A Toy Model of Cross-System Pre-Readout Constraint under Identity-Continuation Variation

Receiver-Side Local Readout from Provenance-Bearing Source Expression

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Abstract

This paper presents a pre-mapping toy realization of receiver-side local readout conditioned by exact identity-continuation records from an preceding symbolic-reuse model. The source interface preserves the full fixed-denominator identity-breadth triple $(B_A^{(\mathrm{id},+)}, B_A^{(\mathrm{id},-)}, B_A^{(\mathrm{id},\mathrm{undef})})$ together with the inherited symbolic coordinate q_A and its provenance. A local qualitative-expression application is defined only when the source record is valid and $B_A^{(\mathrm{id},\mathrm{undef})} = 0$. It carries a narrow expression-support descriptor X_A^{expr}, which is combined with four explicitly toy-local receiver-context coordinates to produce a bounded pre-readout constraint score C_{AB}^{pre}. A defined score below 0.60 yields a nonempty local receiver-side discrimination record and hence PreRead = 1; a defined score at or above 0.60 yields an empty discrimination record and PreRead = 0; undefined cases remain undefined.

The implementation passes seventy-nine structural consistency checks. Five fixed receiver-context fixtures, two 201×201 receiver-coordinate surfaces, four complete deterministic source families, and three separate Monte Carlo receiver-context strata are evaluated under the declared equations, thresholds, source anchor, grids, and random seeds. Under the fixed reference receiver context, all S1–S4 final records remain below the 0.60 local readout threshold; their mean final constraint scores are 0.313400, 0.043282, 0.028985, and 0.052883. In the three Monte Carlo strata, the corresponding mean final scores are 0.150914, 0.149016, and 0.146411, with positive local pre-readout frequencies of 97.19%, 97.20%, and 97.36%. These frequencies are consequences of the declared toy receiver-context law and are not population estimates. The model does not construct a cross-system mapping, mapping quality, mapping-domain readability, directional asymmetry, semantic understanding, or feedback adaptation.

Keywords: cross-system readout; qualitative expression; identity-continuation breadth; receiver context; partial definedness; pre-mapping readability; toy model; cognitive architecture.

1 Analytic Target and Scope

The present model addresses a narrow question: given a provenance-bearing source-side qualitative-expression application, what local receiver-side conditions are sufficient for a defined, nonempty pre-mapping discrimination record? The source state is supplied by a preceding symbolic-reuse and identity-continuation realization [2]. The receiver-side architectural boundary follows the qualitative-expression and local readout construction developed for qualitative manifestation and cross-system readability [1].

The active chain is

$$\begin{aligned}&\text{exact source evaluation record}\\ &\quad\longrightarrow \text{local qualitative-application token}\\ &\quad\longrightarrow \text{QExpr application}\\ &\quad\longrightarrow \text{receiver-context record}\\ &\quad\longrightarrow C_{AB}^{\mathrm{pre}}\\ &\quad\longrightarrow \text{ReadDisc defined nonempty / defined empty}\\ &\quad\longrightarrow \text{PreRead} \in \{1,0\},\ \text{or undefined.}\end{aligned}$$

This is deliberately a pre-mapping realization. It does not construct a mapping graph, a mapping target-alignment object, a mapping-grounding object, or a mapping-quality assessment. Accordingly, its local score and PreRead status are not instances of later mapping-domain readability [3, 4]. One directed $A \to B$ realization also does not constitute a directional-asymmetry result, and no feedback-indexed transition is implemented.

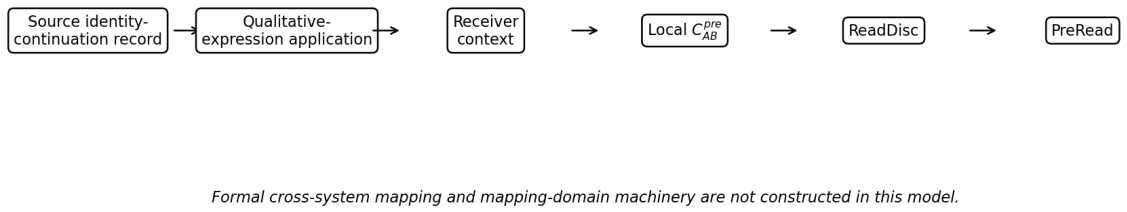


Figure 1: Provenance architecture of the toy realization. The route ends at a local pre-mapping PreRead status; formal cross-system mapping and mapping-domain machinery are outside the model.

2 Exact Source Record and Identity-Continuation Interface

Each source record is an evaluation-index record linked to its trajectory by family and trajectory index while retaining case identity and evaluation index t. The source record contains the inherited symbolic coordinate q_A and the complete identity-continuation breadth profile

$$B_A^{(\mathrm{id},+)}, \qquad B_A^{(\mathrm{id},-)}, \qquad B_A^{(\mathrm{id},\mathrm{undef})}.$$

The associated counts satisfy

$$N_+ + N_- + N_{\mathrm{undef}} = 49,$$

and the fixed-denominator shares satisfy

$$B_A^{(\mathrm{id},+)} = \frac{N_+}{49}, \qquad B_A^{(\mathrm{id},-)} = \frac{N_-}{49}, \qquad B_A^{(\mathrm{id},\mathrm{undef})} = \frac{N_{\mathrm{undef}}}{49},$$

with

$$B_A^{(\mathrm{id},+)} + B_A^{(\mathrm{id},-)} + B_A^{(\mathrm{id},\mathrm{undef})} = 1.$$

The local expression/readout route is active only when $B_A^{(\mathrm{id},\mathrm{undef})} = 0$. This gate does not convert unresolved candidates into negative cases. The full plus/minus/undefined triple remains stored even though $B_A^{(\mathrm{id},+)}$ and $B_A^{(\mathrm{id},-)}$ enter the local scalar equations.

The inherited coordinate q_A is used as the exact source field supplied by the preceding simulation. It is not interpreted here as a universal divergence measure, mapping loss, source-reference distance, or symbolic distortion. Likewise, the derived breadth shares remain distinct from candidate-level identity-continuation classification, identity-stabilization regions, regulatory identity attractors, and pathwise identity preservation.

3 Local Qualitative Expression

For each valid source record, the model constructs one provenance-bearing qualitative-application token and then a QExpr application. The numeric source coordinates are conditioning information attached to this application; they are not themselves declared to be qualitative expression.

Where the source gate is satisfied, the QExpr application carries the local expression-support descriptor

$$X_A^{\mathrm{expr}} = \mathrm{clip}_{[0,1]}\left(0.50 - 0.30q_A + 0.30B_A^{(\mathrm{id},+)}\right).$$

This descriptor is intentionally narrow. It is not a general clarity variable, not mapping quality, not semantic fidelity, and not communication success. It exists only inside the present toy realization.

4 Receiver Context and Pre-Readout Constraint

The receiver-side context is represented by four immutable local coordinates:

$$H = \mathrm{HistAlignCtx}_{AB}, \qquad C = \mathrm{CueAccess}_B,$$

$$L = \mathrm{RecvLoad}_B, \qquad P = \mathrm{PriorDom}_B,$$

all in $[0,1]$. Their names are descriptive rather than canonical formal identities. In particular, H is not a formal mapping target-alignment record, C is not mapping grounding, L is not the canonical retained-overload state, and P is not promoted to a universal prior variable.

The local pre-readout constraint score is

$$\begin{aligned} C_{AB}^{\mathrm{pre}} = \mathrm{clip}_{[0,1]}\Big(&0.20 + 0.25q_A + 0.20B_A^{(\mathrm{id},-)} + 0.20L \\ &+ 0.20P(1-H) - 0.20X_A^{\mathrm{expr}} - 0.25H - 0.25C\Big). \end{aligned}$$

The score is defined only when the source/QExpr route is defined and all four receiver coordinates are finite and lie in $[0,1]$.

Three descriptive score bins are used:

$$\begin{array}{ll} \text{low constraint:} & C_{AB}^{\mathrm{pre}} \le 0.30, \\ \text{intermediate constraint:} & 0.30 < C_{AB}^{\mathrm{pre}} < 0.60, \\ \text{high constraint:} & C_{AB}^{\mathrm{pre}} \ge 0.60. \end{array}$$

These bins are local descriptions of this scalar only. They are not cross-system mapping domains.

5 ReadDisc and PreRead Definedness

For a defined score, the receiver-side discrimination record is

$$\mathrm{ReadDisc}_{A\to B} = \begin{cases} \{d_B\}, & C_{AB}^{\mathrm{pre}} < 0.60, \\ \varnothing, & C_{AB}^{\mathrm{pre}} \ge 0.60, \end{cases}$$

Table 1: Receiver-context fixtures evaluated on the declared source anchor.

Context	H	C	L	P	C_{AB}^{pre}	PreRead
C0_supportive	0.80	0.80	0.20	0.20	0.000	1
C1_low_hist_align	0.20	0.80	0.20	0.20	0.000	1
C2_low_cue_access	0.80	0.20	0.20	0.20	0.000	1
C3_receiver_pressure	0.25	0.30	0.80	0.80	0.289	1
C4_mid_support	0.60	0.60	0.50	0.50	0.000	1

Anchor: S1, trajectory 0, case S1_00000_00000, $t = 20$.

where the nonempty record carries the exact QExpr application and receiver-context provenance. PreRead is then derived as

$$\mathrm{PreRead}_{A\to B} = \begin{cases} 1, & \text{ReadDisc defined and nonempty,} \\ 0, & \text{ReadDisc defined and empty,} \\ \text{undefined}, & \text{ReadDisc undefined.} \end{cases}$$

Thus a defined local no-readout is not an undefined case. Conversely, undefined source or expression conditions are not converted into PreRead = 0, high constraint, mapping failure, or an "unmapped" classification. No complementary scalar such as $1 - C_{AB}^{\mathrm{pre}}$ is introduced.

6 Simulation Design

6.1 Receiver fixtures

Five static receiver contexts are evaluated on one exact source anchor: the lexicographically first S1 trajectory at its final evaluation index $t = 20$. The source anchor has

$$q_A = 0, \qquad (N_+, N_-, N_{\mathrm{undef}}) = (29, 20, 0),$$

so

$$(B_A^{(\mathrm{id},+)}, B_A^{(\mathrm{id},-)}, B_A^{(\mathrm{id,undef})}) = \left(\frac{29}{49}, \frac{20}{49}, 0\right).$$

The contexts are fixed before output evaluation. C4 is a static mid-support contrast, not a feedback or adaptation episode.

All five fixtures produce defined positive local readout. Four are clipped to $C_{AB}^{\mathrm{pre}} = 0$; the receiver-pressure fixture C3 reaches $C_{AB}^{\mathrm{pre}} \approx 0.289$, still within the low-constraint bin. These fixtures therefore do not demonstrate a threshold crossing.

6.2 Receiver-coordinate surfaces

Two 201×201 endpoint-inclusive surfaces use the same exact source anchor. The first varies (H, C) while holding $(L, P) = (0.40, 0.50)$. The second varies (L, P) while holding $(H, C) = (0.25, 0.30)$. Source-side q_A and breadth coordinates are never varied independently: they remain those of the exact anchor.

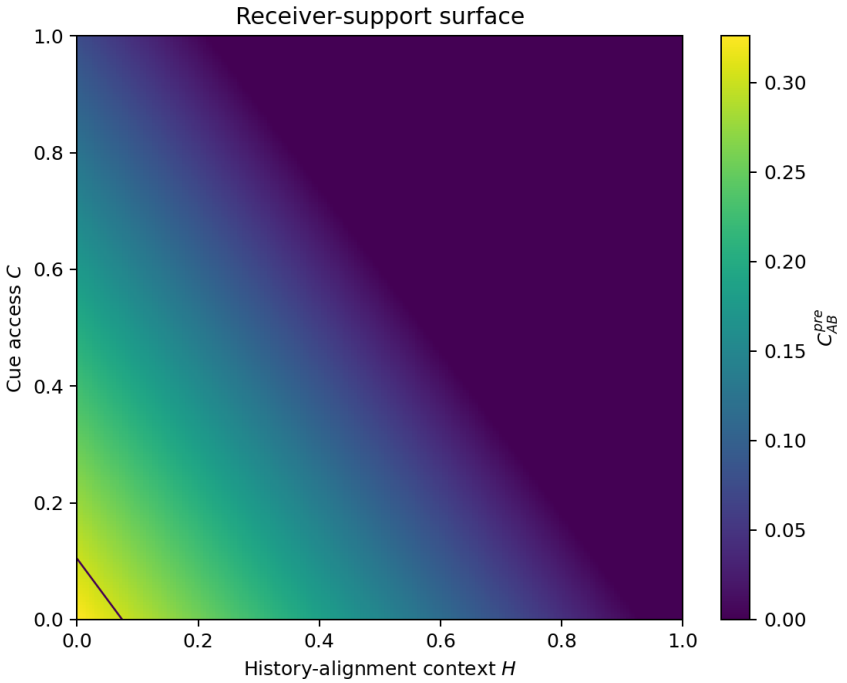


Figure 2: $H \times C$ surface. The score ranges from 0 to approximately 0.326. The 0.30 contour is reached only near the lowest local history-alignment and cue-access corner; the 0.60 PreRead threshold is not reached.

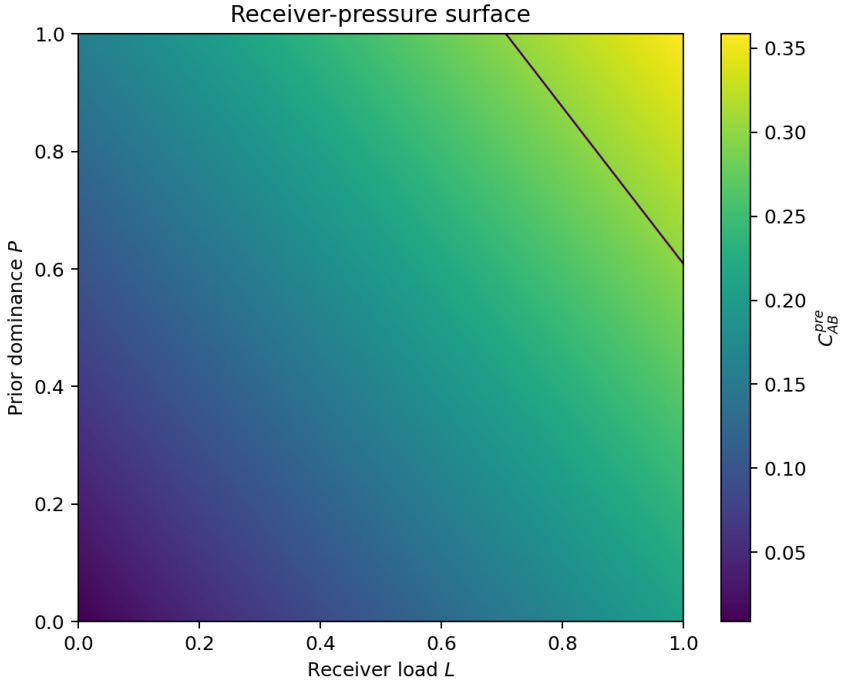


Figure 3: $L \times P$ surface. The score ranges from approximately 0.009 to 0.359. An intermediate-constraint region appears at high receiver pressure, but the 0.60 PreRead threshold is not reached.

The absence of a high-constraint region in these two declared surfaces is a property of the specified design; the axes, constants, and threshold are held fixed across these evaluations.

6.3 Deterministic source families

The four deterministic source families S1–S4 each contribute all 40,401 trajectories at every evaluation index $t = 0, \ldots, 20$. No additional source-side random draw is introduced. Every source record is evaluated under the same fixed reference receiver context

$$(H, C, L, P) = (0.50, 0.50, 0.40, 0.50).$$

6.4 Monte Carlo receiver contexts

The Monte Carlo analysis uses all exact final $t = 20$ records from the three eligible source strata: 9,584 records for MC-M1, 14,416 for MC-M2, and 16,948 for MC-M3. Source rows are sorted by trajectory index and are not resampled. Only the four receiver-context coordinates are newly generated, independently from Uniform$(0, 1)$ using seeds 2029, 2030, and 2031 for the three strata, respectively. This random law is a toy design law; its output frequencies are not prevalence estimates.

7 Structural Consistency and Provenance

Seventy-nine structural consistency checks accompany the computational realization. They verify the fixed-denominator breadth identities, partial-definedness rules, the expression-support and constraint equations, threshold classification, receiver-fixture values, deterministic-family denominator partitions, Monte Carlo stratum summaries, and agreement between the archived score distributions and the reported means, medians, ranges, and readout counts.

The checks also preserve the model's architectural ceiling. No formal cross-system mapping graph, target-alignment variable, mapping-grounding object, mapping-quality object, mapping-domain membership, opposite-direction asymmetry result, or feedback-indexed transition is constructed. Undefined PreRead and defined PreRead = 0 remain separate conditions.

Scientific result summaries are retained at the level required to regenerate the tables and figures. The source-side identity-continuation record, qualitative-expression application, receiver context, constraint score, ReadDisc, and PreRead remain distinct typed stages of the realization.

8 Results

8.1 Deterministic families under the fixed receiver context

Figure 4 shows the mean score over the 21 evaluation indices. All four families share the same initial mean score, approximately 0.115. S1 then rises progressively, whereas S2–S4 move downward before partially separating. At $t = 20$, the mean scores are 0.313400 (S1), 0.043282 (S2), 0.028985 (S3), and 0.052883 (S4).

Table 2: Final deterministic-family denominator, score, and PreRead summary.

Family	D	score def.	PreRead 1	PreRead 0	undef.	mean C^{pre}	median C^{pre}
S1	40,401	40,401	40,401	0	0	0.3134	0.4422
S2	40,401	40,401	40,401	0	0	0.0433	0.0261
S3	40,401	40,401	40,401	0	0	0.0290	0.0261
S4	40,401	40,401	40,401	0	0	0.0529	0.0261

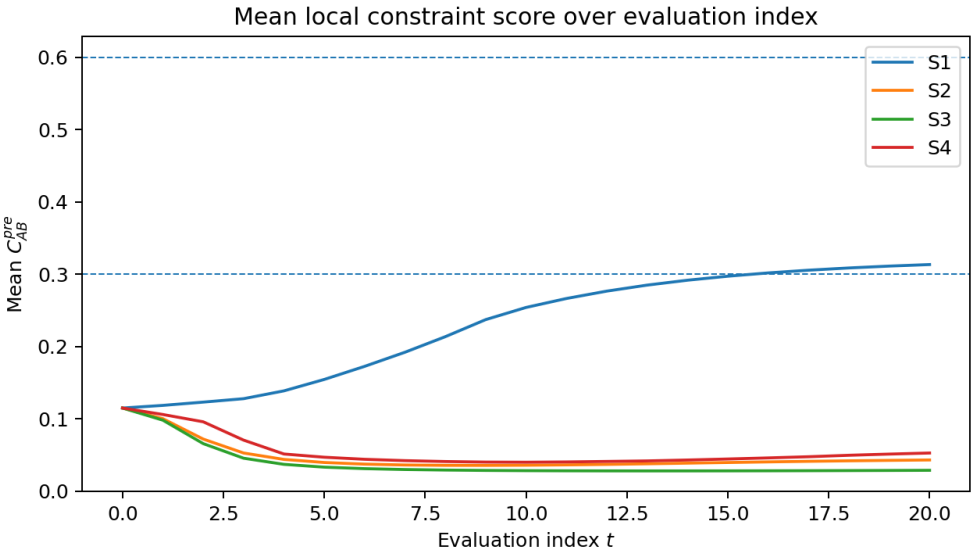


Figure 4: Mean local pre-readout constraint score over $t = 0, \ldots, 20$ for S1–S4 under the single fixed reference receiver context.

All 40,401 final records in each deterministic family are score-defined and ReadDisc-defined. None reaches $C_{AB}^{\mathrm{pre}} \geq 0.60$, so all final PreRead values are positive under this particular receiver context. This does not imply that the source states are universally readable or that a cross-system mapping exists; it only states that the local receiver discrimination is nonempty for these source/context combinations.

The distributional structure remains informative below the readout threshold. S1 has 12,921 low-constraint and 27,480 intermediate-constraint final records, producing a mean of 0.313400 and a median of approximately 0.442. S2–S4 are dominated by the low-constraint bin. Figure 5 shows the discrete final-score structure inherited from the source families.

Table 3: Final Monte Carlo stratum-specific denominator, score, and PreRead summary.

Family	D	score def.	PreRead 1	PreRead 0	undef.	mean C^{pre}	median C^{pre}
MC-M1	9,584	9,584	9,315	269	0	0.1509	0.0891
MC-M2	14,416	14,416	14,012	404	0	0.1490	0.0878
MC-M3	16,948	16,948	16,500	448	0	0.1464	0.0849

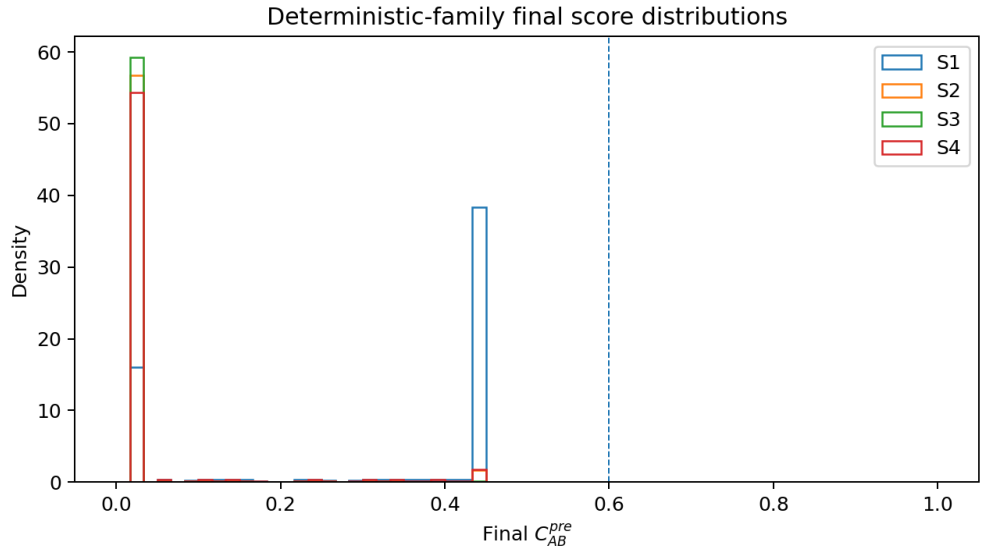


Figure 5: Final C_{AB}^{pre} distributions for S1–S4 under the fixed reference receiver context. The distributions remain entirely below the 0.60 local readout threshold.

8.2 Monte Carlo receiver-context strata

The Monte Carlo strata produce broader score distributions because the receiver context is varied rather than held fixed. Mean final scores are 0.150914, 0.149016, and 0.146411 for MC-M1, MC-M2, and MC-M3, respectively. The corresponding score ranges extend to approximately 0.915, 0.875, and 0.905, so the high-constraint/readout-zero region is reachable under the declared receiver law.

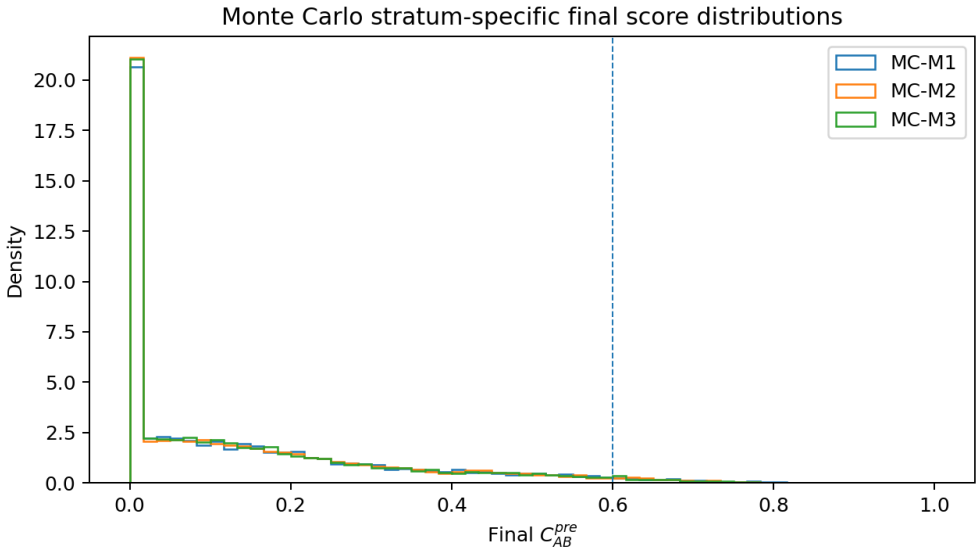


Figure 6: Final C_{AB}^{pre} distributions for the three Monte Carlo strata. The strata are shown separately because the design does not authorize unqualified pooling.

Defined local no-readout occurs in 269 of 9,584 MC-M1 records, 404 of 14,416 MC-M2 records, and 448 of 16,948 MC-M3 records. Equivalently, positive PreRead frequencies are 97.19%, 97.20%, and 97.36%. No final Monte Carlo record is undefined because all imported source records have $B_A^{(\mathrm{id,undef})} = 0$ and all sampled receiver coordinates lie in $[0, 1]$.

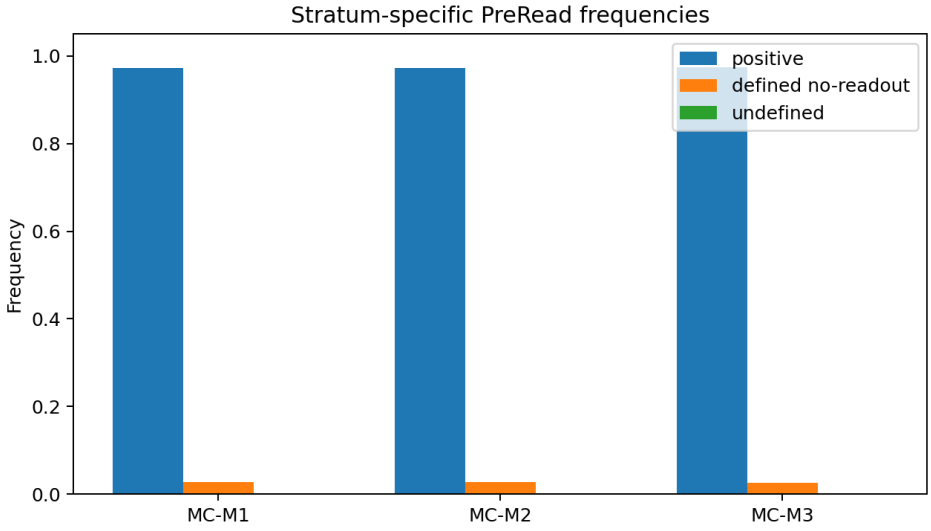


Figure 7: Stratum-specific PreRead frequencies. Defined no-readout is kept separate from undefinedness; the latter is zero under the standard all-defined source and receiver premises.

9 Interpretive Boundaries

The numerical surfaces above support only claims about the declared toy realization. Several stronger interpretations are not licensed.

First, C_{AB}^{pre} is not mapping loss or mapping quality. It is calculated before any formal cross-system mapping object is constructed. Second, PreRead = 1 means only that the declared local receiver

discrimination is defined and nonempty. It does not establish semantic preservation, understanding, communication success, experience transfer, or invertibility. Third, PreRead = 0 is a defined empty local readout, not a global claim of unreadability. Fourth, one $A \to B$ realization does not establish asymmetry because no opposite-direction companion record is constructed. Fifth, the C4 fixture and all Monte Carlo records are static evaluations rather than feedback-indexed updates. Finally, the Monte Carlo frequencies arise from independently uniform toy receiver coordinates and cannot be read as empirical prevalence.

The declared receiver surfaces remain below the 0.60 threshold: neither reaches it. This absence is reported without retuning the declared axes, constants, or threshold. The threshold is reached only in part of the independently sampled Monte Carlo receiver contexts. This difference illustrates why a fixed support surface, a source-family trajectory analysis, and a receiver-context sampling law answer different questions even when they use the same local scalar equation.

10 Limitations

The model has several deliberate limitations. The expression-support descriptor is hand-specified and is not an empirically validated measure. Receiver coordinates are normalized toy variables without a measurement model. The score coefficients and thresholds are design constants. The source layer is inherited from a particular preceding symbolic-reuse/identity-continuation simulation, so the results are conditional on that architecture. The standard source records used here have no identity-breadth undefinedness; undefined propagation is verified through structural consistency checks rather than observed in the reported scientific families. The model contains no formal qualitative-space mapping, no mapping-quality estimator, no bidirectional comparison, and no adaptation rule.

These restrictions are substantive. The present report should therefore be treated as a typed computational demonstration of how provenance, partiality, and local receiver context can be kept explicit when a source-side qualitative expression is evaluated before formal mapping.

11 Conclusion

A cross-system toy model can retain useful scalar structure without treating the scalar as a definition of cross-system readability. Here the source state remains a complete provenance-bearing identity-continuation record; the qualitative-expression application is partial; the receiver context is explicit; the local score has a narrow pre-readout interpretation; and PreRead preserves the difference between positive, defined-empty, and undefined receiver discrimination.

The deterministic families show that substantial variation in C_{AB}^{pre} can occur while all cases remain below the local no-readout threshold under one fixed receiver context. The Monte Carlo receiver contexts show that defined local no-readout is nevertheless reachable under the same declared equation. Neither result is a claim about formal mapping-domain readability or empirical population frequencies. The primary contribution is architectural: scalar convenience is subordinated to typed source, expression, receiver, definedness, and provenance records rather than replacing them.

References

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