. A Diagnostic Framework

The framework classifies explanatory claims by their epistemic status regarding invariance. The classifications are evidence conditions, not qualitative labels.

Tier 1 (Invariance-grounded). C deployed within D where $I(D)$ has been demonstrated. Entitlement established.

Tier 2 (Mediated extension). C deployed in D' where either (a) invariance under conditions of D' independently demonstrated, or (b) $B(D, D')$ specified and independently supported. Entitlement conditionally transferred.

Tier 3 (Unwarranted extension). C deployed in D' where neither (a) nor (b) obtains. Entitlement not established. The construct may retain descriptive applicability, predictive utility, or rhetorical force, but lacks the evidential conditions for explanatory use.

The framework is not a strict mechanist standard: Tier 2 accommodates non-mechanistic warrant through demonstrated regularity. Inflation is diagnosed only when neither form of warrant has been secured.

7. Consequences

The stakes of conceptual inflation are not merely terminological but structural for scientific practice. When explanatory entitlement is tacitly assumed rather than demonstrated, scientific claims begin to circulate with a level of authority that exceeds their evidential grounding. This produces a characteristic pattern of failure: results that are robust within a source domain are treated as explanatorily portable, leading to breakdowns when findings are applied across populations, contexts, or levels of analysis. In the context of the replication crisis, this helps explain why effects that appear stable under controlled conditions fail to generalize, not because they lack validity per se, but because their explanatory entitlement was extended beyond its evidential base. In policy contexts, the same mechanism leads to interventions justified by constructs that have not been shown to operate under the conditions in which they are deployed, resulting in misaligned or ineffective measures that persist through institutional inertia. The problem is further intensified in AI-driven systems, where patterns learned in one domain are scaled and redeployed across heterogeneous contexts without explicit representation of invariance conditions, thereby automating the extension of constructs without securing their explanatory legitimacy. Conceptual inflation thus introduces a systematic distortion: it allows explanatory claims to travel faster than the evidence that licenses them.

A further consequence concerns the distinction between prediction and explanation. A construct may exhibit strong predictive performance in a target domain D' while lacking explanatory entitlement there. Predictive success establishes that a model or generalization captures stable associations under certain conditions, but it does not by itself demonstrate that the underlying causal relationships are invariant or that the mechanism identified in the source domain operates in the same way in the target domain. In such cases, predictive accuracy can increase even as explanatory entitlement decreases, particularly when models exploit correlations that are contingent on domain-specific structures. This distinction is especially salient in contemporary contexts such as machine learning and policy modeling, where high-performing predictive systems are routinely deployed across heterogeneous settings. Without an account of invariance or a justified bridging relation $B(D, D')$, the transition from prediction to explanation remains unwarranted. The framework developed here provides a criterion for identifying this gap: it requires that explanatory use be grounded not in predictive success alone, but in demonstrated or defensibly extended invariance.

7.1. For Scientific Practice

The framework helps distinguish two kinds of study. Studies that replicate a paradigm in a new population test generalizability. Studies that test whether C 's mechanism operates under conditions of D' test explanatory warrant. Only the second addresses conceptual inflation. A well-designed warrant-testing study specifies $B(D, D')$, operationalizes the bridging mechanism, and includes competing explanations as alternative predictors.

7.2. For Philosophy of Science

Scope (Woodward) describes the range of a generalization's invariance. Entitlement describes the normative inferential status that scope confers: the right to use the construct as a basis for causal inference. The two can come apart: a construct can lose entitlement while retaining the appearance of scope. If this analysis is correct, then explanatory entitlement deserves recognition as an epistemic category alongside scope, invariance, and robustness in the philosopher's account of scientific explanation.

8. Self-Application, Limitations, and Conclusions

This article's claims constitute a Tier 2 extension: they specify bridging mechanisms (Woodward's invariance [1], Cartwright's portability [2]) that are independently justified. The conclusions are conditional on these theories.

Limitations: the analysis is conceptual; the cases are heuristic illustrations; the tier structure is a heuristic requiring judgment; the concept is subject to the risk it identifies (deploying it without checking B would itself be Tier 3); the framework applies most directly to causal-explanatory contexts.

The extension of scientific constructs beyond their original evidential domains is both inevitable and, in many cases, productive. Scientific progress depends on the capacity to project concepts into new contexts, to test their limits, and to explore their explanatory reach. The central question, however, is under what conditions such extensions preserve explanatory legitimacy. This article has argued that the answer turns on a distinction that is not adequately captured in existing frameworks: the distinction between empirical support and explanatory entitlement. Drawing on the interventionist notion of invariance and Cartwright's account of causal portability, it has proposed a criterion for when a construct retains the inferential right to explain and when that right has been lost.

The consequences of failing to observe this distinction are not merely conceptual. When constructs are extended without establishing invariance or specifying bridging conditions, explanatory claims acquire a form of epistemic opacity. They retain the appearance of causal authority while lacking the evidential conditions that would justify that authority. This produces a systematic distortion in scientific reasoning: explanations are treated as established where they are, at best, conjectural. The result is not simply error, but a degradation of inferential discipline, in which the boundary between warranted explanation and speculative extension becomes increasingly difficult to discern.

This dynamic bears directly on the replication crisis. Many failed replications can be understood not only as failures of robustness within a domain, but as cases where constructs were tacitly assumed to retain explanatory entitlement across populations, contexts, or levels of analysis without the necessary evidential support. The framework developed here clarifies that replication and entitlement are distinct: replication secures invariance within a domain, while entitlement requires either invariance in the target domain or a justified account of how invariance is preserved across domains. Without this distinction, the generalization of findings is liable to outpace the conditions that warrant explanatory use.

The stakes are equally significant for policy and applied science. When constructs that lack explanatory entitlement are used to guide interventions, policies may be built on

inferences that are not evidentially grounded in the contexts where they are applied. This is not merely a matter of predictive uncertainty. It is a matter of explanatory misattribution, where the mechanisms assumed to be operative have not been shown to function under the relevant conditions. The result can be ineffective or misdirected interventions that persist not because they are well supported, but because the constructs that underwrite them retain rhetorical and institutional authority.

These concerns are further amplified in the context of AI-driven generalization. Contemporary machine learning systems routinely extend patterns detected in one domain to new domains at scale, often without explicit representation of the conditions under which those patterns are invariant. When such systems are integrated into scientific workflows or decision-making processes, they risk accelerating the dynamics of conceptual inflation. Constructs may be operationalized, scaled, and redeployed across contexts in ways that obscure the absence of explanatory entitlement. The framework proposed here provides a way to diagnose this risk: it requires that claims derived from such systems be evaluated not only in terms of predictive performance, but in terms of whether the underlying constructs retain the evidential conditions necessary for explanatory use.

The concept of explanatory entitlement thus serves both a diagnostic and a disciplinary function. It makes explicit what is at stake when constructs are extended beyond their evidential base, and it provides a criterion for distinguishing legitimate extension from inflation. This does not impose a constraint on scientific ambition. On the contrary, it enables more disciplined and transparent forms of extension by requiring that the epistemic status of explanatory claims be clearly specified. Speculative projection remains an essential part of scientific practice, but it must be marked as such unless and until the conditions for entitlement are secured.

A construct becomes scientifically weaker not when it is challenged or revised, but when it is asked to explain more than its evidence can support. The preservation of explanatory rigor therefore depends not only on the accumulation of data, but on the maintenance of a clear boundary between what is empirically established and what is inferentially licensed. The distinction between scope and entitlement, and the criterion developed in this article, aim to make that boundary visible.

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References

1. Woodward, J. *Making Things Happen: A Theory of Causal Explanation*; Oxford University Press: Oxford, UK, 2003.
2. Cartwright, N. *Nature's Capacities and Their Measurement*; Clarendon Press: Oxford, UK, 1989.
3. Popper, K.R. *Conjectures and Refutations: The Growth of Scientific Knowledge*; Routledge: London, UK, 1963.
4. Lakatos, I. Falsification and the Methodology of Scientific Research Programmes. In *Criticism and the Growth of Knowledge*; Lakatos, I., Musgrave, A., Eds.; Cambridge University Press: Cambridge, UK, 1970; pp. 91–196.
5. Meehl, P.E. Theoretical Risks and Tabular Asterisks: Sir Karl, Sir Ronald, and the Slow Progress of Soft Psychology. *J. Consult. Clin. Psychol.* **1978**, *46*, 806–834. [[CrossRef](#)]
6. Boyd, R.; Richerson, P.J. *The Origin and Evolution of Cultures*; Oxford University Press: New York, NY, USA, 2005.
7. Henrich, J. *The Secret of Our Success: How Culture is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter*; Princeton University Press: Princeton, NJ, USA, 2015.

8. Mesoudi, A. *Cultural Evolution: How Darwinian Theory Can Explain Human Culture and Synthesize the Social Sciences*; University of Chicago Press: Chicago, IL, USA, 2011.
9. Levins, R. The Strategy of Model Building in Population Biology. *Am. Sci.* **1966**, *54*, 421–431.
10. Frigg, R.; Hartmann, S. Models in Science. In *The Stanford Encyclopedia of Philosophy*; Zalta, E.N., Ed.; Metaphysics Research Lab, Stanford University: Stanford, CA, USA, 2006.
11. Weisberg, M. *Simulation and Similarity: Using Models to Understand the World*; Oxford University Press: New York, NY, USA, 2013.
12. Kahneman, D.; Tversky, A. Prospect Theory: An Analysis of Decision under Risk. *Econometrica* **1979**, *47*, 263–292. [[CrossRef](#)]
13. Yechiam, E. Acceptable Losses: The Debatable Origins of Loss Aversion. *Psychol. Res.* **2019**, *83*, 1327–1339. [[PubMed](#)]
14. Gal, D.; Rucker, D.D. The Loss of Loss Aversion: Will It Loom Larger Than Its Gain? *J. Consum. Psychol.* **2018**, *28*, 497–516.
15. Mrkva, K.; Johnson, E.J.; Gächter, S.; Herrmann, A. Moderating Loss Aversion: Decision Difficulty, Decision Strategy, and Loss Estimation. *J. Consum. Psychol.* **2020**, *30*, 407–428. [[CrossRef](#)]
16. Benartzi, S.; Thaler, R.H. Myopic Loss Aversion and the Equity Premium Puzzle. *Q. J. Econ.* **1995**, *110*, 73–92. [[CrossRef](#)]
17. Steel, D. Social Mechanisms and Causal Inference. *Philos. Soc. Sci.* **2004**, *34*, 55–78. [[CrossRef](#)]
18. Cartwright, N.; Deaton, A. Understanding and Misunderstanding Randomized Controlled Trials. *Soc. Sci. Med.* **2018**, *210*, 2–21. [[CrossRef](#)]
19. Cartwright, N.; Hardie, J. *Evidence-Based Policy: A Practical Guide to Doing It Better*; Oxford University Press: New York, NY, USA, 2012.
20. Pearl, J.; Bareinboim, E. Transportability of Causal and Statistical Relations: A Formal Approach. *Proc. AAAI Conf. Artif. Intell.* **2011**, *25*, 247–254. [[CrossRef](#)]
21. Cronbach, L.J.; Meehl, P.E. Construct Validity in Psychological Tests. *Psychol. Bull.* **1955**, *52*, 281–302. [[CrossRef](#)] [[PubMed](#)]
22. Sartori, G. Concept Misformation in Comparative Politics. *Am. Political Sci. Rev.* **1970**, *64*, 1033–1053. [[CrossRef](#)]
23. Haslam, N. Concept Creep: Psychology’s Expanding Concepts of Harm and Pathology. *Psychol. Inq.* **2016**, *27*, 1–17.
24. Yarkoni, T. The Generalizability Crisis. *Behav. Brain Sci.* **2022**, *45*, e1. [[CrossRef](#)]
25. Greenwald, A.G.; McGhee, D.E.; Schwartz, J.L.K. Measuring Individual Differences in Implicit Cognition: The Implicit Association Test. *J. Personal. Soc. Psychol.* **1998**, *74*, 1464–1480. [[CrossRef](#)]
26. Greenwald, A.G.; Poehlman, T.A.; Uhlmann, E.L.; Banaji, M.R. Understanding and Using the Implicit Association Test: III. Meta-Analysis of Predictive Validity. *J. Personal. Soc. Psychol.* **2009**, *97*, 17–41. [[CrossRef](#)]
27. Forscher, P.S.; Lai, C.K.; Axt, J.R.; Ebersole, C.R.; Herman, M.; Devine, P.G.; Nosek, B.A. A Meta-Analysis of Procedures to Change Implicit Measures. *J. Personal. Soc. Psychol.* **2019**, *117*, 522–559. [[CrossRef](#)]
28. Oswald, F.L.; Mitchell, G.; Blanton, H.; Jaccard, J.; Tetlock, P.E. Predicting Ethnic and Racial Discrimination: A Meta-Analysis of IAT Criterion Studies. *J. Personal. Soc. Psychol.* **2013**, *105*, 171–192. [[CrossRef](#)]
29. Greenwald, A.G.; Krieger, L.H. Implicit Bias: Scientific Foundations. *Calif. Law Rev.* **2006**, *94*, 945–967. [[CrossRef](#)]
30. Payne, B.K.; Vuletich, H.A.; Lundberg, K.B. The Bias of Crowds: How Implicit Bias Bridges Personal and Systemic Prejudice. *Psychol. Inq.* **2017**, *28*, 233–248. [[CrossRef](#)]
31. Holroyd, J.; Scaife, R.; Stafford, T. Responsibility for Implicit Bias. *Philos. Compass* **2017**, *12*, e12410. [[CrossRef](#)]
32. Paluck, E.L.; Porat, R.; Clark, C.S.; Green, D.P. Prejudice Reduction: Progress and Challenges. *Annu. Rev. Psychol.* **2021**, *72*, 533–560. [[CrossRef](#)] [[PubMed](#)]
33. Putnam, R.D. *Making Democracy Work: Civic Traditions in Modern Italy*; Princeton University Press: Princeton, NJ, USA, 1993.
34. Portes, A. Social Capital: Its Origins and Applications in Modern Sociology. *Annu. Rev. Sociol.* **1998**, *24*, 1–24. [[CrossRef](#)]
35. Coleman, J.S. *Foundations of Social Theory*; Belknap Press of Harvard University Press: Cambridge, MA, USA, 1990.
36. Robinson, W.S. Ecological Correlations and the Behavior of Individuals. *Am. Sociol. Rev.* **1950**, *15*, 351–357. [[CrossRef](#)]
37. Hedström, P.; Ylikoski, P. Causal Mechanisms in the Social Sciences. *Annu. Rev. Sociol.* **2010**, *36*, 49–67. [[CrossRef](#)]
38. Festinger, L. *A Theory of Cognitive Dissonance*; Stanford University Press: Stanford, CA, USA, 1957.
39. Pronin, E.; Lin, D.Y.; Ross, L. The Bias Blind Spot: Perceptions of Bias in Self versus Others. *Personal. Soc. Psychol. Bull.* **2002**, *28*, 369–381. [[CrossRef](#)]
40. Kruger, J.; Dunning, D. Unskilled and Unaware of It: How Difficulties in Recognizing One’s Own Incompetence Lead to Inflated Self-Assessments. *J. Personal. Soc. Psychol.* **1999**, *77*, 1121–1134.
41. Gignac, G.E.; Zajenkowski, M. The Dunning–Kruger Effect Is (Mostly) a Statistical Artefact: Valid Approaches to Testing the Hypothesis with Individual Differences Data. *Intelligence* **2020**, *80*, 101449.

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