

Unequal Capacities for Relational Revisability

A Preliminary Discussion

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Abstract

Meaningful revisability depends on practices that preserve records, interpret changes, keep alternatives usable, and sustain participants through periods of uncertainty. The people who perform that work need not control the choices it supports. This paper examines the joint distribution of revision repertoires, maintenance burdens, and revision authority. Its central question concerns arrangements in which one participant's continuing capacity to reconsider relies on another participant's work, exposure, or restricted alternatives. Drawing on existing Generative Relational (GR) accounts of historical being, generative rules, temporal injustice, and power, the analysis distinguishes enabling dependence, comparative burden displacement, constrained support, and normative wrong. An analytical literature review locates these distinctions within international-relations research on institutional design, bargaining, structural power, and network dependence, alongside research on administrative burdens and justice. Several conditional models develop the argument: labelled relational spacetimes, joint support relations, a restricted allocation problem, operational history algebras, an interacting finite group-domain field, nonlinear response dynamics, and a positive history ensemble. The models expose joint-feasibility failures, information lost by aggregate burden measures, order-sensitive protection, and conditions for stable mediated support. They neither scalarize power nor establish a social quantum ontology. A provisional normative argument connects consequential voice, protected support capacity, and responsibility for revising the arrangements that allocate burdens. Empirical identification, application-specific field semantics, and comparative novelty remain open. The resulting framework is a focused extension of prior GR work intended for sustained public discussion.

Keywords: relational revisability; burden allocation; power; justice; relational spacetime; group fields; operator algebra

Discussion Paper Note

This manuscript develops the fifth item in an ongoing research sequence on trust, cooperation, resources, and relational revisability. Its main title remains provisional. The preceding discussion manuscript, *Resource Constraints on Maintaining Revisability near Criticality: A Preliminary Discussion*, investigated maintainable revision repertoires. The present paper examines their distribution among participants and the relations between choice-holding, support-bearing, and control over support rules. The wider trust-architecture synthesis remains a separate task.

The analysis acknowledges substantial inheritance from the author's existing manuscripts and from established research traditions. It does not claim that unequal waiting, dependence, institutional power, effective alternatives, or historically constituted agency are newly discovered phenomena. The formal constructions are explicit proposals for criticism. Their mathematical consequences hold within stated assumptions; their institutional interpretation requires further argument and evidence.

The paper is written for public discussion and the continuing development of knowledge. Readers may encounter related ideas through other intellectual traditions. Historical priority, conceptual adequacy, empirical usefulness, and normative justification remain distinct questions. Criticism of an example or model should lead to revision of the relevant construction rather than automatic rejection or confirmation of the whole programme.

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Status. This working draft is prepared for the author’s review. It records an evolving research argument; definitions, section structure, and conclusions remain subject to revision. Completion of the draft does not imply publication, acceptance, or final author approval.

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Statement on the use of language models. The author selected the research problem, provisional working title, and paper queue and provided the exploratory discussion and corrections. OpenAI Codex assisted with source retrieval, conceptual analysis, formal reconstruction, drafting, computational examples, and technical checks. This completed working draft awaits the author’s review; its new formulations and arguments have not yet received final author approval. Authorship credit remains with the human author. This disclosure should be reviewed before external circulation.

DRAFT

1 Distributed Revisability

Relational revisability concerns a participant’s practical capacity to alter a consequential arrangement: to correct an interpretation, modify a commitment, contest a decision, replace a support provider, or leave a relation. This section identifies the distributional problem that arises when those capacities require continuing work by others. It establishes the analytical object, separates the present inquiry from its antecedents, and states the argumentative route.

1.1 Supported Choice

Consider a hypothetical institution that retains discretion to reconsider a decision for six months. During that period, an applicant must remain available, preserve documents, respond to repeated requests, and postpone an alternative project. The institution possesses a continuing choice because a wider arrangement keeps the case actionable. Part of that arrangement consists of the applicant’s activity. The institution’s flexibility and the applicant’s restricted activity are therefore related features of one history.

Several explanations remain possible. The arrangement may protect the applicant against premature rejection. It may reflect genuinely indispensable verification. It may distribute administrative work badly. It may permit the institution to postpone the cost of making a decision while the applicant absorbs the consequences. Identical waiting times can occur in each case. The relation between sustained choice and burden-bearing must be reconstructed before evaluation.

A revision capacity is often attributed to the actor who exercises it. That attribution is useful for identifying a right-holder or decision-maker, but incomplete as an account of the capacity’s production. An appeal depends on an archive, interpreters, protected time, procedural standing, and an institution capable of changing its decision. A sponsor’s capacity to revise a project depends on staff who retain skills and refrain from incompatible commitments. A state’s negotiating flexibility may depend on domestic groups that absorb adjustment while negotiations continue. The relevant object includes these enabling relations.

1.2 Analytical Object

The paper studies the *joint distribution of supported revision repertoires, maintenance burdens, and revision authority*. A repertoire identifies the meaningful changes a participant can practically seek. A burden profile records what participants must do, endure, or forgo to sustain the relevant arrangement. An authority profile identifies who can initiate, authorize, refuse, or amend the practices that connect them.

These profiles are analytically distinguishable and historically coupled. The same person can occupy several positions. A caregiver can preserve another’s revisability while gaining meaningful options through the relationship. An institution can finance a review process while controlling its scope. A formally weak participant can possess a specialized skill that makes the arrangement dependent on continued cooperation. The analysis therefore avoids assigning fixed roles of powerful beneficiary and powerless bearer in advance.

The central comparison concerns how an arrangement distributes the conditions of future change. This is narrower than a complete theory of justice and broader than a study of one maintenance cost. Its theoretical interest lies in the coupling: a change that improves one participant’s capacity to revise can transform the supports, authority, and alternatives of others.

1.3 Contribution Boundary

Existing GR work already develops optionality that depends on resources, unequal interpretive capacity, transformations of generative rules, and recursive power [9, 12, 10, 13]. The present investigation extends these objects by making the support relation between different participants explicit. Its formal results concern joint feasibility, participant-indexed history operations, mediated field interactions, and

burden-sensitive reduction. The conjunction of those devices is a research proposal, not evidence of historical originality.

The distinction from the companion resource paper is substantive. An arrangement can maintain an extensive aggregate repertoire while assigning the work to participants whose own avenues of change contract. Conversely, a demanding support obligation may sustain a fair cooperative arrangement with robust protections for its bearers. Aggregate maintainability leaves both possibilities open. The present paper asks which relations produce them and what grounds their evaluation.

1.4 Argumentative Route

Sections 2–8 develop the literature position and philosophical argument. Sections 9–16 give several conditional formal representations. Sections 17–21 examine institutional configurations, protective arrangements, objections, and empirical obligations. The formal constructions make selected implications reproducible; they do not replace the interpretive work needed to identify a burden, a meaningful alternative, or legitimate authority.

2 Antecedent Research

Unequal capacities to sustain or revise cooperation belong to established research programmes. This section organizes the relevant literature around dependence, institutional design, political burdens, and justice. Its method is selective analytical comparison. The objective is to identify inherited explanations and the precise additional work required by a support-sensitive GR representation.

2.1 Relational Dependence

Emerson locates dependence in valued goals mediated by another and in the availability and costs of alternative avenues to those goals [4]. The present inquiry inherits that relational orientation. A participant's reserve resources matter partly through the relations they can sustain or replace. A record becomes useful because some institution accepts it; a skill becomes an alternative because a possible partner can use it. Possession alone supplies an incomplete account of independence.

The present analytical emphasis concerns the work that preserves an alternative before it is exercised. A substitute provider may exist today yet disappear if no one maintains contact, compatibility, or reserve capacity. Dependence can thus change during a formally undecided interval. This is a bounded extension of a familiar question about alternatives, rather than a replacement for dependence theory.

Process-relational IR scholarship also challenges analyses that treat states and their relations as wholly preconstituted units. Jackson and Nexon offer a particularly relevant statement of that approach [17]. GR's use of spacetime objects is one possible representational development of historical constitution. The terminology does not establish equivalence among relational theories, whose accounts of agency, causality, and explanation differ.

2.2 Institutional Cooperation

Keohane's account of the demand for regimes identifies information and transaction-cost functions that help explain institutional cooperation [18]. Abbott and Snidal analyze centralization and independence as reasons for employing formal international organizations [1]. Neither contribution licenses an assumption that institutions distribute the costs of cooperation equally. A useful organization may reduce some burdens while reallocating others.

The rational-design research programme treats institutional features as responses to cooperation problems, including distribution, enforcement, numbers, and uncertainty [19]. This provides a direct antecedent for investigating revision procedures. Who can reopen an agreement, who finances monitoring,

and which participants can survive a review interval are institutional-design questions. The present argument asks that the support work and changing capacities generated during that interval become explicit parts of the comparison.

Fearon shows why bargaining and enforcement should be examined together: conditions that facilitate enforcement can also make bargaining more difficult [6]. Powell identifies changing future bargaining power as a source of commitment problems within the study of war [23]. These arguments warn against treating a longer future or greater flexibility as an unqualified cooperative benefit. Their specific models retain their own domains. The present paper does not derive conflict or war from any instance of unequal revisability.

An institutional arrangement may therefore produce cooperation that is reliable for some purposes and costly for some participants. Reliability does not settle the separate questions of burden incidence and authority. Those questions can be investigated within institutionalist and strategic approaches; GR must demonstrate additional explanatory usefulness rather than declare an omitted problem by fiat.

2.3 Differentiated Power

Barnett and Duvall distinguish compulsory, institutional, structural, and productive power, including relations that constitute differential actor capacities [3]. This typology prevents the present inquiry from locating power only in an overt demand to wait. Rules can organize whose delay counts, whose records are credible, and whose alternatives appear administratively relevant.

Farrell and Newman show how asymmetries in global networks can enable information collection and denial of access [5]. Such mechanisms direct attention to infrastructure and jurisdiction. A network position alone does not establish the present paper's burden-displacement relation. An application must trace which supports are controlled, how their use sustains a particular revision capacity, and which alternative arrangements are actually feasible.

The comparison also exposes a potential failure of the proposed framework. If a case is fully explained by control of a bottleneck and no distinctive history of maintenance, authority change, or foreclosed alternatives matters, a simpler network-power account may suffice. Additional GR structure should earn its explanatory cost.

2.4 Political Burdens

Moynihan, Herd, and Harvey distinguish learning, psychological, and compliance costs and analyze administrative burden as a venue of political choice [21]. Their argument directly precedes any claim that an institution can reduce its internal workload by imposing work on those it governs. The present paper inherits that possibility and asks how the imposed work affects later capacities to challenge or transform the arrangement.

Auyero's study of waiting in Argentina connects extended administrative waiting with state control [2]. The publisher's account supports that bounded characterization; the present paper does not claim an independent reanalysis of the ethnographic material. Its hypothetical administrative examples are constructions, distinct from Auyero's cases.

Star's account of infrastructure emphasizes relational organization, differing standpoints, and work that can become invisible in ordinary institutional descriptions [24]. A maintenance practice can be essential while disappearing from the beneficiary's account of its own competence. Treating that invisibility as a possible explanatory issue is therefore inherited. Establishing that a particular practice preserves revision requires further evidence.

2.5 Temporal Persistence

Pierson's analysis of increasing returns supplies an antecedent for sequence-sensitive institutional persistence and costly reversal [22]. The concern here is a specified distributional trajectory: present support

obligations can affect the bearer’s future ability to refuse or renegotiate them. Persistence alone is insufficient to identify that trajectory. Coordination benefits, common shocks, and voluntary specialization can produce similar visible stability.

Stirling distinguishes opening up appraisal from closing down commitment and examines the role of framing and power [25]. This matters because a paper about revisability can itself assume that more alternatives are always preferable. The normative argument below instead asks which alternatives deserve protection and whose commitments or safety may justify limiting them.

2.6 Normative Antecedents

Lovett’s account connects domination with dependence and arbitrary power and develops a justice argument concerning avoidable domination [20]. It supplies an evaluative alternative to treating every unequal support relation as wrongful. The present paper does not equate burden with domination. It examines control over consequential revision as one possible site at which a domination argument may apply.

Young’s social-connection model distinguishes shared, forward-looking responsibility for structural injustice from an isolating liability model [26]. That distinction is relevant where burdens arise through interacting institutions rather than one intentional decision. A causal account of support incidence can inform responsibility while leaving the grounds and distribution of remedial obligations open.

These approaches preserve disagreements. A capability-based argument may prioritize effective alternatives; a republican argument may prioritize uncontrolled power; a procedural account may prioritize legitimate authorization. The present construction supplies objects for such judgments and a limited argument for protected contestation. It does not collapse their standards into one numerical index.

2.7 GR Inheritance

The author’s resource manuscript already distinguishes heterogeneous support capacities and dissipative waiting [9]. The ethical-legibility manuscript treats costly interpretation, archive access, and the externalization of becoming institutionally intelligible [12]. *Justice of Relational Becoming* examines histories, transformation authority, generative rules, and exit burdens [10]. The temporal-injustice manuscript distinguishes registration from governing status and states a conditional thesis about the concentration of unrecoverable divergence [8]. The recursive-power manuscript separates mediated return from mere persistence [13].

These precedents substantially constrain novelty. The current paper does not inherit unrestricted claims that other traditions lack a criterion of wrong, or that institutional coordination always requires an irreducible temporal obstruction. Its own argument works where such an obstruction is absent. A unilaterally imposed reporting rule, for example, can redistribute revision capacity even when all parties could coordinate under a different feasible schedule.

Table 1 summarizes the resulting division of analytical labour.

Table 1: Antecedent Objects And Present Extensions

Antecedent Object	Inherited Insight	Present Investigation
Dependence	Alternatives condition relational power	Maintenance of those alternatives before exercise
Institutional design	Rules respond to cooperation problems	Distribution of support work and amendment capacity
Administrative burden	Costs can be politically allocated	Effects on later contestation and refusal
Temporal injustice	Registration differs from governing status	Effective response before a protected option closes
Generative rules	Actions alter future transformability	Actor-indexed operations and burden-sensitive reductions
Resource maintenance	Repertoires require continuing support	Joint feasibility across differently situated holders

3 Historical Constitution

A distribution of revision capacity presupposes participants, meaningful requests, and recognizable support. This section examines how those objects acquire their identities through a relational history. Its method is philosophical reconstruction from GR’s history-bearing perspective, followed by distinctions needed for the later models.

3.1 Historically Extended Participants

An institution’s current authority can depend on a record of competence, a legal settlement, inherited infrastructure, and repeated recognition by other institutions. A participant’s apparent compliance can depend on a history of accommodated requests, threats, dependency, or successful challenge. Present descriptions can be similar while those histories support different interpretations of what continuing cooperation means.

GR’s spacetime perspective treats the participant as a historically extended configuration. A name at a boundary identifies a currently relevant role; it does not exhaust the being occupying that role. The formal development will therefore represent a participant through a region and continuation data within a coupled history. Which continuities matter remains an interpretive judgment. Organizational succession, migration, loss of records, and changes in membership can make identity itself contested.

Historical extension matters practically. A person who has organized care, housing, or expertise around a relation may face a different revision problem from a newly arriving person with the same current income. A resource count that omits those dependencies can misdescribe an apparently equal offer. Conversely, history should enter selectively: an unrelated earlier event need not be preserved in every model. The purpose of historical detail is to retain distinctions that affect the inquiry.

3.2 Constituted Request Languages

A revision request must become recognizable as a request. Institutions categorize errors, admissible evidence, authorized claimants, and appropriate remedies. A participant can experience a changing relation before possessing a vocabulary that the institution accepts. Support for revision therefore includes interpretive and procedural work, alongside material execution.

A request language can also be generated by contestation. Participants may discover that what appeared to be an individual inconvenience is a shared structural restriction. A new category can make previously dispersed experiences actionable. The present finite models freeze a request vocabulary for a declared inquiry; they do not imply that the social universe of requests is closed.

This qualification changes the interpretation of preservation. Retaining every request already recognized by an institution can coexist with excluding a newly intelligible injury. A model that preserves an

old repertoire can establish a limited success while leaving the adequacy of that repertoire open. An institution's capacity to revise its classifications is therefore different from its capacity to process requests within them.

3.3 Manifestation Sensitivity

The manifestation of cooperation can conceal substantial variation in relational conditions. Continued attendance may express trust, strategic patience, dependence, or lack of a usable alternative. A completed form may reflect voluntary participation or the minimum action required to keep a claim alive. The analyst should avoid promoting an observable act into a complete description of the relation.

The distinction is not a claim that manifestations are useless. Records of participation, communication, expenditure, and withdrawal can constrain interpretations. Their evidential role depends on the observation channel and on the possibilities excluded from the record. An agency can record every completed application while missing people who cannot begin one. A project can record successful continuation while missing the alternatives that staff abandoned to sustain it.

Burden assessment accordingly requires more than adding visible tasks. It may require reconstructing the relation between an action and the feasible paths available at that point. This is why an opportunity foregone cannot simply be read from an accountant's expenditure category.

3.4 Generative Conditions

A support arrangement can change the conditions of its own future revision. Maintaining a proprietary system may deepen dependence on its operator. Training a claimant to navigate an appeal can also create transferable knowledge and collective capacity. The same broad activity, maintenance, can therefore support closure or new forms of independence.

Prior GR work describes this second-order object through generative rules [10]. The present argument makes a limited use of that idea. A rule enters the analysis when changing it would alter who can form, amend, contest, or leave the relevant arrangement. It need not be a written instruction. It can be an access practice, interface dependency, or recognized chain of authorization.

The philosophical consequence is that distributing resources and distributing transformability are related but distinct. A payment can improve a participant's present position while leaving exclusive amendment authority intact. A procedural reform can redistribute authority while remaining practically unusable without support. Adequate analysis follows both changes through their historical realization.

4 Supported Revision Repertoires

This section defines the practical object whose unequal distribution the paper investigates. It distinguishes a meaningful revision from a nominal permission, explains the common-maintenance requirement, and clarifies the relational character of a participant's repertoire.

4.1 Meaningful Revision

A revision changes something consequential in a relation. It may correct a description without dissolving cooperation, alter a commitment without abandoning its purpose, or terminate an arrangement whose continuation has become harmful. The relevant change depends on the problem. More frequent revision is neither a definition of success nor a general ethical objective.

A practical revision requires several connections. The participant must be able to recognize or articulate the issue, possess standing to raise it, reach an institution capable of responding, and sustain the process long enough for an effective change. A favourable judgment that arrives after an irreplaceable opportunity has closed may establish retrospective recognition while providing little of the revision originally sought.

These connections explain why formal symmetry can coexist with unequal capacity. Two parties may hold an identical contractual amendment clause while only one can finance the expertise, withstand the delay, or compel disclosure required to use it. The text supplies one component of a repertoire. The relation supplies its practical realization.

4.2 Common Maintenance

A list of individually reachable options can overstate revisability. Suppose a small organization can preserve either an independent archive or a specialist review team, but cannot sustain both until the future problem becomes known. Each response is individually possible. The organization nevertheless lacks one maintenance policy that preserves the full pair.

A *supported revision repertoire* therefore concerns a family of possible later requests that one feasible policy keeps actionable during a shared preceding interval. The policy can adapt to information actually available, but cannot choose its early investments with knowledge of a request that has not yet emerged. The distinction between individual reachability and common support is inherited from the companion resource inquiry and becomes distributionally important here.

Participants' policies interact. Preserving one party's later choice can require another to remain available, refrain from incompatible commitments, or carry a reserve of evidence. An institution that claims a large repertoire for itself should therefore identify the shared policy that supports it and the people whose conduct that policy presupposes.

4.3 Relational Attribution

To say that a repertoire belongs to a participant identifies who can invoke its requests. It need not imply private ownership of every support. Public institutions, mutual care, professional communities, and common infrastructures can constitute the capacity. The distinction is comparable to identifying a speaker without attributing the invention of language to that speaker.

This relational attribution protects two concerns. First, acknowledging dependence should not erase the participant's standing: a publicly financed right remains the holder's right. Second, acknowledging the holder should not erase the work and authority of those who maintain the relevant practice. A valid right to request assistance does not by itself determine how assistance must be organized.

The analysis therefore separates the holder of a request, the beneficiary of its successful use, the bearer of maintenance, and the controller of the supporting arrangement. These positions sometimes coincide. Their divergence is the central object when one party can repeatedly reopen a decision because another is required to preserve the conditions of reopening.

4.4 Selected Alternatives

A repertoire needs a justified boundary. Retaining the capacity to appeal an erroneous decision can deserve protection; retaining unlimited discretion to reopen a settled obligation may undermine another's security. The same institutional feature can enlarge one repertoire and damage another. A finding of unequal revisability requires interpretation before evaluation.

This boundary also limits comparison by inclusion. If one repertoire contains every request in another plus an abusive request, set enlargement need not be an improvement. Later formal results use inclusion as a structural relation among preselected requests. The selection and valuation of those requests remain external to the set-theoretic proof.

A practical analysis should thus name the requests, holders, horizon, conditions of exercise, common supports, and grounds for inclusion. That discipline makes an inequality claim more precise than saying that one participant has more freedom in general.

5 Burden Incidence

This section specifies the relation between support and burden. Its objective is to distinguish an enabling contribution from a comparative displacement and to explain why neither automatically establishes imposition or injustice. The argument proceeds through different burden types, counterfactual comparisons, and the limits of attribution.

5.1 Heterogeneous Burdens

Maintenance can require performed work: monitoring, translation, record preservation, technical repair, travel, or repeated participation. It can also require exposure: remaining available to uncertain demands, carrying a risk whose timing another controls, or accepting restrictions while a decision remains open. A third dimension concerns incompatible activities that cannot be pursued during the support interval.

These dimensions are related without being interchangeable. A payment can reimburse travel while leaving an unavailable career opportunity unrestored. A shorter review can reduce uncertainty while concentrating work into an impossible schedule. A record-retention policy can preserve evidence while exposing a participant to continuing surveillance. No common measure follows from the word burden.

The analysis consequently begins with a profile and a declared comparison. A burden need not be experienced as aversive in order to restrict an alternative. Conversely, an activity experienced as demanding may be valuable, chosen, and reciprocally sustained. The participant's interpretation belongs in the inquiry without serving as its only evidence.

5.2 Enabling Contributions

An enabling contribution is a practice whose presence matters to the support of a specified request. A translator makes a challenge intelligible; a reserve team keeps a project restartable; an archive preserves the evidence needed for reconsideration. The relation is request-specific and context-sensitive.

A simple removal test can mislead. Removing one of two substitute translators may leave the request supportable. That does not show that translation is irrelevant or that neither translator contributes. Conversely, removing a whole institution can destroy a request because the claimant disappears from the procedure, rather than because one maintenance task was essential. Causal descriptions need carefully bounded interventions.

Complementarity creates a further difficulty. A record and an interpreter may each be indispensable while neither alone supports revision. Their contributions need not admit unique additive shares. The later support relation retains such joint requirements. An accounting convention may divide costs for a practical purpose, but that convention should not masquerade as a uniquely discovered causal decomposition.

5.3 Comparative Displacement

A claim of burden displacement compares arrangements. Suppose an agency can maintain an appeal file internally or require the claimant to reconstruct it repeatedly. If both are feasible and preserve the declared appeal function, the comparison can identify a shift in work. The relevant institutional expenditure and claimant burden must be traced together. Observing claimant work alone does not establish what the alternative would have required.

Displacement also covers a different configuration: the beneficiary acquires an additional revision option because another participant supplies new support. Here the beneficiary's own cost need not decline. The common feature is a support-sensitive advantage whose incidence is separated from its holder. The two cases should remain distinguishable: substitution of a bearer and expansion financed by another are different mechanisms.

The word transfer does not imply conservation. Changing the bearer may increase total work because the recipient lacks expertise or must duplicate evidence. It may reduce total work through specialization.

It may create new capacities or destroy alternatives whose value cannot be added to the work measure. The present paper therefore uses burden transfer as a comparative relation, not a physical flow of a fixed quantity of freedom.

5.4 Constrained Support

Imposition requires an additional account of control, dependency, or unavailable refusal. A participant may choose to support another's options as part of a mutually endorsed practice. Alternatively, the beneficiary may be able to extend demands while the bearer cannot safely refuse or renegotiate them. These are different relations even when the visible maintenance task is identical.

Formal consent supplies relevant evidence but leaves its supporting conditions open. A person can agree to an obligation while lacking a viable alternative, misunderstanding its duration, or being unable to challenge later expansion. Continued participation can likewise reflect practical commitment, coercive pressure, or a mixture. The analyst should identify the actual avenues of refusal and revision rather than infer voluntariness from a signature or infer coercion from inequality alone.

Constrained support can arise without a single controlling actor. Separate institutions can impose individually limited demands whose combined effect makes refusal impossible. A funding body, employer, and care service may each treat their schedule as locally reasonable while one participant absorbs the incompatibility. The appropriate causal object then includes the coupling among institutions.

5.5 Attribution Limits

Identifying a beneficiary does not automatically identify a wrongdoer. A patient may benefit from a caregiver's restricted alternatives while lacking the power to create a different care system. A junior official may impose a reporting requirement without authority to amend it. Responsibility should track roles, knowledge, control, contribution, and realistic remedial possibilities.

Nor does the absence of intentional design remove the distributional problem. An inherited infrastructure can repeatedly allocate support work to participants who cannot influence it. The account should therefore distinguish the origin of an arrangement, its present reproduction, and the responsibilities of those capable of changing it. These distinctions make a remedy possible without inventing a single author of a complex historical outcome.

6 Temporal Exposure

Support is sustained through time, and elapsed time can transform the capacities of its bearers. This section examines waiting, uncertainty, deadlines, and renewal. Its purpose is to explain how a shared interval can preserve one participant's options while changing another's practical future.

6.1 Active Waiting

Waiting can involve continual activity. The person awaiting a decision may need to monitor communication, update evidence, preserve availability, and avoid commitments incompatible with a favourable outcome. The institution may describe the interval as pending while the participant experiences it as ongoing work.

The burden depends on the arrangement of attention and interruption. A known appointment in three weeks differs from an unpredictable call requiring immediate response throughout those weeks. Equal calendar durations can therefore sustain very different practical repertoires. The difference cannot be represented adequately by elapsed time alone.

An analysis should ask what must remain ready, who replenishes it, and which other activities readiness excludes. This changes the causal question from whether time passed to how the interval was organized. The history-bearing representation retains that organization as part of the support relation.

6.2 Asymmetric Horizons

A large organization can often preserve a file beyond the period during which a particular person can sustain an undecided life. The organization's staff can rotate, resources can be pooled, and case histories can be transferred. The participant's relevant horizon may depend on a nonrenewable opportunity or a bodily, familial, or professional trajectory.

The asymmetry is not a general fact about large and small actors. An institution can face a funding deadline while a participant can afford delay. The analytical requirement is to identify the relevant renewal and closure processes for each participant. A common clock supplies a way to coordinate records, not a proof of equivalent exposure.

The temporal-injustice manuscript's distinction between registration and governing status is useful here [8]. An institution can record a participant's deadline without changing its own process. The present inquiry adds a further test: whether recognition can trigger a supported response before the protected option closes. A sympathetic acknowledgment and an executable stay are different institutional events.

6.3 Uncertainty Allocation

Uncertainty is also distributed through institutional design. One party may retain discretion over when to decide, what information to request, or which interpretation to adopt. Another may have to make costly preparations without knowing which choice will be made. Preserving the former's discretion can require the latter to keep several incompatible possibilities provisionally alive.

This arrangement can be justified in some contexts. Investigators may need time to avoid an erroneous decision; negotiators may need discretion to reach a workable agreement. The practical question is whether the uncertainty bearer receives limits, support, information, and a consequential way to challenge escalation. Justification for inquiry does not determine the whole distribution of its costs.

Changing interpretive conditions deepen the issue. New information may arrive after an earlier vocabulary has become inadequate, requiring a claimant to reformulate the case. Yet repeated updating can itself exhaust the resources needed for eventual response. Qualitative epistemic lag therefore matters without becoming an arbitrary numerical difference between rates of knowledge and change.

6.4 Closure Events

A revision window can close through resource exhaustion, loss of standing, expiry of evidence, disappearance of a substitute, or a practically irreversible commitment. These mechanisms are distinct. Reimbursing a financial expense may address one while leaving the others intact.

A later correction can also create a new option rather than restore the old one. Compensation, recognition, and institutional reform can be valuable even when restoration is impossible. The relevant difference concerns the object of repair. A missed opportunity and a later payment are connected through an evaluative argument; they are not identical historical events.

This is why the formal models will retain cumulative burden records even when resources are replenished. Renewal changes present supportability. It does not delete the history through which the participant arrived there. The historical register prevents an apparent return to equal stocks from silently becoming a claim of restored equality.

6.5 Transition-Sensitive Conditions

Near-critical dynamics can matter when a specified restoring process weakens or a relational configuration becomes susceptible to structural change. They are not required for the present mechanism. Ordinary deadlines, concentrated authority, and nonstationary requirements can already produce unequal exposure.

The field model below includes nonlinear responses and a stated domain of stability. It does not identify institutional waiting with a universal relaxation time. If criticality becomes an explanation in

an application, the relevant mode, perturbation, and observable must be independently identified. This preserves the broader programme's hypothesis without adding criticality to every distributional account.

7 Revision Authority

A support arrangement distributes control as well as work. This section distinguishes the powers involved in revising a relation, reconstructs a possible self-reproducing mechanism, and identifies the role of interpretation. Its method is relational and historical rather than a ranking of actors on a single power scale.

7.1 Differentiated Control

Initiative places a request on the agenda. Authorization makes a proposed change institutionally valid. Interpretation determines whether its conditions are satisfied. Execution makes the change effective. Amendment alters the procedures through which later changes will be sought. These capacities can be held by different participants.

The differences matter because a formal right may be present at one stage and ineffective at another. A claimant can initiate review while the institution controls disclosure. A committee can authorize relief while a separate budget holder withholds implementation. A participant can leave one relation while another institution continues to recognize the old classification.

Authority must therefore be described by operations and their conditions. Describing someone as powerful can summarize a finding, but should follow the analysis of what they can do, over which relations, with what resistance and support. A resource-rich actor may still lack a relevant authorization; a resource-poor actor may control a narrow but consequential veto.

7.2 Amendment Dependence

A particularly consequential arrangement appears when the beneficiary of maintenance also controls the conditions under which the bearer can seek relief. A sponsor can extend the review period, define adequate reporting, and decide whether a request to reduce reporting is itself adequately documented. The support relation then includes a recursive procedural dependency.

This dependency can persist even when decisions are conscientious. The objection concerns exposure to a structure whose amendment depends on the party benefiting from its continuation. Evidence of fair decisions matters to evaluation, but does not by itself establish that independent challenge is secure.

An independent reviewer can alter the structure only if the reviewer's judgment is executable. A nominally external body that relies on the same beneficiary for funds, data, or permission may relocate rather than remove the relevant dependence. Institutional independence should be traced through actual support relations.

7.3 Recursive Restriction

Consider a conditional mechanism. A bearer performs repeated support tasks. Those tasks consume resources that would otherwise sustain alternative partnerships or contestation. The resulting reduction in alternatives makes refusal more costly. The beneficiary can then maintain or extend the original demands. If the loop is causally supported, the present exercise changes a condition of later control.

This is an application of the mediated-return distinction already developed in the author's recursive-power manuscript [13]. The present paper does not infer a loop from persistence alone. It requires evidence that support obligations changed the bearer's alternatives and that this change contributed to the beneficiary's later control.

Countervailing dynamics are possible. The support task can produce transferable expertise, shared organization, or independent records. A bearer can learn how to contest the arrangement more effectively. Support can thus reproduce control, redistribute it, or generate collective capacity. These possibilities

motivate an interacting dynamical representation rather than a predetermined monotone story of domination.

7.4 Interpretive Authority

The burden bearer and the institution can disagree about what the support does. An agency can classify repeated documentation as routine compliance while the claimant experiences it as a barrier to review. A funder can classify staff availability as flexibility while staff regard it as unacknowledged reservation of their labour.

Neither description should win merely because it belongs to a particular role. The inquiry should inspect the actual tasks, their functions, the available alternatives, and the procedures through which interpretations acquire consequences. The ethical-legibility manuscript already locates such issues in classification, interfaces, and archives [12].

Interpretive authority can affect future revision by shaping the record. If additional demands appear as claimant failures, later reviewers may see a history of noncompliance rather than a history of changing requirements. Preserving versions and reasons can help, but recording alone remains insufficient. Participants need an avenue through which a competing reconstruction can matter.

7.5 Collective Counter-Capacity

Some burdens cannot be reduced by individual exit. A participant may depend on a public service, a shared network, or a care arrangement that cannot simply be replaced. Collective representation, pooled expertise, independent archives, and common funding can create alternatives to individualized refusal.

Collective capacity introduces its own authority problems. Representatives can become insulated from those they represent; a common fund can impose new conditions; coordination can marginalize unusual needs. The relevant question is whether the new arrangement supports consequential participation and revisability within the collective as well as against the original institution.

The resulting account is recursive without being circular. Each claimed remedy is evaluated through the support relations needed to operate it. The inquiry ends at a declared practical boundary, with remaining dependencies recorded as limits rather than silently assumed away.

8 Normative Standing

A causal relation between another's burden and one's own revisability does not itself establish a wrong. This section develops a limited normative argument concerning consequential voice and protected support capacity. It states its premises, distinguishes permissible asymmetry from imposed closure, and leaves disagreements about substantive justice visible.

8.1 Evaluative Premises

The argument adopts three contestable premises for cooperative arrangements that claim to respect participants as agents. First, consequential demands on a participant require reasons responsive to that participant's situation. Second, those reasons should be challengeable through a process capable of affecting the arrangement. Third, the demanded support should not ordinarily consume the practical conditions necessary to exercise that challenge.

The third premise follows from the practical interpretation of the second. If a procedure permits criticism while predictably exhausting the critic's ability to use it, the arrangement's promise of consequential challenge is internally defective. This is an argument about the coherence of a stated institutional commitment. It does not derive a universal moral law from the mathematics of a support relation.

The premises can receive different normative foundations. Equal standing, protection against domination, effective agency, or responsibilities within an established relationship may each support them.

Their overlap on a particular protection does not erase disagreements about other demands. The paper offers a limited institutional orientation, not a complete ranking of possible societies.

8.2 Protected Support Capacity

A bearer may reasonably be required to perform substantial work. The proposed protection concerns a justified floor of capacity to understand, contest, renegotiate, or safely conclude that obligation. The floor must be specified for the context. It can include protected time, independent assistance, relevant records, an emergency response, or a secure transition to another provider.

Protecting that floor can restrict another's discretion. A sponsor may lose the ability to postpone a decision indefinitely; an agency may need to bear more of the documentation cost; a participant may face limits on repeatedly reopening a settled matter. Such restrictions can preserve relational agency by limiting a particular repertoire.

The proposal therefore does not maximize optionality. Its aim is a supported relation among legitimate choices. Some forms of closure protect participants against harassment, perpetual uncertainty, or repeated threats to settled rights. A defensible arrangement can reduce the number of permissible revisions while improving the conditions under which the remaining ones are exercised.

8.3 Justified Asymmetry

Care, expertise, emergency response, and division of labour can justify asymmetric contributions. A person with greater capacity may bear more work precisely to protect another's effective agency. Requiring equal burden shares in such cases can deepen injustice. The relevant standard cannot be a universal equality of effort.

Asymmetry nevertheless requires interpretation of scope and duration. An emergency justification may warrant temporary concentration of authority while leaving later review necessary. Expertise can justify a technical decision without granting control over every contested value. A freely undertaken commitment can generate reliance interests while leaving room to challenge an unforeseen expansion.

Support for the beneficiary and protection for the bearer should therefore be jointly considered. Removing a burden abruptly can damage someone whose dependence is legitimate. A remedy may need replacement support, phased transition, or pooled responsibility. The burden relation identifies a problem to address, not an instruction to sever the relation.

8.4 Consequential Registration

Institutional recognition has several practical stages. A burden can become recordable, admissible, reviewable, and finally capable of changing a decision. Each transition can fail. A record of distress may improve description without changing a deadline; a successful review may remain unfunded; a funded remedy may arrive after its purpose has disappeared.

The normative proposal requires a meaningful link between recognition and response, subject to justified limits. It does not grant every complaint an automatic favourable outcome. It requires that relevant reasons can enter a process with a real capacity to alter the supported arrangement.

This requirement also concerns the design of the process itself. If a participant can contest only individual errors while the rule generating repeated burdens is insulated from challenge, relief may remain episodic. A support-sensitive account asks whether rule revision is available where recurring problems originate in the rule.

8.5 Remedial Responsibility

The beneficiary, controller, designer, funder, and public authority can have different reasons to participate in repair. Causal contribution, benefit, knowledge, role obligations, and ability to assist do not

coincide automatically. A complete responsibility judgment requires an account of how these considerations interact.

A provisional practical priority is to identify actors capable of changing the relevant support relation without destroying the protected function. That inquiry can locate duties of inquiry, temporary protection, disclosure, funding, or redesign. It does not settle liability or legal fault. The distinction is particularly important where cumulative burdens arise through several individually ordinary decisions.

Remedy should also preserve the bearer's participation in defining what counts as improvement. An externally designed solution can replace one dependency with another. The proposal's own reflexive requirement is that the remedy remain open to consequential challenge by those whose support it reorganizes.

9 Relational Spacetime Representations

The formal investigation begins with histories and their composition. This section fixes the inherited incidence conventions, adds participant and burden annotations, and states the distinction between a spacetime object, its two-complex representation, and an optional spin-foam instantiation. The construction is representational throughout.

9.1 Boundary Data

Following the prior heterogeneous-dynamics manuscript, a boundary contains primitive elements P , couplings C , and an incidence assignment ι [7]. The finite boundary object is specified in Equation 1.

$$\Gamma = (P, C, \iota), \quad \iota : C \longrightarrow \mathcal{P}(P), \quad |\iota(c)| \geq 2. \quad (1)$$

Here $\mathcal{P}(P)$ is the power set. Each element belongs to at least one coupling. For the graph presentation used below, each belongs to at most two. Couplings are graph vertices; elements are edges or half-edges. An element with greater incidence requires an explicitly revised representation. It should not be silently made into a graph node.

This boundary is a structural cut through a historical object. It is not a complete instantaneous description of a social being. Stocks, permissions, observations, and the current rule regime are additional boundary labels where needed. Two boundaries with the same unlabelled incidence can differ operationally because their histories or authorizations differ.

9.2 Historical Cells

A represented history has event vertices V , coupling-history edges E , and element-history faces Φ . Its extra data consist of a label assignment ℓ and an acyclic occurrence order $\prec$ on events. Equation 2 records the resulting object.

$$h = (F, \ell, \prec), \quad F = (V, E, \Phi), \quad \partial_- h = \Gamma_-, \quad \partial_+ h = \Gamma_+. \quad (2)$$

The boundary maps in Equation 2 inherit incidence from the free ends of faces and edges. Labels include types, continuation identifications, role attribution, and the locally declared support events. The ordering is additional data: arbitrary combinatorial complexes do not automatically supply causal histories.

A cut is a down-set of the event order, together with the induced boundary data. Different cuts need not be synchronized by one physical clock. An application can add durations or local temporal modes without identifying them with the combinatorial order.

For each participant i in a declared index set I , a spacetime region $W_i(h)$ selects the cells and continuation data relevant to that participant. Regions can overlap through shared practices. Their attribution is interpretive and potentially contested. A whole participant is therefore ordinarily represented by a historically extended configuration rather than one vertex. The prior source supplies the cell convention; participant attribution is an addition of the present model.

9.3 Composition

Two histories compose when their adjoining boundaries have a chosen incidence-preserving isomorphism and their nonboundary cells are otherwise fresh. Corresponding face and edge ends must match consistently. The composite is written $h_2 \circ h_1$, with h_1 occurring first.

Associativity holds up to the isomorphism induced by the common seam identifications: either bracketing identifies exactly the same boundary cells in the disjoint union of the three histories. The argument depends on freshness and compatible seam maps. An accidental identification of equal names away from a seam would be a different operation.

A zero-duration identity has no additional events or consumption. A positive-duration waiting history may preserve incidence while adding work, exposure, or resource use. Such a marked history is not operationally identical to doing nothing. This distinction protects the philosophical argument from a formal convention that would otherwise make maintenance disappear.

9.4 Burden Marks

Let R be a finite set of resource kinds admitted for a particular quantitative projection. A gross-use mark $c_{ir}(e)$ assigns a nonnegative quantity to each event e , participant i , and kind r . Cumulative use is defined by Equation 3.

$$B_{ir}(h) = \sum_{e \in V(h)} c_{ir}(e), \quad B_{ir}(h_2 \circ h_1) = B_{ir}(h_1) + B_{ir}(h_2). \quad (3)$$

The second equality assumes that no event is counted twice at a seam. Equation 3 concerns gross use in declared units, such as recorded work time. Resource inflows and renewal are separate labels. They can restore a current stock without making earlier use negative.

Exposure, consent, standing, and lost alternatives remain typed annotations unless an independent measurement model justifies numerical treatment. The later diagonal observables apply only to the gross-use coordinates. This limitation is essential: the equation does not turn a history of dependence into a universal cost number.

9.5 Optional Spin-Foam Instantiation

A spin-foam-style instantiation can attach representation labels to faces, compatibility or intertwiner data to edges, and local weights to vertices. It requires a chosen group, allowed representations, boundary data, and a rule for composing weights. The two-complex alone supplies none of these.

The prior GR field architecture distinguishes fixed-complex weighting, varying-complex ensembles, and group-field generation [14, 16]. This paper preserves that distinction. The finite field construction in Section 14 generates stranded diagrams; a separate realization map must determine which represent admissible support histories. No physical interpretation of social actors as quantum systems follows.

10 Joint Support Relations

This section formalizes supported repertoires without imposing a common measure of power or justice. Its objective is to retain the fact that several participants rely on the same maintenance policy. The construction distinguishes individual projections, simultaneous support, and counterfactual comparisons.

10.1 Policy Primitives

Fix an initial labelled history h_0 , a finite horizon, a rule regime z , and a declared family Ω of possible environmental continuations. The regime specifies recognized requests, allowed operations, observations, resource access, and amendment procedures. It is descriptive; legal or moral legitimacy requires additional evaluation.

For each participant i , let Q_i be a finite set of selected revision requests. A request specifies an acceptable response, its deadline, and any transition-safety conditions. Let $\mathcal{Q} \subseteq \prod_i (Q_i \cup \{\perp\})$ specify which combinations of requests are admitted, where $\perp$ denotes absence of a request. Every singleton request profile belongs to $\mathcal{Q}$, so a request cannot be declared supported merely because it never appears in an admitted profile. Compatible requests need not be simultaneous or independent.

A policy π maps available observation histories and revealed requests to authorized operations. It is nonanticipative: histories indistinguishable to the policy require the same action until new information becomes available. Let Π_z denote the policies that respect the declared transition, authorization, resource, and safety conditions on every continuation in Ω .

A repertoire tuple $\mathbf{R} = (R_i)_{i \in I}$ has $R_i \subseteq Q_i$. Write $\pi \models \mathbf{R}$ when π successfully serves every admitted request profile in $\mathcal{Q} \cap \prod_i (R_i \cup \{\perp\})$, on every continuation in Ω . The same policy must support the common period preceding request revelation. Robustness here is relative to Ω ; it is not a guarantee against every imaginable event. Let $H(\pi, \mathbf{R}; \Omega)$ denote the histories generated under those selected request profiles and environmental continuations.

10.2 Shared Support

Let $\beta(h)$ be a burden profile on a history, taking values in a declared partially ordered space $\mathcal{B}$. This profile can contain the measured coordinates of Equation 3 and separately ordered attributes where their comparison is justified. An upper bound $\mathbf{b} \in \mathcal{B}$ is acceptable only if its meaning is stated. Incomparable profiles need not be ranked.

The joint support relation is given in Equation 4.

$$\mathcal{J}_z = \left\{ (\mathbf{R}, \mathbf{b}) : \begin{array}{l} \exists \pi \in \Pi_z \text{ with } \pi \models \mathbf{R}, \\ \beta(h) \preceq \mathbf{b} \text{ for every } h \in H(\pi, \mathbf{R}; \Omega) \end{array} \right\}. \quad (4)$$

Equation 4 preserves the common existential quantifier over π . Replacing it by one policy for each participant would change the object. The same caution applies to burden bounds: bounds on several coordinates need not be jointly achieved by any one policy.

The relevant unit is thus an implementable arrangement. Individual repertoire projections remain useful, but they are derived views of $\mathcal{J}_z$. They cannot generally be recombined into an implementable joint promise.

10.3 Marginal Incompatibility

Proposition 10.1 establishes the simplest obstruction.

Proposition 10.1 (Marginal Support Incompatibility). *Individual supportability of each participant's selected request need not imply supportability of their repertoire tuple, even when only one participant will request revision.*

Proof. Let two participants have requests a and b . Before the requester is revealed, one indivisible maintenance slot must be committed either to preserving the support for a or to preserving the support for b . The commitment cannot be changed within the horizon. A policy preserving a supports the tuple $(\{a\}, \emptyset)$, and a policy preserving b supports $(\emptyset, \{b\})$. Admitted request profiles include $(a, \perp)$ and $(\perp, b)$. Any policy must make the same early commitment under these indistinguishable futures. Whichever commitment it chooses leaves the other profile unsupported. Hence $(\{a\}, \{b\})$ has no common support policy. Randomization cannot provide success on every continuation either. $\square$

The obstruction in Proposition 10.1 is a preparation conflict. It does not depend on a simultaneous demand for the same service. A retrospective list of the options available under different early policies can therefore exaggerate the institution's prospective revisability.

Figure 1 displays the three feasible support profiles and the incompatible joint promise in this example.

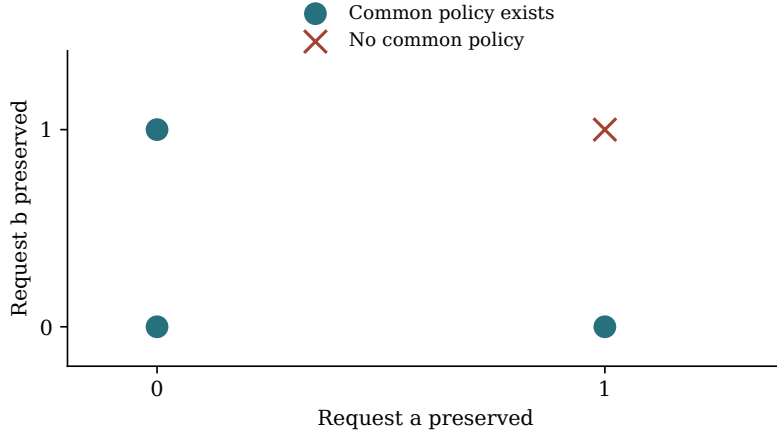


Figure 1: Illustrative Joint Support Profiles. One indivisible preparation slot supports either request. The separately feasible marginal choices cannot be combined into one policy before the requester is known.

10.4 Support Comparisons

To investigate burden displacement, compare two specified regimes or interventions z_0 and z_1 . State which histories, requests, and background supports are held comparable. A disappearance of a request after deleting its beneficiary is not evidence about the burden of supporting that request.

One useful comparison fixes a target tuple $\mathbf{R}$ and examines feasible burden profiles in the fibre $\{\mathbf{b} : (\mathbf{R}, \mathbf{b}) \in \mathcal{J}_z\}$. Another fixes a protection bound for the bearers and compares which repertoire tuples remain supportable. These answer different questions and should not be merged into one index.

A causal contribution claim additionally requires an intervention interpretation. Removing a support practice while permitting a documented substitute tests replaceability; removing every substitute tests dependence on the whole support class. Both can be informative. Their results do not identify a unique additive share of causal credit.

10.5 Authority Changes

A participant may be able to transform z itself. A funding decision can alter the available carrier set; a procedural reform can change recognized requests; a technical change can alter observations or action interfaces. Such transformations change $\mathcal{J}_z$, not merely the location of a policy within a fixed relation.

This is the formal place for the generative-rule issue. The relevant question becomes which participants possess executable operations that alter the support relation and which must act within the resulting regime. A snapshot of resources can leave that asymmetry invisible.

11 Feasible Burden Allocations

A restricted allocation model isolates one practical obstruction: sufficient aggregate capacity may be located among bearers who cannot perform the required support. This section derives an exact feasibility criterion for integer service units. The model is an operational projection of the historical account, with fixed task types, incidence, horizon, and authorization.

11.1 Carrier Restrictions

Let I be a finite set of potential bearers and J a finite set of maintenance tasks. Bearer i has a nonnegative integer capacity s_i in one declared service unit; task j requires d_j such units. The relation $E \subseteq I \times J$

identifies permitted and technically feasible assignments. A zero or missing edge can represent absent expertise, unavailable access, or a protected prohibition, provided the interpretation is recorded.

An allocation x_{ij} is a nonnegative integer for $(i, j) \in E$, and zero otherwise. Its feasibility conditions are stated in Equation 5.

$$\sum_{i \in I} x_{ij} = d_j \quad (j \in J), \quad \sum_{j \in J} x_{ij} \leq s_i \quad (i \in I). \quad (5)$$

Equation 5 assumes interchangeable units within each task and a common service unit across the admitted carriers. It does not combine money, authority, emotional exposure, and interpretation into one budget. Multiple nonconvertible resources require a richer feasibility problem.

11.2 Capacity Cuts

For a task subset $U \subseteq J$, write $N(U) = \{i : \exists j \in U, (i, j) \in E\}$. Proposition 11.1 gives a necessary and sufficient condition within this integer model.

Proposition 11.1 (Carrier Capacity Criterion). *An allocation satisfying Equation 5 exists exactly when every task subset $U \subseteq J$ satisfies Equation 6.*

$$\sum_{j \in U} d_j \leq \sum_{i \in N(U)} s_i. \quad (6)$$

Proof. Necessity follows by summing the assigned units for U : they can originate only from $N(U)$.

For sufficiency, replace each task j by d_j unit copies and each bearer i by s_i unit copies. Join every copy pair whose original indices belong to E . Choose a matching with maximal cardinality. Suppose a task copy remains unmatched. Explore alternating paths from all unmatched task copies, crossing unmatched edges toward bearer copies and matched edges back toward task copies. If an unmatched bearer copy were reached, reversing an alternating path would enlarge the matching. Thus every reached bearer copy is matched.

Let T be the reached task copies. Their entire neighbour set is reached: an unmatched edge is traversed directly, and the matched neighbour of a reached task copy is already reached along the alternating path that led to it. The matching pairs every reached bearer copy to a distinct reached task copy, while T contains an unmatched copy. Therefore $|N(T)| < |T|$. Let U be the original task types represented in T . Copies of a task type have identical neighbours, so $|N(T)| = \sum_{i \in N(U)} s_i$, whereas $|T| \leq \sum_{j \in U} d_j$. This contradicts Equation 6. Hence a full task matching exists, and collecting matched copies yields the required integer allocation. $\square$

The criterion in Equation 6 is a familiar matching-style capacity condition, proved here for the declared projection. It is not a new theorem about relational justice. Its role is to reveal which subset of promised supports lacks a sufficient carrier set.

11.3 Aggregate Funding

Suppose a review procedure requires two translation units and one archival unit. Bearer A has capacity three but can perform only archival work; bearer B has capacity one and is the only permitted translator. Total capacity is four and total demand is three. Nevertheless, the translation subset violates Equation 6: demand two exceeds accessible capacity one.

Increasing A 's capacity further does not repair that obstruction. Training another translator, recognizing a different translation provider, or changing an unnecessarily restrictive authorization rule can. Those remedies affect different parts of the model and require different institutional justification.

The example clarifies why allocating more resources to an institution need not enlarge a claimant's practical repertoire. The resources must reach an admissible support path. Conversely, an incidence restriction may protect confidentiality or professional competence. Removing it solely to satisfy a capacity inequality can sacrifice another legitimate requirement.

11.4 Protected Bearer Floors

A bearer may need part of its capacity for its own protected functions. Let f_i be a justified reserve with $0 \leq f_i \leq s_i$. Replacing s_i by $s_i - f_i$ in Equation 6 gives the exact feasibility test after those reserves are protected.

A failure of that test identifies incompatible commitments within the projection. It does not choose among increasing capacity, reducing demands, changing admissible assignments, or revising the reserve. Those choices require practical and normative arguments. In particular, feasibility should not be restored automatically by consuming the weakest bearer's reserve.

11.5 Projection Limits

The model freezes identities, units, requirements, and incidence. It omits learning, fatigue, scheduling incompatibility, quality variation, and changes to the rules themselves. Those omissions explain its position within the paper: it is one transparent local diagnostic, not the principal ontology of revisability.

A richer model can make the carrier relation history-dependent or generated by field interactions. Before doing so, the analyst should specify what the added structure explains. A complicated representation is warranted when it changes an inference about support, burden, or authority, rather than merely supplying additional symbols.

12 Operational History Algebra

The algebraic model represents executable continuations and their order. Its objective is to distinguish a containing mathematical algebra from the operations available to a participant. It also gives a precise criterion for deciding when a compressed record preserves revision operations.

12.1 History Space

Choose a finite, prefix-closed set H of labelled histories, truncated at a declared maximum number of events. Prefix closure retains the represented history preceding each event. Let $\mathcal{H} = \ell^2(H)$ be the finite-dimensional complex Hilbert space with orthonormal basis $|h\rangle$, one vector for each history.

For each action type a in a finite alphabet A , let u_a be a partial extension map on H . Its domain records boundary compatibility, authority, resource availability, and the truncation limit. The associated operator is defined in Equation 7.

$$L_a|h\rangle = \begin{cases} |u_a(h)\rangle, & h \in \text{dom}(u_a), \\ 0, & h \notin \text{dom}(u_a). \end{cases} \quad (7)$$

The zero vector in Equation 7 denotes an unavailable represented operation. It is distinct from a social outcome of failure; such an outcome would require its own labelled history. Full histories make the extension injective when the appended occurrence includes its provenance. Operational projections need not preserve that injectivity.

A word $a_1 \cdots a_k$ acts through $L_{a_k} \cdots L_{a_1}$, with the rightmost operator acting first. The multiplication order is fixed here to prevent ambiguity. Event order and participant authority remain in the labels and domains.

12.2 Available Operations

The matrix algebra generated by the L_a , their adjoints, and the identity is denoted $\mathfrak{A} \subseteq \mathcal{B}(\mathcal{H})$. This is a finite-dimensional $*$ -algebra. Its closure properties are mathematical. An arbitrary linear combination of two operations need not be an institutionally available operation, and an adjoint need not reverse a historical process.

Let $\mathcal{O}_i(z, h)$ instead denote the set of action words that participant i can execute from h under regime z , including any required joint authorizations. This operational set is constrained by admissibility at every prefix. Its images lie in the containing algebra, but it is not generally itself an algebra.

The distinction is decisive for unequal revisability. Two participants can be represented in the same $\mathfrak{A}$ while possessing different $\mathcal{O}_i(z, h)$. A mathematical capacity to write a reversal does not give either participant access to the resources, permissions, or records needed to implement it.

An amendment action changes a rule label in the boundary and consequently changes the domains of later u_a . The history-space construction can therefore represent changes in the conditions of later operations. It need not restrict analysis to evolution on a fixed menu of institutionally executable acts, although any finite model still declares an outer vocabulary of represented possibilities.

12.3 Order-Sensitive Protection

A small operational projection isolates the importance of timely protection. Its three statuses are open, protected, and closed. A delay operation D closes an unprotected request, preserves a protected request, and leaves closure irreversible. A stay operation S protects an open request, preserves existing protection, and cannot reopen a closed request.

Using the ordered basis $(|o\rangle, |p\rangle, |c\rangle)$, their matrices are given in Equation 8.

$$D = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{pmatrix}, \quad S = \begin{pmatrix} 0 & 0 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}, \quad (DS - SD)|o\rangle = |p\rangle - |c\rangle. \quad (8)$$

Equation 8 follows by direct multiplication. Granting protection before delay yields $DS|o\rangle = |p\rangle$; granting it after delay yields $SD|o\rangle = |c\rangle$. The model is a deterministic administrative-status example, not quantum noncommutativity. Its purpose is to make a familiar sequencing issue explicit.

A full history lift records both event words even when their status projections coincide. This retains who requested the stay, who could authorize it, and what work occurred during delay. A protection operator exists in the model only because its institutional meaning has been stipulated. An application must establish whether a real stay actually preserves the threatened alternative.

12.4 Operational Compression

Let $q : \mathbf{H} \rightarrow \overline{\mathbf{H}}$ be a surjective record map. Its linear extension $Q : \mathcal{H} \rightarrow \ell^2(\overline{\mathbf{H}})$ sends $|h\rangle$ to $|q(h)\rangle$. The question is whether an operation can be performed on the reduced record without recovering the discarded history.

Proposition 12.1 states the exact finite linear criterion.

Proposition 12.1 (Operation-Preserving Reduction). *An operator T on $\mathcal{H}$ has an induced operator $\overline{T}$ satisfying Equation 9 if and only if $T(\ker Q) \subseteq \ker Q$.*

$$QT = \overline{T}Q. \quad (9)$$

Proof. If Equation 9 holds and $v \in \ker Q$, then $QTv = \overline{T}Qv = 0$, proving invariance. Conversely, define $\overline{T}(Qv) = QTv$. If $Qv = Qw$, then $v - w \in \ker Q$ and invariance gives $QT(v - w) = 0$. Thus the definition is independent of the representative. It is linear and defined on the entire reduced space because Q is surjective. $\square$

The criterion in Proposition 12.1 must hold for every operation claimed to survive compression. For deterministic partial extensions, histories merged by q must have matching definedness and equivalent successors. A record can preserve current status while failing this future-operation test.

The prior potential-effects manuscript already develops joint historical and predictive records and emphasizes compatible continuation [11]. The present result is a finite operator formulation adapted to burden and authority. It does not announce the general insight that current-state storage can erase history.

13 Burden Observables

This section adds measured burden coordinates to the history algebra. Its objective is to show which distributional distinctions an aggregate description discards and to derive the accounting relation for composed operations. These observables apply to declared gross-use quantities, not to power or moral worth.

13.1 Participant-Indexed Registers

For each participant i and resource kind r , use the cumulative quantity $B_{ir}(h)$ from Equation 3. Define the diagonal self-adjoint operator D_{ir} by Equation 10.

$$D_{ir}|h\rangle = B_{ir}(h)|h\rangle. \quad (10)$$

Equation 10 represents an accounting query on histories. A classical probability distribution over those histories can be encoded as a diagonal density matrix, but such encoding adds no empirical probability model by itself.

For an arbitrary operator T , define $\delta_{ir}(T) = [D_{ir}, T]$. This commutator measures changes in the recorded quantity across the transitions represented by matrix entries. Its entries are stated in Equation 11.

$$\delta_{ir}(T)_{kh} = (B_{ir}(k) - B_{ir}(h))T_{kh}. \quad (11)$$

For a licensed extension, Equation 11 records the additional gross use. Negative entries associated with adjoints are algebraic differences; they do not license recovery of past time or historical erasure.

13.2 Compositional Accounting

Proposition 13.1 states the exact composition law.

Proposition 13.1 (Burden Derivation). *For operators $U, T \in \mathcal{B}(\mathcal{H})$, the burden commutator obeys Equation 12.*

$$\delta_{ir}(UT) = \delta_{ir}(U)T + U\delta_{ir}(T). \quad (12)$$

Proof. Expand the right-hand side as $(D_{ir}U - UD_{ir})T + U(D_{ir}T - TD_{ir})$. The two middle terms cancel, leaving $D_{ir}UT - UTD_{ir}$, which is the left-hand side. $\square$

Equation 12 is a standard inner-derivation identity. Its value here lies in the interpretation of the register: a composed revision can distribute additional use among several participants even when its terminal institutional outcome is unchanged. The proposition supplies accounting consistency, not a theory of causal attribution.

13.3 Aggregate Indistinguishability

Suppose two histories h_A and h_B reach the same current boundary and record the same total of one service unit. In h_A , participant A supplied it; in h_B , participant B supplied it. A reduced record retaining only the terminal boundary and total use merges them.

Proposition 13.2 makes the loss exact.

Proposition 13.2 (Burden Register Descent). *The operator D_{ir} descends through the record map Q of Section 12 if and only if B_{ir} is constant on each fibre of q .*

Proof. If $q(h) = q(k)$, the vector $|h\rangle - |k\rangle$ lies in $\ker Q$. Applying QD_{ir} to it gives $(B_{ir}(h) - B_{ir}(k))|q(h)\rangle$. Kernel invariance therefore requires equal values. Conversely, when the values are constant on fibres, define the reduced diagonal operator using that common value. It satisfies Equation 9. $\square$

By Proposition 13.2, the aggregate record in the example preserves total use while losing participant-specific use. An unchanged total therefore cannot establish unchanged burden incidence. If later protection depends on which participant has already supplied work, the same compression can also violate Proposition 12.1 for future actions.

13.4 Accessible Evidence

An observer may have access to only some elements of the containing algebra. A beneficiary's reporting interface may expose terminal success and total expenditure while hiding the bearer register. A claimant's own records may expose repeated work while omitting the institution's alternative procedures. Agreement on accessible observations can therefore coexist with disagreement about a larger historical model.

The author's prior topology manuscript separates a represented substrate from its accessible algebra and warns against inferring hidden structure from accessible fit alone [15]. The present use is narrower: it gives an explicit distributional example of information loss. It does not import a general claim that every inaccessible history is unidentifiable under every possible intervention.

Additional observation or a redesigned record can expose the difference. The relevant choice is practical and normative as well as technical. Recording every burden indefinitely can create surveillance and privacy risks. An adequate record should preserve the distinctions needed for accountable revision under a defensible access and retention policy.

13.5 Rights Beyond Registers

The burden operator cannot determine whose work was voluntary, whether its distribution was justified, or what remedy is owed. Those judgments depend on permissions, reasons, conditions of refusal, and historical commitments. A perfectly accurate register can coexist with arbitrary control.

The algebra helps locate the missing information. If two histories agree on recorded use but differ in legitimate authority, authority labels or relevant institutional observations must be retained. This is a methodological requirement to represent the object being evaluated, not a promise that one finite algebra can encode every morally relevant feature.

14 Interacting Support Fields

The preceding models retain a declared family of histories or a fixed allocation interface. This section introduces a generative field construction in which interactions can assemble different incidence structures. Its purpose is to investigate mediated support without reducing a whole participant to a scalar state. The model is finite, explicitly regulated, and one possible GR-compatible representation.

14.1 Field Domain

Let G be a finite group of order n . Let $\mathcal{V}$ be the real vector space of functions on G^2 invariant under simultaneous right multiplication. The inner product and invariance condition are fixed in Equation 13.

$$\langle f, k \rangle = \frac{1}{n^2} \sum_{x, y \in G} f(x, y) k(x, y), \quad f(xa, ya) = f(x, y) \quad (a \in G). \quad (13)$$

The norm induced by Equation 13 is denoted $\|f\|$. The fields $\varphi, \psi, \chi \in \mathcal{V}$ describe two supported role configurations and a mediating support configuration. They are functions over relational boundary labels, not three scalar people. Their labels acquire institutional meaning only through a separately defended realization.

The finite group supplies a controlled algebraic domain. It can index symmetries of a chosen representation; it does not establish that institutions possess a physical gauge symmetry. Changing the group can change the representable configurations and therefore requires a preservation argument.

14.2 Cyclic Interaction

Define the bilinear map $\mathcal{C} : \mathcal{V} \times \mathcal{V} \rightarrow \mathcal{V}$ by Equation 14.

$$\mathcal{C}(\varphi, \psi)(y, z) = \frac{1}{n} \sum_{x \in G} \varphi(x, y) \psi(z, x), \quad \langle \chi, \mathcal{C}(\varphi, \psi) \rangle = \frac{1}{n^3} \sum_{x, y, z \in G} \varphi(x, y) \chi(y, z) \psi(z, x). \quad (14)$$

Reindexing x by xa proves invariance of the output under $(y, z) \mapsto (ya, za)$. Equation 14 therefore closes on the declared field space. Its cyclic index identification is the structural content of the interaction: the three fields meet through a specified pattern of shared arguments.

Let K_φ, K_ψ be self-adjoint operators on $\mathcal{V}$, and let M be self-adjoint with $M \geq m \text{ id}$ for a constant $m > 0$. These operators are kinetic kernels. Their inverses are covariances only when the corresponding Gaussian reference is positive. The two K operators may have negative modes in the full interacting model; the quartic terms below control large amplitudes.

For real g and positive u, v , define the action in Equation 15.

$$\begin{aligned} \mathcal{S}(\varphi, \psi, \chi) = & \frac{1}{2} \langle \varphi, K_\varphi \varphi \rangle + \frac{1}{2} \langle \psi, K_\psi \psi \rangle + \frac{1}{2} \langle \chi, M \chi \rangle \\ & - g \langle \chi, \mathcal{C}(\varphi, \psi) \rangle + \frac{u}{4} \|\varphi\|^4 + \frac{v}{4} \|\psi\|^4. \end{aligned} \quad (15)$$

The quartic terms in Equation 15 are declared stabilizers, not a measured law of social saturation. Other invariant interactions can be considered, provided their analytical role and stability are established.

14.3 Mediator Elimination

The field χ can be integrated exactly because its dependence in the action is Gaussian once φ, ψ are fixed. Let $d = \dim \mathcal{V}$ and use Lebesgue measure in an orthonormal basis. Completing the square gives the effective action in Equation 16.

$$\begin{aligned} \mathcal{S}_{\text{eff}}(\varphi, \psi) = & \frac{1}{2} \langle \varphi, K_\varphi \varphi \rangle + \frac{1}{2} \langle \psi, K_\psi \psi \rangle + \frac{u}{4} \|\varphi\|^4 + \frac{v}{4} \|\psi\|^4 \\ & - \frac{g^2}{2} \langle \mathcal{C}(\varphi, \psi), M^{-1} \mathcal{C}(\varphi, \psi) \rangle. \end{aligned} \quad (16)$$

Equation 16 contains an induced interaction between the supported configurations. Its kernel retains the mediation structure through M^{-1} . Eliminating the support field from the description therefore leaves a dependence in the effective model.

This is a useful philosophical warning with a precise mathematical instance. A reduced account can make the beneficiary's response appear autonomous while incorporating the eliminated support into its coefficients. The calculation does not show that every apparently autonomous capacity has this form. It shows exactly how such a dependence can arise in one declared construction.

The corresponding integral identity is Equation 17.

$$\int_{\mathcal{V}} e^{-\mathcal{S}(\varphi, \psi, \chi)} d\chi = \frac{(2\pi)^{d/2}}{\sqrt{\det M}} e^{-\mathcal{S}_{\text{eff}}(\varphi, \psi)}. \quad (17)$$

The determinant in Equation 17 is computed on the invariant field space. Appendix A gives the square completion and normalization explicitly.

14.4 Stability Domain

The cyclic contraction satisfies a norm bound. Proposition 14.1 uses it to establish a sufficient stability domain.

Proposition 14.1 (Finite Field Stability). *If $uv > g^4/m^2$, the integral of $e^{-\mathcal{S}}$ over $\mathcal{V}^3$ is finite and positive, and the action has compact sublevel sets.*

Proof. Cauchy–Schwarz in the x sum of Equation 14, followed by the normalized y, z sums, gives $\|\mathcal{C}(\varphi, \psi)\|^2 \leq \|\varphi\|^2 \|\psi\|^2$. Since $\|M^{-1}\| \leq 1/m$, the quartic part of Equation 16 is bounded below by $(uX^2 + vY^2 - 2g^2XY/m)/4$, where $X = \|\varphi\|^2$ and $Y = \|\psi\|^2$. The symmetric matrix with diagonal u, v and off-diagonal $-g^2/m$ is positive definite under the stated condition. Thus this quartic expression dominates a positive multiple of $X^2 + Y^2$.

In finite dimension, the quadratic terms are bounded below by a negative constant times $X + Y$. The quartic bound therefore makes $e^{-\mathcal{S}_{\text{eff}}}$ integrable. Equation 17 proves integrability of the full density, whose positivity gives a positive integral. Square completion writes the remaining term as $\frac{1}{2}\|\chi - gM^{-1}\mathcal{C}(\varphi, \psi)\|_M^2$, where $\|w\|_M^2 = \langle w, Mw \rangle$. An action sublevel bounds φ, ψ , then the shifted χ , and hence χ itself. Closedness and finite dimension give compactness. $\square$

Proposition 14.1 is sufficient, not necessary for every possible kernel. At equality or beyond it, this proof ceases to establish stability. Higher-order interactions or a different parameter regime may repair the model, but should be analyzed explicitly.

14.5 Generated Complexes

Expanding interactions around a chosen positive Gaussian reference pairs field arguments through propagators and cyclic vertices. The resulting stranded diagrams carry faces following repeated indices and edges following propagations. Different diagrams can have different incidence structures. This is the generative role inherited from the prior GR group-field architecture [14].

If either K is indefinite, use a positive reference kernel and include the difference in the interaction. The expansion is formal; convergence of the full finite integral does not establish convergence of its perturbation series. The stabilizing quartic interactions can also produce signed coefficients in that series.

A diagram becomes a support history only after an extraction assigns boundaries, participant regions, labels, and an admissible occurrence order. Some generated diagrams will fail that extraction. The model does not silently interpret every loop as a temporally possible institutional process, or every amplitude as a frequency.

The field description can consequently investigate generated support structure while preserving GR's distinction between formal representation and relational reality. Demonstrating an actual institutional realization remains a substantive research obligation.

15 Nonlinear Field Response

The interacting action supports a dynamical investigation beyond linear evolution on a fixed social state vector. This section derives its nonlinear gradients, establishes a conditional dissipation result, and examines a homogeneous sector with a change in restoring behaviour. The sector illustrates model consequences; it does not measure trust, power, or justice.

15.1 Field Gradients

Let $\mathcal{C}_\psi$ be the linear map $\delta\varphi \mapsto \mathcal{C}(\delta\varphi, \psi)$, and let $\mathcal{C}_\varphi$ be the map $\delta\psi \mapsto \mathcal{C}(\varphi, \delta\psi)$. Their adjoints are defined using Equation 13. The gradients of the full action are given in Equation 18.

$$\begin{aligned}\nabla_\varphi \mathcal{S} &= K_\varphi \varphi + u\|\varphi\|^2 \varphi - g\mathcal{C}_\psi^* \chi, \\ \nabla_\psi \mathcal{S} &= K_\psi \psi + v\|\psi\|^2 \psi - g\mathcal{C}_\varphi^* \chi, \\ \nabla_\chi \mathcal{S} &= M\chi - g\mathcal{C}(\varphi, \psi).\end{aligned}\tag{18}$$

Equation 18 retains nonlinear coupling between configurations and their mediating field. Appendix A derives the normalized adjoint sums. The cubic and quartic terms are essential to the stated dynamics; replacing them by an unqualified linear law would change the model.

Choose positive mobilities $\kappa_\varphi, \kappa_\psi, \kappa_\chi$ and a model parameter τ . A gradient dynamics is defined by Equation 19.

$$\frac{df}{d\tau} = -\kappa_f \nabla_f \mathcal{S}, \quad f \in \{\varphi, \psi, \chi\}. \quad (19)$$

The parameter in Equation 19 may index a mathematical relaxation procedure or a proposed temporal model. It is not automatically an institutional or bodily clock. The kinetic and interaction data also remain fixed during this particular flow; rule-changing interventions require a further law.

15.2 Dissipation

Proposition 15.1 states the resulting global existence and energy identity.

Proposition 15.1 (Dissipative Field Evolution). *Within the stability domain of Proposition 14.1, every finite initial field configuration has a global forward solution of Equation 19. Along that solution, Equation 20 holds.*

$$\frac{d\mathcal{S}}{d\tau} = - \sum_{f \in \{\varphi, \psi, \chi\}} \kappa_f \|\nabla_f \mathcal{S}\|^2 \leq 0. \quad (20)$$

Proof. The vector field is polynomial in a finite-dimensional space, hence locally Lipschitz. The chain rule and Equation 19 give Equation 20. The trajectory remains in the initial action sublevel, which is compact by Proposition 14.1. A locally Lipschitz solution confined to a compact region can be continued past every finite forward time because its derivative remains bounded there. Thus finite-time escape is impossible. $\square$

Equation 20 does not prove that every trajectory converges to the same configuration, that institutional burdens fall, or that the resulting arrangement is desirable. The action is a specified model functional, not social welfare. Its decrease has precisely the meaning supplied by the construction.

15.3 Homogeneous Sector

Assume the constant function is an eigenvector of each kinetic kernel, with eigenvalues μ_φ, μ_ψ, m respectively. Constant fields $\varphi = a$, $\psi = b$, and $\chi = c$ then form an invariant sector of the full dynamics. The effective potential after static elimination of c is Equation 21.

$$V(a, b) = \frac{\mu_\varphi}{2} a^2 + \frac{\mu_\psi}{2} b^2 + \frac{u}{4} a^4 + \frac{v}{4} b^4 - \frac{\gamma}{2} a^2 b^2, \quad \gamma = \frac{g^2}{m}. \quad (21)$$

Equation 21 is a two-mode projection of fields on a group domain. The amplitudes describe constant field configurations within that projection. They are not scalar measures of entire actors or their capacities.

The stationary conditions are stated in Equation 22.

$$a(\mu_\varphi + ua^2 - \gamma b^2) = 0, \quad b(\mu_\psi + vb^2 - \gamma a^2) = 0, \quad c = \frac{g}{m} ab. \quad (22)$$

Equation 22 permits configurations sustained through mutual coupling even when one uncoupled mode would have positive restoring curvature. It supplies a concrete sense in which support can alter what configurations are sustainable.

15.4 Restoring-Mode Change

Set $\mu_\varphi = -1$ and retain $u, v > 0$ with $uv > \gamma^2$. On the branch with $a \neq 0$, minimization over a gives $a^2 = (1 + \gamma b^2)/u$. Substitution into Equation 21 gives Equation 23.

$$V_{\text{red}}(b) = -\frac{1}{4u} + \frac{1}{2} \left(\mu_\psi - \frac{\gamma}{u} \right) b^2 + \frac{1}{4} \left(v - \frac{\gamma^2}{u} \right) b^4. \quad (23)$$

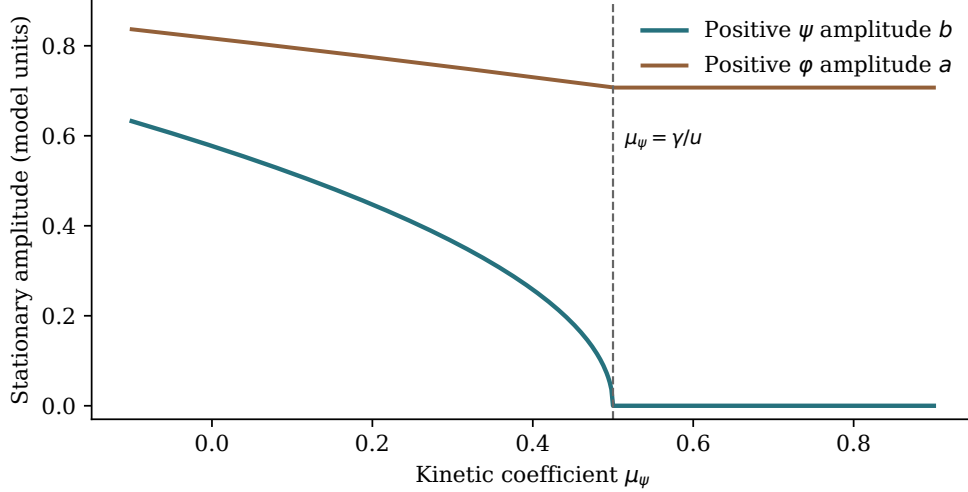


Figure 2: Illustrative Homogeneous Field Branch. The plot uses $u = v = 2$, $\gamma = 1$, and $\mu_\varphi = -1$. Amplitudes label a restricted stationary field sector; they are not measured participant capacities.

The quartic coefficient in Equation 23 is positive within the stated stability domain. The curvature at $b = 0$ changes sign at $\mu_\psi = \gamma/u$. The nonzero stationary branch is therefore given by Equation 24.

$$b^2 = \frac{\gamma/u - \mu_\psi}{v - \gamma^2/u} \quad \text{when } \mu_\psi < \gamma/u, \quad a^2 = \frac{1 + \gamma b^2}{u}. \quad (24)$$

Equations 23 and 24 are exact stationary reductions. A dynamical law that continually replaces a and c by their conditional minima requires a separate fast-relaxation assumption. The stationary calculation alone does not establish that approximation.

Figure 2 shows the positive stationary branch for one illustrative parameter choice. The change in curvature is a specific model mechanism. Ordinary administrative delay or rapid institutional change need not instantiate it.

15.5 Institutional Interpretation

The model suggests a disciplined empirical question: can the reproduction of a support configuration depend on an interaction whose removal changes a restoring mode or an attainable branch? Answering it requires a target interpretation for the fields, kernels, perturbations, and observation channel. Similar-looking time series cannot supply those identifications by themselves.

Burden incidence remains additional information even after the field parameters are identified. Two realizations can share an effective potential while assigning the work of maintaining χ to different participants. The beneficiary's response alone then underdetermines who sustains it. A field theory adequate to the present problem must connect generated histories to the bearer labels and authority operations of the earlier sections.

Rule changes can also alter the interaction kernel or admissible diagram family, rather than merely shift field amplitudes. The present model leaves the endogenous law for such kernel change open. It nonetheless makes the distinction explicit, avoiding a claim that all relational transformation occurs on one fixed background.

16 Generated History Ensembles

A field integral, a formal diagram expansion, and a probability distribution over institutional histories are different constructions. This section specifies a positive finite history ensemble and derives its burden-

response identity. It then states the additional interface needed to connect that ensemble to a generative field model.

16.1 Positive History Sector

Fix a finite nonempty family H_z of admissible labelled histories, with positive reference weights $w_z(h)$. Histories can have different numbers of cells and different incidence structures. Let the multi-index $\alpha = (i, r)$ refer to a measured burden coordinate $B_\alpha(h)$, and let s_α be a real source parameter with reciprocal units.

The partition sum and normalized distribution are defined in Equation 25.

$$Z_z(\mathbf{s}) = \sum_{h \in H_z} w_z(h) e^{-\sum_\alpha s_\alpha B_\alpha(h)}, \quad p_{\mathbf{s}}(h) = \frac{w_z(h) e^{-\sum_\alpha s_\alpha B_\alpha(h)}}{Z_z(\mathbf{s})}. \quad (25)$$

Finiteness and positivity make Equation 25 a probability distribution. The sources express an exponential reweighting of the declared ensemble. They are not automatically policy instruments, prices, or causal effects of compensation.

Let $A_q(h) \in \{0, 1\}$ indicate whether request q is operationally supported at the specified point of history h . Its construction uses the request and support semantics of Section 10. A visible successful outcome should not be substituted for an unobserved capacity without justification.

16.2 Response Identity

For any fixed real observable O on H_z , define its expectation using $p_{\mathbf{s}}$. Proposition 16.1 gives the derivative with respect to a burden source.

Proposition 16.1 (Burden-Source Response). *The finite ensemble satisfies Equation 26.*

$$\frac{\partial \log Z_z}{\partial s_\alpha} = -\mathbb{E}_{\mathbf{s}}[B_\alpha], \quad \frac{\partial \mathbb{E}_{\mathbf{s}}[O]}{\partial s_\alpha} = -\text{Cov}_{\mathbf{s}}(O, B_\alpha). \quad (26)$$

Proof. Differentiate the finite sum term by term. Its derivative is the sum of each weight multiplied by $-B_\alpha$. Dividing by Z_z gives the first identity. Differentiating the expectation's numerator and denominator gives $-\mathbb{E}[OB_\alpha] + \mathbb{E}[O]\mathbb{E}[B_\alpha]$, which is the second identity. $\square$

Equation 26 shows why a universal sign claim would be unwarranted. If availability of q is positively associated with a particular bearer's work, suppressing histories with more of that work reduces ensemble availability. If high burden occurs mainly in histories where q is unavailable, the sign reverses.

16.3 Illustrative Comparisons

Consider three equally weighted histories with (A_q, B_B) equal to $(0, 0)$, $(1, 1)$, and $(1, 2)$. At zero source, availability is $2/3$ and the covariance is $1/3$. Its derivative with respect to the source on B 's work is therefore $-1/3$. This is an exact finite sensitivity calculation.

For a contrasting ensemble with histories $(1, 0)$ and $(0, 2)$, the covariance is $-1/2$ at zero source. Increasing the burden source increases the relative weight of the history in which the request is available. The examples establish that the sign depends on the represented association.

Neither example establishes what would happen if a real institution stopped demanding work. Such an intervention can change available histories, reference weights, request meanings, and authority. A source derivative holding all those objects fixed is a different estimand. This distinction is required even when an exponential family fits observed data well.

Appendix B records the reproducible checks for these examples and the other formal constructions.

16.4 Generative Interface

A formal field diagram can be mapped to a labelled complex by an extraction $\mathcal{E}$, then tested against temporal, semantic, and operational requirements. To obtain Equation 25 from such a model, one must additionally specify how accepted diagrams yield positive weights on H_z , how equivalent diagrams are counted, and how excluded diagrams are handled.

The signed perturbative coefficients of Section 14 do not automatically meet these conditions. Squaring an amplitude, taking its absolute value, or truncating negative terms changes the model and requires justification. The positive ensemble here is therefore an independently declared representation. Its covariance identity is not attributed to an unproved equivalence with the interacting field.

This separation preserves methodological pluralism within formal inquiry. A generative field can investigate incidence production; a history algebra can investigate executable composition; a positive ensemble can investigate conditional response; a qualitative account can investigate meaning and authority. Their coordination requires explicit preservation relations.

16.5 Observational Limits

A fit to beneficiary outcomes may fail to identify burden incidence, just as the aggregate quotient in Section 13 does. The ensemble should therefore include observations capable of distinguishing alternative bearer assignments when that distinction matters.

Even then, data can support several causal models. A high-burden history may reflect difficult cases rather than imposed work that sustains another's discretion. Estimation should separate selection into an arrangement from the effects of its rules. The formalism supplies a vocabulary for declaring these questions; it does not remove their evidential difficulty.

17 Institutional Configurations

The following configurations are hypothetical analytical illustrations. Their purpose is to compare mechanisms while holding the support question visible. They are not reported empirical cases, assessments of current law, or evidence that a particular field model describes an institution.

17.1 Administrative Reconsideration

An agency retains authority to revise an eligibility decision while requiring the claimant to keep producing updated documents. The agency benefits from a continuing ability to reconsider without maintaining a complete internal record. The claimant bears retrieval work, interruption, and uncertainty while an alternative opportunity approaches its deadline.

The first analytical task is to identify the protected function. Updated information may be necessary for an accurate decision, while repeated requests for unchanged material may be avoidable. A comparison that abolishes verification altogether would mix burden reduction with loss of the declared function. A more informative comparison preserves appropriate verification while changing custody, retrieval, or responsibility for updating.

The second task concerns authority. If the agency can repeatedly redefine adequate documentation and alone decides whether the resulting burden warrants relief, the claimant's revision capacity depends on the beneficiary's discretion. Independent review could change that relation. It will be ineffective, however, if the reviewer receives the same incomplete record or cannot suspend the deadline.

The third task concerns historical residue. A successful final decision may leave the claimant with lost work, depleted funds, or a missed alternative. Those effects need their own evaluation. They should neither be erased by the successful outcome nor automatically treated as proof that the entire procedure was unjust.

17.2 International Programme Finance

Consider a hypothetical international programme in which a donor retains discretion to revise funding priorities while a recipient administration must preserve staff, monitoring systems, and implementation readiness. The recipient's own local partners may in turn retain facilities and suspend alternative projects. The donor's apparent flexibility is supported through several organizational layers.

The state-level description can conceal this incidence. A recipient government may formally agree to the arrangement while local maintainers have little influence over its terms. Conversely, a recipient administration may use external conditions to impose restrictions it independently prefers. Attribution should therefore trace the actual decision chain rather than assign every burden to the donor by definition.

A credible comparison could provide a bounded financing commitment, fund agreed standby costs, or allow portability of infrastructure to another programme. Each changes the support relation differently. Funding standby work may protect present capacity while leaving unilateral amendment authority intact. Portability may improve future alternatives while creating transition costs for current beneficiaries.

The IR significance is a distributional question internal to cooperation. An arrangement can achieve an agreed programme objective while allocating the costs of continued flexibility asymmetrically. Institutional effectiveness, mutual benefit relative to no programme, and justified revision authority are distinct evaluative claims.

17.3 Verification Cooperation

Suppose two parties establish a joint verification process for a sensitive agreement. One has extensive technical infrastructure; the other relies on a small team and externally provided equipment. Formally identical reporting requirements can consume very different shares of their usable capacity.

The asymmetry need not establish a wrong. Comparable evidence may be necessary, and technical assistance can be a legitimate way to support it. The relevant question is whether the arrangement preserves the less resourced party's practical ability to challenge an interpretation, request correction, or contest a new requirement.

Assistance itself can alter dependence. If equipment, expertise, and archives remain controlled by the party whose interpretation is disputed, the support relation can narrow independent review. A remedy might include plural custody or jointly authorized technical support. Such measures have costs and may create confidentiality risks; they need a case-specific justification.

A future empirical study would have to distinguish deliberate leverage from genuine verification needs, common security constraints, and the effects of technical specialization. The present configuration defines comparison questions without asserting a historical finding.

17.4 Shared Care

A care arrangement preserves a dependent person's ability to change routines, seek treatment, or reconsider living arrangements. A caregiver remains available and postpones other activities. The beneficiary may have little control over the wider system that makes the burden fall on that caregiver.

Treating the relation solely as optionality extraction would misidentify both agency and responsibility. The support can be valuable and legitimately asymmetric. The relevant failure may lie in the absence of replacement care, income protection, accessible housing, or collective provision. Relief that simply removes the caregiver's obligation can destroy the dependent person's effective alternatives.

A support-sensitive remedy therefore investigates both repertoires. It can preserve the beneficiary's choices while broadening the caregiver's access to rest, renegotiation, and substitution. The configuration is a counterexample to any inference that whoever benefits from another's restricted alternatives necessarily controls or wrongfully imposes the restriction.

Table 2: Hypothetical Support Configurations

Configuration	Preserved Choice	Support Bearer	Distinctive Question
Administrative review	Reconsider a decision	Claimant and record staff	Can review protect the option before its deadline?
Programme finance	Revise funding direction	Recipient and local partners	Who supports standby capacity across organizational layers?
Verification	Reinterpret compliance	Reporting and technical teams	Is independent challenge practically supported?
Shared care	Revise care arrangements	Carers and public services	Can both beneficiary and carer retain justified alternatives?
Platform change	Revise an interface	Dependent organizations	Can adaptation burdens and portability rules be contested?

17.5 Platform Revision

A platform can preserve its capacity to change a technical interface while requiring dependent organizations to keep adapting their systems. The burden includes maintenance labour, repeated retraining, and the preservation of compatibility. A formally available exit option may be weakened by historical data formats and accumulated user relationships.

The platform can have legitimate reasons to revise the interface, including security, reliability, and new functionality. The dispute concerns the allocation of transition work, the notice period, portability, and authority to challenge repeated changes. Freezing all innovation would be a different intervention from making its support burden contestable.

This example also illustrates the distinction between a field parameter and an institutional mechanism. An abstract model of interacting support configurations may capture changing compatibility. It becomes useful only if it preserves the concrete paths through which participants acquire or lose the capacity to adapt. An effective fit to platform performance alone would leave burden incidence underidentified.

17.6 Comparative Structure

Table 2 identifies the common analytical coordinates while preserving differences among the configurations.

The comparison does not claim that one mechanism exhausts each case. Its value is to direct evidence collection toward the relation connecting a preserved choice to its supporting history.

18 Protective Arrangements

A support-sensitive diagnosis should distinguish remedies according to the relation they change. This section develops protective arrangements for consideration, explains their possible failure modes, and connects them to the normative argument of Section 8. None is offered as a universal institutional prescription.

18.1 Bounded Obligations

A support obligation can specify its purpose, duration, revision conditions, and permissible expansion. A bounded commitment allows the bearer to organize other activities and allows the beneficiary to rely on a declared level of support. The boundary can be revised where reasons warrant, but the procedure for changing it should itself be identifiable.

A nominal time limit can fail if every new request restarts it or if the beneficiary can declare exceptional circumstances without review. Effective limits therefore depend on the authority and evidence needed to invoke an extension. The objective is a credible relation between commitment and revision, rather than a particular number of days.

Some contexts require open-ended care or continuing public obligations. In those cases, bounding the individual bearer's exposure may require replacement arrangements rather than ending the supported function. The unit of limitation should follow the source of the burden.

18.2 Independent Support

Independent expertise, funding, and records can make contestation less dependent on the beneficiary of the disputed rule. Their independence is functional: the relevant participant must be able to invoke them when the dispute arises. Mere organizational separation does not establish that condition.

Funding may be withheld, records may remain inaccessible, or assistance may arrive after the critical window. Protection therefore requires an executable path with adequate timing. In the algebraic example, the stay must be available before delay closes the request; writing the operator after closure does not restore its lost function.

Independent support can also create new burdens. Multiple records require coordination, independent review consumes resources, and fragmented authority can make decisions slower. A defensible arrangement should specify which risks it addresses and what additional burdens it creates.

18.3 Bearer Participation

Participants who perform maintenance often possess knowledge about its actual demands and failure points. Their participation can reveal support dependencies missed by a beneficiary-centred account. Participation becomes consequential when this knowledge can affect rules, resources, or the scope of the obligation.

Participation should not become another unfunded support task. Requiring already overburdened people to attend repeated consultation can reproduce the original problem. Protected time, accessible representation, and a clear route from input to decision may therefore be necessary parts of the participation mechanism.

Nor should testimony be reduced to a veto over every change. Others can have legitimate interests in continuity, accuracy, safety, or resource stewardship. The normative requirement is a responsive process with meaningful influence and reasons, not unilateral control by whichever participant speaks as bearer.

18.4 Portable Capacities

A participant's ability to leave or renegotiate can depend on whether expertise, records, relationships, and infrastructure remain usable elsewhere. Portability can reduce dependence without dissolving current cooperation. It can also make continued cooperation more credible by separating it from the absence of alternatives.

Portability is rarely costless. A record may need contextual interpretation, a skill may be institution-specific, and a substitute provider may not preserve the same relation. A practical proposal should identify which capacities can be transferred and which require regeneration. Formal export of data alone need not preserve its evidential or operational value.

An arrangement can also protect partial exit. Participants may change one dimension of cooperation while retaining others. Unbundling can prevent an objection to one obligation from threatening access to every associated good. It can nevertheless sacrifice useful integration, so its benefits and costs require explicit comparison.

18.5 Replenishment

Compensation, rest, replacement staff, and infrastructure renewal can restore the capacity to support a relation. Their effects should be assessed by what they actually replenish. Money may purchase assistance while leaving an expired opportunity unavailable; replacement staff may restore service capacity while losing accumulated local knowledge.

The historical burden register remains relevant after replenishment. It can document unequal exposure, justify recognition or repair, and inform future allocation. Keeping that record is compatible with acknowledging successful restoration of current capacity. The two statements answer different questions.

A compensation rule controlled entirely by the beneficiary can also leave the underlying authority relation intact. The recipient may need to repeatedly prove the cost of the beneficiary's continuing discretion. Repair of the resource position and revision of the governing rule should therefore be considered separately.

18.6 Joint Feasibility

Protective arrangements must be mutually supportable. A right to review, a right to rest, and a promise of continuous service can each be individually attractive while lacking a common feasible policy. Proposition 10.1 and the carrier criterion in Proposition 11.1 identify two restricted forms of this problem.

A failure of joint feasibility calls for revising the institutional design or its commitments. It does not justify silently assigning the residual work to the participant with the least bargaining capacity. Making the conflict explicit creates a basis for public reasons, additional support, or a defensible limitation of some requests.

19 Counterarguments

The proposed object risks both overextension and unnecessary complexity. This section develops the strongest objections to its scope, normative orientation, and formal architecture. The responses identify conditions under which a simpler account would be preferable or the present argument would need revision.

19.1 Ordinary Distribution

A first objection is that the paper merely restates a familiar distributional problem: cooperation has benefits and costs, and these fall unequally. Much of that objection is correct. Burden incidence, effective alternatives, and structural power have established antecedents. A GR vocabulary adds little if it only redescribes unequal shares.

The narrower reason for the present object is that the distributed good includes the capacity to alter the distribution itself. A maintenance obligation can affect who remains able to contest it, while amendment authority can determine whose support counts as available. A snapshot of benefits and costs can omit that recursive relation.

This response defines an explanatory obligation rather than satisfying it in every case. If an ordinary cost-distribution model preserves the relevant history, authority, and future transformation, it may already contain the needed structure. The proposed framework should be evaluated by its distinctions and consequences, not by its name.

19.2 Universal Interdependence

A second objection holds that nearly every capacity depends on others. If dependence is ubiquitous, the account might classify every social relation as burden transfer. The response is to require a specified request, support path, feasible comparison, and authority relation. General social dependence supplies background; it does not establish the focal comparative mechanism.

A public archive, for example, supports many people's capacities. Calling every use a transfer from the archivist would obscure the jointly endorsed organization of the service. A more specific issue arises if one beneficiary can repeatedly expand demands while the maintainers cannot secure limits or preserve their own protected activities. The distinction lies in the arrangement, not in the mere existence of support.

The causal criterion must also accommodate substitutes and complements. A simplistic removal test would incorrectly treat redundant support as causally irrelevant. The joint relation is designed to preserve those possibilities, though applications may require richer counterfactual models than the finite examples.

19.3 Voluntary Commitment

A third objection emphasizes that people legitimately commit their future activity. A promise can reduce later discretion, and another's reliance can make unilateral withdrawal wrongful. A theory that protects every option against commitment would undermine cooperation.

The paper accepts this objection to unrestricted revisability. Its selected repertoires include justified limits, and its normative proposal protects avenues of understanding, contestation, and warranted renegotiation rather than a universal right to costless withdrawal. The nature of the relation and the reliance it has generated matter.

The remaining question concerns the historical conditions of commitment and its later expansion. Consent to a bounded task does not automatically authorize indefinite extensions. An arrangement can also change the conditions under which later consent is given. Those issues require evidence and normative argument; neither voluntariness nor its absence follows from a static signature.

19.4 Beneficial Specialization

A fourth objection argues that unequal support often reflects competence and efficiency. Requiring every party to maintain identical revision capacities can waste resources and weaken a valuable institution.

The present account supports specialization when its justification is adequate. A bearer can perform more work while enjoying secure standing, compensation, and effective influence over the obligation. The relevant comparison concerns these relations rather than equal numerical shares.

An efficiency claim is nevertheless incomplete if its accounting boundary excludes the work shifted to others or the alternatives lost during the support interval. Enlarging the accounting boundary does not prejudice the conclusion. It makes the proposed benefit assessable.

19.5 Formal Overreach

A fifth objection concerns the field model. A finite group, invariant fields, and a cubic contraction may be mathematically coherent while lacking an institutional realization. The objection is decisive against treating the model as empirical evidence or established social ontology.

The model's current role is conditional investigation. It demonstrates how mediated support can leave induced interactions after reduction, how a stable nonlinear sector can exhibit a restoring-mode change, and why generated diagrams require a separate historical interpretation. These are formal possibilities. Their value to a specific institution remains unproved.

The finite allocation and operator constructions have similar limits. Their transparency can be useful for identifying assumptions, but it does not grant them automatic priority over historical or interpretive inquiry. A model should be abandoned or revised if the required reduction erases the relations that explain the case.

19.6 Protective Paternalism

A sixth objection is that protecting a support-bearer's future alternatives can become paternalistic. An external evaluator may reject a demanding commitment that the participant values or impose an unwanted

form of independence.

The proposed response is consequential participation in defining the protection, together with attention to the relation's own goods. A person may reasonably choose dependence, care, or long-term commitment. Protection should not impose a universal ideal of detachable individuals.

At the same time, present endorsement may coexist with limited information or an inability to contest future escalation. An adequate process should preserve room to distinguish a valued commitment from an arrangement whose changing terms the participant cannot challenge. The tension remains substantive; the model does not eliminate it.

19.7 Infinite Support Regress

Every remedy requires support, and every support arrangement can be questioned. This seems to produce an infinite regress. Practically, inquiry needs a declared boundary and an account of residual dependence. Philosophically, the demand is not that every dependency be removed. It is that consequential dependencies relevant to the claim be identified and justified to an adequate level.

A publicly accountable institution can provide a reasonable stopping point for a specific analysis while remaining open to later criticism. The possibility of further inquiry need not prevent a bounded judgment. It prevents the judgment from being mistaken for a final account of the whole relational world.

20 Empirical Identification

The models establish conditional distinctions, not prevalence or causation in actual institutions. This section specifies the evidence needed to investigate a burden-supported revision relation. Its purpose is to connect the philosophical object to research designs without making a data-collection vocabulary stand in for identification.

20.1 Historical Reconstruction

A study should first reconstruct the relevant sequence: formation of the obligation, maintenance practices, changes in requirements, requests for relief, available alternatives, and subsequent outcomes. The sequence can draw on records, interviews, observation, and technical documentation. Each source offers a situated manifestation and may omit important activity.

Version histories matter where requirements change. A final form can conceal earlier requests; a current rule can conceal how access was narrowed; a closed case can omit attempts that never became administratively admissible. The researcher should record those limitations and seek evidence from differently positioned participants.

Participant identity also needs care. Staff turnover, institutional succession, and changing membership can shift the bearer without changing the organization's name. A history that attributes every event to a timeless actor may misidentify both control and responsibility.

20.2 Feasible Comparisons

The comparison arrangement should preserve the declared function while varying the support mechanism of interest. Examples include different record-custody practices, funded versus unfunded standby requirements, alternative review deadlines, or independently supported appeal routes. Each comparison changes particular features and leaves others open.

A comparison can be conceptually coherent yet practically unavailable. Removing a maintenance obligation may require replacement expertise that does not exist. Introducing independent review may alter expectations and strategic conduct throughout the institution. The study should distinguish an ideal benchmark, a feasible institutional alternative, and an identifiable causal intervention.

The source-parameter derivative in Equation 26 holds the history family and reference weights fixed. A real reform can change both. Using that derivative as an empirical treatment effect without an additional causal model would therefore be a category error.

20.3 Mechanism Evidence

A burden-supported advantage requires evidence linking support work to a specific revision capacity. Records can show that the beneficiary's choice remained actionable because staff preserved readiness or because a claimant kept a case alive. Alternative explanations include routine obligations unrelated to the retained option or a common external requirement affecting both parties.

A claim of constrained support requires evidence about refusal, substitutes, sanctions, and amendment. A recursive-control claim adds another step: the burden must affect the bearer's later alternatives, and that change must contribute to continuing control. Temporal order is necessary to some causal stories but insufficient to distinguish them.

Process evidence can also reveal mechanisms missed by a scalar outcome. A reform may leave final decisions unchanged while making review more independent, or reduce recorded processing time by shifting preparation outside the institution. The meaning of success depends on the chosen object.

20.4 Counterevidence

Several observations would weaken the proposed explanation. The beneficiary may retain the same revision capacity after the focal support is replaced at little cost. The alleged burden may not affect the bearer's meaningful alternatives. Participants may have an effective, routinely used procedure for limiting demands. The apparent asymmetry may arise from a shared shock rather than the institution's design.

Such findings need interpretation. Easy replacement would weaken a claim of dependence on a particular bearer while potentially supporting a claim about dependence on the support class. Effective review could rebut an arbitrary-control diagnosis while leaving a distributive concern. Counterevidence should revise the proposition actually tested.

A research design should also include cases of successful reciprocal support and justified asymmetry. Selecting only severe restrictions would make the proposed distinctions difficult to evaluate. Negative cases are particularly important for testing whether the framework adds anything beyond a broad description of disadvantage.

20.5 Model Comparison

A field model needs evidence connecting its group domain, kernels, interactions, and observables to the case. A nonlinear curve or apparent threshold alone is insufficient. Competing explanations can include administrative deadlines, resource depletion, strategic coordination, and ordinary changes in demand.

An operator model needs evidence that its action domains correspond to actual authority and resource conditions. A formal inverse or a nominal procedure cannot substitute for an executable operation. An allocation model needs defensible task units, carrier restrictions, and timing assumptions.

Comparative evaluation should ask whether added structure improves an inference: identifying a previously obscured burden bearer, distinguishing present resource restoration from historical repair, predicting a joint-support failure, or clarifying which rule change would alter the feasible relation. If it does none of these, the simpler model should remain available.

20.6 Research Participation

Research can itself impose burdens by requesting testimony, records, or continuing availability. A study of burden transfer should examine its own support relation. Participants' contribution should have a declared purpose, realistic limits, and appropriate protection.

This reflexive requirement does not turn every research demand into a wrong. It asks that the inquiry apply its distinctions consistently. The research process should avoid treating the time and interpretive work of less powerful participants as an inexhaustible resource for the investigator's continuing flexibility.

21 Research Limits

The inquiry has developed a history-sensitive object for comparing relational revisability: the joint distribution of supported requests, maintenance burdens, and revision authority. This final section states the resulting position, separates the established conditional results from the open research claims, and identifies the implications for the wider programme.

21.1 Analytical Results

A revision repertoire belongs to a participant as a capacity to invoke meaningful changes, while its realization can depend on other participants' practices. That relation makes the distribution of support an internal part of the object. It also makes individual repertoire summaries insufficient where the same maintenance policy must support several parties.

The formal investigation establishes several precise consequences under declared assumptions. Individually supportable requests can lack a common preparation policy. Carrier restrictions can make aggregate capacity insufficient. A compressed record preserves an operation exactly when its kernel is invariant under that operation. Participant-specific burden registers require distinctions that total-use records can erase. Protection and delay can have order-sensitive effects. The finite interacting field has a stated stability domain, an exact mediator elimination, and a nonlinear stationary sector. The positive history ensemble has a covariance response whose sign depends on the represented association.

These results differ in kind. Some are counterexamples, some are familiar mathematical identities applied to a selected object, and some are conditional constructions. None establishes that the entire framework is novel, empirically prevalent, or normatively authoritative.

21.2 Normative Position

The proposed normative orientation concerns cooperative arrangements that claim to respect participants as agents. Consequential demands should be responsive to the bearer's situation, open to effective challenge, and ordinarily compatible with the practical conditions of that challenge. This supports a contextual protection floor rather than maximization of every possible option.

Asymmetric support can be legitimate and valuable. A remedy must consider the beneficiary's dependence, the bearer's alternatives, and the authority through which a transition is organized. Recognition, compensation, resource replenishment, and rule revision address different objects. An adequate judgment should state which of them is required and why.

The argument remains preliminary. It does not supply a complete theory of responsibility, a legal criterion of wrong, or a universally sufficient design. Its normative premises require further comparison with capability, republican, relational-egalitarian, care, and procedural approaches.

21.3 Formal Obligations

The field model has no established institutional calibration. Its regulated group domain and chosen interactions are proposals, and its formal diagrams require semantic realization. The positive ensemble is separately specified; no equivalence with signed diagram weights is assumed. The gradient dynamics supplies a conditional temporal model, not a universal law of relational change.

The history algebra uses a finite represented domain. Enlarging the domain can reveal distinctions absent at the chosen horizon. Burden units, participant boundaries, and request vocabularies are likewise

revisable. A model's internal precision should make these choices more visible rather than turn them into settled ontology.

The models are therefore several possible ways to investigate a GR object. Their coordination depends on preserving the relations relevant to support and authority across representations. The object remains historically extended even when a local calculation uses a finite state, a matrix, or a homogeneous field mode.

Appendix C collects the representation interfaces and the principal notation to make those preservation obligations accessible.

21.4 Programme Boundary

The paper extends existing resource, power, temporal-justice, and relational-becoming inquiries. Its focused subject is the supported distribution of future relational change. It leaves trust formation, the full architecture of reliable cooperation, and the wider synthesis to their respective investigations.

A broader synthesis may eventually connect these results, but it should preserve the present distinctions: causal support, comparative displacement, constrained cooperation, and normative wrong. Treating them as interchangeable would lose the very object the current inquiry makes explicit.

A Field Derivations

This appendix supplies the intermediate calculations used in Sections 14 and 15. All sums use the normalized inner product on the invariant real field space. The results are finite-dimensional and do not assume a continuum limit.

A.1 Contraction Bound

For fixed y, z , Cauchy–Schwarz gives Equation 27.

$$\left| \frac{1}{n} \sum_x \varphi(x, y) \psi(z, x) \right|^2 \leq \left(\frac{1}{n} \sum_x |\varphi(x, y)|^2 \right) \left(\frac{1}{n} \sum_x |\psi(z, x)|^2 \right). \quad (27)$$

Summing Equation 27 over y, z and dividing by n^2 separates the right-hand factors. The resulting inequality is Equation 28.

$$\|\mathcal{C}(\varphi, \psi)\|^2 \leq \left(\frac{1}{n^2} \sum_{x,y} |\varphi(x, y)|^2 \right) \left(\frac{1}{n^2} \sum_{z,x} |\psi(z, x)|^2 \right) = \|\varphi\|^2 \|\psi\|^2. \quad (28)$$

Equation 28 makes the normalization in Proposition 14.1 explicit. Replacing normalized sums by ordinary sums without changing coefficients would alter the stated stability condition.

A.2 Square Completion

Set $r = \mathcal{C}(\varphi, \psi)$ and $\chi_0 = gM^{-1}r$. Direct expansion gives Equation 29.

$$\frac{1}{2} \langle \chi, M\chi \rangle - g \langle \chi, r \rangle = \frac{1}{2} \langle \chi - \chi_0, M(\chi - \chi_0) \rangle - \frac{g^2}{2} \langle r, M^{-1}r \rangle. \quad (29)$$

Self-adjointness of M and $M\chi_0 = gr$ establish the cross term in Equation 29. Substitution into the full action yields Equation 16.

Choose an orthonormal eigenbasis of M on $\mathcal{V}$, with positive eigenvalues $\lambda_1, \dots, \lambda_d$. Translation by χ_0 preserves Lebesgue measure. The integral then separates into d one-dimensional Gaussian integrals, giving Equation 30.

$$\int_{\mathcal{V}} e^{-\langle \chi - \chi_0, M(\chi - \chi_0) \rangle / 2} d\chi = \prod_{k=1}^d \sqrt{\frac{2\pi}{\lambda_k}} = \frac{(2\pi)^{d/2}}{\sqrt{\det M}}. \quad (30)$$

Equation 30 establishes the normalization in Equation 17. It is conditional on the chosen real integration contour and positive mediator kernel.

A.3 Adjoint Maps

The adjoints in Equation 18 can be read directly from the trilinear sum. They are given in Equation 31.

$$\begin{aligned} (\mathcal{C}_\psi^* \chi)(x, y) &= \frac{1}{n} \sum_z \chi(y, z) \psi(z, x), \\ (\mathcal{C}_\varphi^* \chi)(z, x) &= \frac{1}{n} \sum_y \chi(y, z) \varphi(x, y). \end{aligned} \quad (31)$$

For example, inserting the first line of Equation 31 into $\langle \delta\varphi, \mathcal{C}_\psi^* \chi \rangle$ produces the normalized triple sum $n^{-3} \sum_{x,y,z} \delta\varphi(x, y) \chi(y, z) \psi(z, x)$. That is exactly $\langle \chi, \mathcal{C}(\delta\varphi, \psi) \rangle$. The second line follows by collecting the $\delta\psi(z, x)$ factors. Reindexing all group arguments simultaneously shows that both adjoint outputs remain in $\mathcal{V}$.

The variation of $\|\varphi\|^4$ in direction $\delta\varphi$ is $4\|\varphi\|^2 \langle \varphi, \delta\varphi \rangle$. Combining this with the self-adjoint quadratic variation and Equation 31 yields the first gradient in Equation 18. The other two follow in the same way by collecting the explicitly displayed terms.

For completeness, define $R = M^{-1} \mathcal{C}(\varphi, \psi)$. Differentiating the effective action gives Equation 32.

$$\begin{aligned} \nabla_\varphi \mathcal{S}_{\text{eff}} &= K_\varphi \varphi + u \|\varphi\|^2 \varphi - g^2 \mathcal{C}_\psi^* R, \\ \nabla_\psi \mathcal{S}_{\text{eff}} &= K_\psi \psi + v \|\psi\|^2 \psi - g^2 \mathcal{C}_\varphi^* R. \end{aligned} \quad (32)$$

The factor g^2 in Equation 32 follows because the two terms in the variation of $\langle r, M^{-1} r \rangle$ agree by self-adjointness. These gradients describe the eliminated potential, not the full time-dependent elimination of χ .

A.4 Stationary Reduction

In the homogeneous sector with $\mu_\varphi = -1$, minimize over a at fixed b . The relevant terms can be regrouped as Equation 33.

$$-\frac{1}{2}a^2 + \frac{u}{4}a^4 - \frac{\gamma}{2}a^2b^2 = \frac{u}{4} \left(a^2 - \frac{1 + \gamma b^2}{u} \right)^2 - \frac{(1 + \gamma b^2)^2}{4u}. \quad (33)$$

Since $\gamma = g^2/m \geq 0$, the minimizing value of a^2 in Equation 33 is positive. Expanding the final term and adding $\mu_\psi b^2/2 + vb^4/4$ yields Equation 23. Differentiating that reduced polynomial gives $b[(\mu_\psi - \gamma/u) + (v - \gamma^2/u)b^2]$. Its nonzero root establishes Equation 24.

At a nonzero stationary pair, the Hessian of the effective potential is Equation 34.

$$\nabla^2 V = 2 \begin{pmatrix} ua^2 & -\gamma ab \\ -\gamma ab & vb^2 \end{pmatrix}, \quad \det \nabla^2 V = 4a^2b^2(uv - \gamma^2) > 0. \quad (34)$$

The positive diagonal and determinant in Equation 34 establish a strict local minimum in the two-mode sector. Restoring the homogeneous mediator adds the positive square from Equation 29, so the corresponding point is also a strict local minimum of the three-mode homogeneous potential. Stability against nonconstant field perturbations requires a separate spectral analysis of the full field Hessian.

For the illustrative choice $u = v = 2$, $\gamma = 1$, and $\mu_\psi = 0.2$, the positive solution has $a^2 = 0.6$ and $b^2 = 0.2$. With $g = m = 1$, the mediator value is $c = ab$. The numerical checks evaluate the stationary residual and the full three-mode Hessian rather than inferring stability from the plotted branch alone.

B Computational Examples

The accompanying script `simulations/check_models.py` reproduces the finite examples and figures. The calculations are illustrative checks of the manuscript’s models. They are not institutional data, parameter estimates, or evidence of empirical prevalence.

B.1 Allocation Enumeration

The script enumerates all 2^6 carrier-incidence patterns for three bearers and two tasks. Each bearer capacity and each task demand takes values in $\{0, 1, 2\}$. This gives $2^6 3^5 = 15,552$ configurations.

For each configuration, one procedure searches assignments of individual demand units to available bearer capacity. A separate procedure checks every task-subset inequality in Equation 6. The results agree on every configuration. The independent enumeration checks the finite criterion and its handling of zero demand, missing carriers, and unused capacity.

The script also verifies the aggregate-capacity counterexample in Section 11 and a repaired incidence pattern. Those examples test different statements: more total capacity need not suffice, while an additional eligible carrier can remove the specific obstruction.

B.2 Operator Calculations

The matrices in Equation 8 are multiplied in both orders. The resulting statuses agree with the stated sequence interpretation. Separate diagonal-register calculations verify that a total burden observable descends under a coarse record while a bearer-specific observable does not.

Forty reproducibly seeded integer-matrix examples check the inner-derivation identity in Equation 12. The general result follows from the proof, not from the sample. The calculations help detect sign and multiplication-order errors in the implementation.

B.3 Field Calculations

Invariant fields on the cyclic group of order three are generated from a function of the group difference. The script checks closure of the cyclic contraction and verifies the norm bound on one hundred reproducible field pairs. Three independent finite-difference directional derivatives check the normalized analytic gradients, with absolute errors below 4×10^{-10} in the recorded run.

The mediator kernel is represented on an orthonormal invariant basis. Direct solution for its conditional minimum verifies square completion and the mediator’s stationary equation. A separate one-dimensional quadrature checks the Gaussian normalization to relative error below 10^{-9} .

The full homogeneous stationary point is checked by substitution into all three gradient equations. Its Hessian eigenvalues are approximately 0.2631, 2, and 2.7369, consistent with the local-minimum calculation. A forward Euler trajectory with step 0.002 and 15,000 steps is an additional numerical illustration: it shows decreasing action and a final gradient norm below 10^{-3} . This particular discretization is not proved stable for every initial state or parameter choice.

B.4 Ensemble Calculations

Finite differences of the normalized positive ensemble confirm the two opposite response signs in Section 16. Their purpose is to guard against a universal monotonicity interpretation of burden-source changes.

Twenty named checks pass in the supplied record, including the exhaustive allocation comparison. The phrase twenty checks refers to checks grouped by mathematical purpose; it does not replace the separately reported number of enumerated configurations. The results and parameters are stored in `simulations/results/formal_checks.json`.

Table 3: Representation Interfaces And Limits

Representation	Retained Structure	Additional Obligation
Labelled spacetime	Occurrences, continuities, couplings and participant regions	Defensible identification, temporal order and semantic labels
Joint support relation	One policy for several repertoires and burden bounds	Adequate request vocabulary and continuation family
Carrier allocation	Eligible assignments of fixed service units	Valid reduction of timing, quality and resource kinds
History algebra	Partial operations, composition and retained history	Actual authority, executable support and observation access
Group-domain field	Interactions, nonlinear response and formal incidence generation	Kernel identification and admissible-history extraction
Positive ensemble	Normalized history weights and conditional sensitivity	Probability meaning, causal interpretation and sampling design

C Representation Interfaces

The manuscript uses several models because each exposes a different part of the analytical object. This appendix states their interfaces and losses. It also supplies a compact notation guide for readers entering through the formal sections.

C.1 Preservation Requirements

Table 3 distinguishes what each representation retains from what it leaves to further argument.

A map between rows of Table 3 should preserve the distinctions used in the target inference. For example, a projection from a history to an allocation should retain which bearer performs each required task. A projection to current resources can discard cumulative burden, but then it cannot answer a historical burden query without additional records.

A formal correspondence also needs a stated direction. The existence of a history representation for a matrix example does not show that every matrix has an institutional realization. An interacting field can generate complexes without identifying their social meaning. A positive ensemble can be well defined without being the positive sector of a particular field theory.

C.2 Notation Guide

Table 4 collects the principal symbols. Each object is defined before use in the main text.

The field amplitudes, source parameters, and service units have declared model roles. They should not be reinterpreted as measures of trust, power, legitimacy, or justice without an independent measurement argument. This restriction is part of the formal specification rather than a general rejection of quantitative research.

Table 4: Principal Formal Objects

Symbol	Declared Meaning
I, R	Participant and quantitative resource-kind indices
$\Gamma = (P, C, \iota)$	Boundary elements, couplings and incidence
$h = (F, \ell, \prec)$	Labelled, ordered history of a two-complex
$W_i(h)$	Historically extended participant region
$Q_i, \mathcal{Q}$	Selected requests and admissible request profiles
z, Ω, Π_z	Rule regime, environmental continuations and feasible policies
$\mathcal{J}_z$	Jointly supported repertoires and burden bounds
$B_{ir}(h), D_{ir}$	Gross-use history coordinate and diagonal register
$H, \mathcal{H}$	Finite represented histories and their Hilbert space
$L_a, \mathfrak{A}, \mathcal{O}_i$	Extension operator, containing algebra and executable words
q, Q	Record map and its linear extension
$G, \mathcal{V}$	Finite group and invariant real field space
φ, ψ, χ	Two supported configurations and mediating field
$\mathcal{C}, K_\varphi, K_\psi, M$	Cyclic contraction and kinetic kernels
$\mathcal{S}, \mathcal{S}_{\text{eff}}$	Full and mediator-eliminated actions
$\mu_\varphi, \mu_\psi, \gamma$	Homogeneous kinetic coefficients and induced coupling
Z_z, p_s, A_q	Positive history sum, distribution and availability indicator

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