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Olympic programme change and national event supply: structural correspondence of China's National Games towards Los Angeles 2028

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Article

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Abstract

As Olympic programmes become increasingly flexible, national sport systems face a recurring dilemma: how closely should domestic competition structures correspond to changes in Olympic medal events? Replicating every Olympic adjustment may strengthen direct alignment, but it may overlook existing domestic capacities and the broader functions of national competition systems. Using China's National Games as an institutional case, this study compares changes in domestic event supply with changing Olympic programmes rather than examining programme overlap alone. A four-wave event-level database covered Paris 2024 (329 medal events), Los Angeles 2028 (353), the 14th National Games (410), and the 15th National Games (419). Raw programme records were first harmonised within a hierarchical event ontology, after which the resulting Olympic–National Games matches were classified as Exact, Equivalent, Modified, Developmental, or None. They were assessed using structural alignment measures, longitudinal transition-pattern classification, set similarity, and sensitivity analysis. Direct alignment declined from 93.9% in the Paris 2024-NG14 comparison to 87.8% in the LA28-NG15 comparison. Broader structural supply remained higher, declining from 99.7% to 95.5%. Stable Olympic events were usually accompanied by maintained domestic correspondence. All modified LA28 events retained some form of domestic structural supply. Added and returning events showed subsequent domestic additions, pre-existing domestic supply, structural gaps, and retrenchment. Olympic exits often coexisted with continued domestic supply. These patterns were robust across alternative weighting assumptions. The findings show that lower programme overlap does not necessarily imply weaker structural correspondence. More broadly, national event systems display combinations of direct alignment, structural modification, pre-existing domestic supply, persistence, and structural gaps, while preparation pathways outside the National Games remain beyond the scope of the present analysis. The four-wave design identifies temporal correspondence, not causal effects or policy intent. This framework offers a transferable approach for analysing how domestic competition structures coexist with changing international programme demands.

1. Introduction

The Olympic Games represent one of the most influential global sporting institutions, yet the Olympic programme itself is not a fixed structure. Since the beginning of the twenty-first century, Olympic governance reforms have increasingly emphasised flexibility, sustainability, and event-based programme management (Parent and Chappelet, 2017). The International Olympic Committee (IOC) introduced Olympic Agenda 2020 to enhance the adaptability of the Olympic programme by allowing greater flexibility in event composition and encouraging a more balanced relationship between sporting value, operational feasibility, and host-city interests (International Olympic Committee, 2014). Consequently, Olympic programme evolution has increasingly occurred not only through the inclusion or exclusion of entire sports but also through modifications at the event level, including changes in competition formats, gender structures, weight categories, and medal-event configurations (Toohey and Veal, 2007; Chappelet, 2014). This transformation has important implications for national elite sport systems. Olympic success is not produced exclusively through international competition structures; it depends on domestic systems of athlete identification, training, selection, resource allocation, and competitive evaluation (Houlihan and Green, 2008). Research on elite sport systems has demonstrated that international sporting success is shaped by the interaction of multiple institutional factors, including governance arrangements, athlete development pathways, coaching systems, and competition environments (Green and Oakley, 2001; De Bosscher, 2008; Andersen et al., 2015; De Bosscher et al., 2015; Gómez-Rodríguez et al., 2024). Therefore, changes in Olympic programmes raise adaptation questions for national sport systems, particularly regarding whether domestic competition structures can provide appropriate preparation environments for newly introduced, modified, or discontinued Olympic events (De Bosscher, 2008; Grix and Carmichael, 2012).

The Los Angeles 2028 Olympic Games (LA28) provide a representative example of this increasingly dynamic programme environment. Compared with Paris 2024, LA28 introduces additional sports while simultaneously modifying existing Olympic events (Los Angeles 2028 Olympic and Paralympic Games, 2025). These changes include the introduction of cricket, flag football, lacrosse, squash, and baseball/softball, as well as adjustments within established sports such as

swimming, athletics, sport climbing, rowing, and modern pentathlon. Such developments demonstrate that contemporary Olympic programme change is no longer simply a matter of whether a sport enters or exits the Games; rather, it increasingly involves continuous restructuring of event portfolios. Existing research has mainly examined Olympic programme change from the perspective of international governance (Chappelet, 2023; Bayle, 2024). Previous studies have analysed the challenges of managing Olympic size and scope, the institutional processes shaping programme decisions, and the balance between universality, sustainability, and commercial considerations (Chappelet, 2014). Similarly, IOC reforms have highlighted the need for a more flexible programme model capable of responding to changing social expectations and sport development trends (International Olympic Committee, 2014; International Olympic Committee, 2021). However, comparatively less attention has been paid to how national competition systems change alongside Olympic programmes.

This represents an important research gap. National multi-sport events occupy a critical position within many elite sport systems because they connect athlete development, competition opportunities, organisational coordination, and public sport policy objectives (Bodin, 2018). In China, for example, the National Games of China function not only as a major competitive event but also as an institutional mechanism linking central sport administration, provincial sport organisations, athlete selection, and elite sport resource allocation (Tan and Houlihan, 2013; Ma and Kurscheidt, 2019). Similar to other national multi-sport competitions, the National Games must balance international competitive objectives with domestic institutional priorities (Hong and Zhouxiang, 2012). Therefore, the relationship between Olympic programme demand and domestic event supply should not be evaluated solely through programme similarity. A high degree of overlap may indicate strong direct alignment, but it does not necessarily represent optimal adaptation (Hall and Taylor, 1996). Conversely, differences between Olympic and domestic programmes may reflect either limited programme correspondence or legitimate institutional choices based on domestic sport development objectives. Understanding this relationship requires moving beyond static comparison and examining how domestic systems display different structural patterns across Olympic programme transitions (Mahoney and Thelen, 2009). China provides an analytically valuable case for examining this process. The connection between the Olympic programme and the National Games has become particularly explicit during preparation for the 15th National Games. According to regulations issued by the General Administration of Sport of China, the programme of the 15th National Games was adjusted with reference to the Los Angeles 2028 Olympic programme (General Administration of Sport of China, 2023; General Administration of Sport of China, 2025). Subsequent revisions included changes in swimming, rowing, athletics, archery, shooting, sport climbing, golf, and modern pentathlon, documenting an explicit policy-level linkage between Olympic programme evolution and domestic competition planning.

However, several questions remain unanswered. First, although policy documents frequently state that domestic competitions should support Olympic preparation, event-level structural correspondence has not been systematically examined. Second, Olympic programme change includes additions, modifications, and exits. Existing research offers limited evidence on how domestic supply patterns differ across these transition types. Third, the absence of a direct domestic equivalent does not by itself establish insufficient preparation capacity. Related events, athlete populations, and alternative competition pathways may coexist with a programme-level gap, but their compensatory effectiveness is not measured here. To address these gaps, this study develops a four-wave event-level framework connecting Paris 2024, LA28, NG14, and NG15. It combines structural alignment measures, longitudinal transition-pattern classification, and sensitivity analysis to address three research questions:

RQ1: How did structural alignment differ between the Paris 2024-NG14 and LA28-NG15 comparisons?

RQ2: What National Games supply patterns were observed across Olympic programme additions, modifications, and exits?

RQ3: How can structural gaps between LA28 and NG15 be differentiated at the programme level?

This study makes three contributions. First, it constructs a longitudinal event-level database that compares Olympic programme evolution with national competition supply. Unlike sport-level comparisons, this approach captures changes within sports and identifies precise forms of structural correspondence. Second, it reconceptualises adaptation as a descriptive relationship between programme change and domestic structural patterns, rather than as an assumed causal response. The framework distinguishes direct alignment, structural modification, pre-existing domestic supply, persistence, and structural gaps. Third, it integrates event harmonisation, crosswalk analysis, set-based similarity measurement, transition-pattern classification, and robustness testing. This framework provides a transferable approach for comparing national sport systems with flexible Olympic programme environments.

2. Methods

2.1 Research design and data sources

This study employed a four-wave longitudinal comparative design to compare Olympic programme transitions with changes in the event supply of China's National Games. The analysis covered Paris 2024, Los Angeles 2028 (LA28), the 14th National Games (NG14), and the 15th National Games (NG15). The design identifies structural and temporal correspondence but does not estimate causal effects.

The design combined two complementary comparisons. First, static programme alignment was examined between Paris 2024 and NG14 and between LA28 and NG15. These two pairings provide snapshots of the correspondence between Olympic programmes and domestic event supply at different points in time. They are treated as analytical benchmarks rather than identical causal cycles, because National Games programmes are determined by multiple domestic and international considerations. Second, a longitudinal transition analysis linked changes in the Olympic programme from Paris 2024 to LA28 with changes in National Games supply from NG14 to NG15. This four-wave structure made it possible to distinguish between pre-existing domestic supply, subsequent domestic additions, persistent supply, retrenchment, and structural gaps. The analytical universe comprised all competitive events in the four programmes: 329 medal events at Paris 2024, 353 medal events at LA28, 410 competitive events at NG14, and 419 competitive events at NG15. These event inventories were constructed from officially confirmed programme documents, including Olympic programme materials released by the International Olympic Committee and LA28, as well as National Games competition programmes and regulations issued by Chinese sport authorities and organising bodies (General Administration of Sport of China, 2021; International Olympic Committee, 2022; General Administration of Sport of China, 2025; Los Angeles 2028 Olympic and Paralympic Games, 2025). The competitive event, rather than the sport, was used as the primary unit of analysis because a substantial proportion of contemporary Olympic programme change occurs within sports through changes in event format, gender composition, distance, weight category, or medal-event configuration (Wheaton et al., 2026).

Data were obtained from official Olympic programme documents, National Games competition regulations, and related event lists released by the International Olympic Committee, LA28, the General Administration of Sport of China, National Games organising bodies, and relevant sport federations (International Olympic Committee, 2025). Specifically, the Paris 2024 and LA28 event inventories were derived from officially confirmed Olympic programme materials, while NG14 and NG15 event inventories were extracted from official National Games competition regulations and programme documents. When multiple versions of programme documents existed, the final confirmed versions were used to construct the analytical database, and earlier versions were retained only for source verification. Figure 1 summarises the four-wave analytical design, comparing changes in the Olympic programme with changes in the National Games programme and the four principal stages of the analysis.

2.2 Programme harmonisation and upstream ontology coding

Direct comparison across four editions required programme harmonisation because identical or closely related competitive events were not always labelled consistently. Conversely, similar event names could refer to materially different competitive structures. A hierarchical coding framework was constructed at four levels: sport, discipline, event family, and master event. The master event represented the most specific competitive identity that could be consistently traced across editions. The event family represented broader structural continuity where an event underwent substantial modification but remained within the same competitive lineage. Each Olympic medal event was matched with National Games supply using five categories: Exact, Equivalent, Modified, Developmental, and None. Their operational criteria and analytical interpretations are summarised in Table 1.

Matching followed a hierarchical procedure. Master-event correspondence was assessed first. Event-family correspondence was considered only where a master-level match could not be established but a defensible structural lineage remained. This rule was particularly important for sports characterised by frequent event restructuring, including boxing, weightlifting, sailing, sport climbing, race walking, and modern pentathlon (Dowling and Harris, 2022).

To assess the reliability of event harmonisation, 109 raw event-to-ontology mappings requiring additional judgement were independently recoded by a second coder, who was blinded to Coder 1's case-level assignments and the manuscript results. These cases involved ambiguous event names, cross-edition restructuring, event-family judgements, or cases lacking a direct master-event match. Both coders assigned a master-event identity, an event-family identity, and one of five event-to-ontology relation codes: Exact, Equivalent, Modified, Developmental, or Domestic-specific. Domestic-specific denoted a distinct National Games event retained in the ontology rather than collapsed into an Olympic master event. This reliability exercise evaluated upstream ontology coding, not the downstream Olympic–National Games matching order. Although four relation codes shared names with the downstream matching categories, they represented mutually exclusive nominal assignments at this stage, and no rank order was assumed. Pre-adjudication agreement was 100% for master-event identity and event-family identity and 78.9% for relation type; unweighted Cohen's κ was 0.511 (95% bootstrap CI, 0.331–0.668; 10,000 resamples). Unweighted Cohen's κ was therefore appropriate for evaluating agreement among the nominal ontology-relation codes. The moderate agreement level reflects the interpretive complexity of event-level harmonisation involving modified event structures and cross-edition terminology differences. After reliability assessment, the coders reviewed the 23 relation-type disagreements through case-by-case discussion based on the predefined matching criteria and reached consensus. The final consensus dataset was used for subsequent analyses.

Table 1
Event-level matching rules for Olympic–National Games programme comparison

Matching category	Operational criterion	Analytical interpretation
Exact	The Olympic and National Games events share the same master-event identity and substantive competitive specifications.	Direct event-level correspondence
Equivalent	The events represent the same competitive activity, with only non-substantive differences in terminology or presentation.	Direct event-level correspondence
Modified	The events belong to the same event family but differ in substantive specifications, such as format, distance, weight category, gender composition, or competition structure.	Structural continuity without exact identity
Developmental	The same underlying competitive activity is supplied through a youth or developmental category in the National Games.	Developmental structural continuity
None	No defensible correspondence can be established at either the master-event or event-family level.	Structural gap

Note: Event harmonisation prioritised master-event correspondence and used event-family correspondence only when a master-event match was not defensible. The 4–0 order classified downstream transition direction only; upstream ontology-relation codes were treated as nominal for intercoder reliability.

2.3 Downstream Olympic–National Games matching and longitudinal transition analysis

Static structural alignment was assessed using two complementary indicators. The first was the strict alignment rate (SAR), defined as the proportion of Olympic medal events with either an Exact or Equivalent counterpart in the corresponding National Games programme:

$$SAR = \frac{N_{\text{Exact}} + N_{\text{Equivalent}}}{N_{\text{Olympic}}} \tag{1}$$

where N_{Olympic} denotes the total number of Olympic medal events in the relevant edition, and N_{Exact} and $\mathrm{N}_{\text{Equivalent}}$ denote the numbers of events classified as Exact and Equivalent, respectively. SAR therefore captures direct event-level correspondence.

The second indicator was the structural supply rate (SSR), which additionally included Modified and Developmental supply:

$$SSR = \frac{N_{\text{Exact}} + \mathrm{N}_{\text{Equivalent}} + N_{\text{Modified}} + N_{\text{Developmental}}}{N_{\text{Olympic}}} \tag{2}$$

SSR captures whether structurally related domestic supply remains available even where exact Olympic event identity is not reproduced. Comparing SAR and SSR therefore helps distinguish identity-level divergence from broader structural continuity. Both indicators use Olympic medal events as the denominator and therefore measure Olympic-event coverage by National Games supply rather than symmetric programme overlap.

Set-based similarity was further assessed using the Jaccard coefficient (Jaccard, 1912):

$$J\left(A, B\right) = \frac{|A \cap\ B|}{|A \cup\ B|} \tag{3}$$

where *A* and *B* represent the Olympic and National Games event sets. Jaccard similarity was calculated separately at the master-event and event-family levels. The master-event measure provides a stricter assessment of event identity similarity, whereas the event-family measure captures continuity across broader competitive lineages.

The longitudinal analysis classified Olympic programme transitions from Paris 2024 to LA28 into four categories: Stable, Modification, Addition/Returned, and Exit. Stable referred to medal events whose competitive identity remained substantially unchanged. Modification captured events retained in the Olympic programme but structurally reconfigured. Addition/Returned referred to newly introduced or reinstated medal events. Exit referred to Paris 2024 medal-event identities not retained at LA28. National Games supply patterns were then classified from changes between NG14 and NG15. The classes distinguished maintained alignment, alignment change, subsequent domestic addition, pre-existing domestic supply, persistent supply, retrenchment, and structural gaps. These classes describe temporal correspondence between two programme sequences. They do not identify whether an Olympic transition caused a National Games change or whether pre-existing supply reflected anticipatory intent.

For longitudinal transition classification, the downstream Olympic–National Games matching categories were assigned a task-specific order: Exact (4), Equivalent (3), Modified (2), Developmental (1), and None (0). This ordering was used only to determine whether domestic correspondence upgraded, remained stable, or downgraded between NG14 and NG15. It was not applied to the upstream event-to-ontology relation codes used in the intercoder reliability analysis. Modified was placed above Developmental because it preserves a non-developmental counterpart within the same event family, despite substantive differences in event specifications. By contrast, a Developmental match supplies the underlying competitive

activity only through a youth or developmental category. The ordering therefore represents proximity to the Olympic medal-event structure, not category quality, policy importance, athlete-development value, or preparation effectiveness. The scores were not assumed to have equal intervals and were not used as primary structural alignment measures. For LA28 events lacking a National Games counterpart, an additional interpretive distinction was made between within-sport and sport-absent structural gaps. Within-sport structural gaps referred to missing event identities within sports that remained represented in the National Games programme. Sport-absent structural gaps referred to sports that were absent from the National Games programme itself. This distinction was used for structural interpretation only and did not indicate the existence, form, or effectiveness of preparation pathways outside the National Games.

2.4 Sensitivity and robustness analysis

Because Equivalent, Modified, and Developmental relationships may reasonably be assigned different degrees of structural credit, sensitivity analysis was conducted under five alternative weighting scenarios (Saltelli et al., 2008). The Strict scenario assigned full credit to Exact and Equivalent matches and no credit to Modified or Developmental supply. The Conservative scenario assigned weights of 1.00, 0.85, 0.50, and 0.25 to Exact, Equivalent, Modified, and Developmental relationships, respectively. The Balanced scenario used weights of 1.00, 0.90, 0.70, and 0.40; the Liberal scenario used 1.00, 1.00, 0.85, and 0.50; and the Any structural supply scenario assigned full credit to all non-None categories. Like the 4–0 transition rule, these weighting scenarios were applied only to downstream programme matches and did not alter the nominal treatment of ontology-relation codes in the reliability analysis. For each weighting scenario w, the structural alignment score was calculated as:

$$S_{\omega} = \frac{\omega_{E} N_{\mathrm{E}} + \omega_{Eq} N_{Eq} + \omega_{M} N_{M} + \omega_{D} N_{D}}{N_{\mathrm{Olympic}}} \tag{4}$$

where ω_{E}, ω_{Eq}, ω_{M}, and ω_{D} denote the weights assigned to Exact, Equivalent, Modified, and Developmental relationships, respectively.

The weighted scores were not interpreted as a single preferred index. They were used solely to test whether the direction of the main findings changed under alternative assumptions regarding the degree of structural similarity represented by each matching category. Additional robustness tests were conducted at the master-event and event-family levels and by recalculating LA28-NG15 alignment after excluding two analytically important sources of programme divergence: the five additional LA28 sports and the major weight-category restructuring in boxing and weightlifting. Because the study analysed the complete event populations of the four programmes rather than probability samples, inference was based on structural proportions, percentage-point differences, transition frequencies, and consistency across alternative analytical specifications rather than conventional significance testing.

3. Results

3.1 Overall structural alignment

Both Olympic–National Games pairings exhibited high levels of structural correspondence, although the LA28-NG15 comparison showed lower direct event-level alignment than the Paris 2024-NG14 benchmark. As shown in Table 2, the strict alignment rate declined by 6.1 percentage points, whereas the broader structural supply rate declined by only 4.2 percentage points.

The smaller reduction in SSR than in SAR shows that some loss of exact event identity coexisted with continued related domestic supply. The same pattern is evident in the Jaccard results: similarity declined at both analytical levels, but event-family similarity remained consistently higher than master-event similarity, suggesting that broader competitive lineages were more stable than exact event identities.

Table 2
Structural alignment across the two Olympic–National Games comparisons

Programme comparison	Olympic events (N)	Exact/ Equivalent, n (%)	Modified, n	Developmental, n	None, n	SAR (%)	SSR (%)	Jaccard similarity (Master/ Family)
Paris 2024 -NG14	329	309(93.9)	17	2	1	93.9	99.7	0.763/ 0.848
LA28 -NG15	353	310(87.8)	25	2	16	87.8	95.5	0.714/ 0.790
Change	-	-6.1pp	-	-	+ 15	-6.1pp	-4.2pp	-0.049/ -0.058

Note: SAR = strict alignment rate; SSR = structural supply rate. SAR includes Exact and Equivalent matches only, whereas SSR additionally includes Modified and Developmental supply. Jaccard similarity was calculated separately at the master-event and event-family levels. Changes are calculated as LA28-NG15 minus Paris 2024-NG14; pp = percentage points.

Overall, the LA28-NG15 pairing displayed lower aggregate programme similarity, but the gap between strict alignment and broader structural supply indicates that part of this difference reflects event restructuring rather than complete supply loss.

3.2 National Games supply patterns across Olympic programme transitions

The four-wave analysis contained 361 Olympic transition units: 296 Stable events, 29 Modifications, 28 Addition/Returned events, and eight Exits. As shown in Table 3, National Games supply patterns differed across these transition types. Stable Olympic events were accompanied by maintained or improved domestic correspondence in 97.6% of cases. All 29 modified LA28 events retained some form of structural supply in NG15. Addition/Returned events showed greater heterogeneity. Fifteen of 28 had structural supply in NG15: four were subsequent domestic additions and eleven were already present before the LA28 programme change. For Olympic exits, six of eight event identities retained or expanded related domestic supply. These are descriptive temporal patterns. They show when domestic programme changes occurred relative to Olympic transitions, but they do not establish that the Olympic changes caused them.

Table 3
National Games supply patterns across Olympic programme transitions

Olympic programme transition	Transition units (N)	National Games supply pattern	n (%)	Main finding
Stable	296	Stable Alignment	273 (92.2)	97.6% maintained or improved alignment
		Alignment Upgrade	16 (5.4)	
		Alignment Downgrade /Domestic Retrenchment	7 (2.4)	
Modification	29	Subsequent Alignment Upgrade	5 (17.2)	100% retained some form of structural supply
		Stable Modified Supply	23 (79.3)	
		Lower-fit Modified Supply	1 (3.4)	
Addition/Returned	28	Subsequent Domestic Addition	4 (14.3)	53.6% had structural supply in NG15
		Pre-existing Domestic Supply	11 (39.3)	
		NG15 Structural Gap	11 (39.3)	
		Retrenchment despite Addition	2 (7.1)	
Exit	8	Subsequent Domestic Removal	2 (25.0)	75.0% retained or expanded domestic supply
		Supply Persistence	5 (62.5)	
		Post-exit Domestic Expansion	1 (12.5)	

Note: The transition universe contains 361 analytical units: 353 LA28 target events and eight Paris 2024 medal-event identities not retained at LA28. Percentages are calculated within each Olympic transition type and may not sum to 100.0% because of rounding. “Downgrade / retrenchment” combines Alignment Downgrade and Domestic Retrenchment for concise presentation; the underlying categories remain separate in the event-level database.

3.3 Sport-level heterogeneity and structural gaps

The aggregate results concealed substantial variation across sports. Some sports exhibited event-level correspondence changes despite little change in aggregate coverage. Archery and sport climbing, for example, maintained complete strict correspondence while improving the identity of their domestic event supply alongside LA28 programme changes. Sailing likewise moved closer to the Olympic event structure even though its broader structural supply changed little. By contrast, modern pentathlon and weightlifting illustrate why strict alignment alone can overstate structural deterioration. Both sports experienced pronounced declines in direct event identity because of substantial changes in competition format or weight categories, yet their broader structural supply remained complete. These cases therefore represent event reconfiguration rather than supply withdrawal. A different pattern was observed in golf, shooting, tennis, and table tennis, where declines in strict alignment were accompanied by declines in broader structural supply. These sports therefore represented more substantive forms of structural divergence.

Among the 16 LA28 events classified as None in the NG15 comparison, eight were interpreted as within-sport structural gaps and eight as sport-absent structural gaps. Within-sport structural gaps occurred within sports that remained

represented in the National Games programme, including golf, gymnastics, shooting, tennis, and table tennis. By contrast, cricket, flag football, lacrosse, and squash accounted for eight sport-absent structural gaps because the sports themselves were absent from NG15. The distinction is particularly important in table tennis. The absence of several LA28 event identities from NG15 constitutes a clear programme-level gap, but it does not demonstrate the absence of athlete, coaching, or competition capacity within the domestic system. Structural non-alignment and preparation incapacity should therefore not be treated as equivalent outcomes.

Detailed sport-level structural correspondence profiles are reported in Supplementary Table S1.

3.4 Robustness of the aggregate findings

Sensitivity analysis confirmed that the direction of aggregate change was consistent across all five weighting scenarios (Fig. 2). The LA28-NG15 alignment score remained below the Paris 2024-NG14 benchmark under every specification, although the difference narrowed from 6.1 percentage points under the Strict scenario to 4.2 percentage points when all forms of structural supply received full credit.

Programme-range tests further clarified the source of the difference. Under the Balanced specification, LA28-NG15 alignment increased from 92.8% for the full programme to 95.1% when the five additional LA28 sports were excluded, to 94.1% when boxing and weightlifting were excluded, and to 96.7% when both sources of divergence were removed. Under the Strict specification, the corresponding score increased from 87.8% to 95.9% when both were excluded. These results indicate that the lower aggregate alignment observed for LA28-NG15 was concentrated primarily in two identifiable components: Olympic programme expansion into sports not represented in the National Games and event-specification restructuring within established sports. It therefore should not be interpreted as evidence of a uniform decline in National Games programme correspondence.

4. Discussion

4.1 Beyond programme overlap: interpreting structural correspondence

The results indicate that structural correspondence between Olympic programmes and national multi-sport event systems cannot be assessed solely through direct programme overlap. Although the strict alignment rate declined from the Paris 2024-NG14 comparison to the LA28-NG15 comparison, broader structural supply remained high in both comparisons. The difference between SAR and SSR shows that reduced event-level identity does not necessarily coincide with the disappearance of domestic competitive supply. In several sports, the apparent decline reflected changes in event specifications, competition formats, or weight categories rather than withdrawal of the underlying sport or competitive pathway. Here, structural correspondence is used as a descriptive analytical concept, not as evidence that Olympic changes caused domestic changes.

This distinction is important because national competition systems serve broader institutional purposes than reproducing Olympic medal-event structures. The Olympic programme is itself dynamic, with events entering, exiting, or being reconfigured across cycles. If domestic event systems were evaluated exclusively according to exact Olympic correspondence, any modification in the international programme would mechanically appear as a domestic mismatch until the national programme reproduced the new configuration. Such an approach would overstate structural discontinuity and provide limited insight into how domestic programme structures compare across international changes. The findings therefore support a distinction between exact programme overlap and broader structural correspondence. Exact programme overlap concerns whether Olympic and domestic event identities are identical at a given point in time. In this study, broader structural correspondence descriptively denotes whether the domestic system retains or develops competitive structures corresponding to changing Olympic programmes (Scott, 2014). Observed correspondence may

take the form of exact replication, modified supply, pre-existing domestic supply, or other forms of institutional continuity (Nite and Edwards, 2021; Robertson et al., 2021).

From this perspective, maximum programme overlap should not automatically be regarded as the optimal form of adaptation. A national multi-sport event system may retain high programme correspondence with Olympic events while retaining event structures that also serve athlete development, domestic competition, regional participation, or institutional continuity. Structural divergence therefore requires explanation rather than automatic interpretation as a policy failure.

4.2 Temporal correspondence across Olympic programme transitions

The longitudinal analysis identified different temporal correspondence patterns across Olympic transition types. Stable Olympic events were usually accompanied by stable or improved domestic alignment, and all modified LA28 events retained structural supply in NG15. Added and returning events showed more heterogeneous domestic patterns, while Olympic exits often coexisted with continued domestic supply. These observations are consistent with easier structural accommodation when changes occur within established sports, but they do not test that explanation. Existing athlete pools, coaching systems, venues, expertise, and organisational arrangements provide a plausible interpretation that requires separate evidence. Among the 28 added or returning events, four were followed by domestic additions, while eleven already had domestic supply before the LA28 programme change. We therefore describe the latter as pre-existing domestic supply, not anticipatory supply. Prior presence establishes temporal order but does not demonstrate foresight, policy intent, or preparation purpose. Likewise, subsequent additions indicate timing, not direct programme response, unless case-specific policy documentation establishes that linkage.

Domestic supply also frequently remained after Olympic exits. This pattern is inconsistent with simple one-to-one convergence, but it does not establish the direction of influence. Events may persist because they serve national development, participation, institutional, or sporting functions. The observed relationship is therefore best described as selective structural correspondence across programme transitions.

4.3 Structural gaps and their differentiated meanings

The results also show that apparently identical structural gaps may have different institutional meanings. Sixteen LA28 medal events had no corresponding supply in NG15, but these gaps were evenly divided between within-sport and sport-absent cases.

Within-sport structural gaps occur where a specific Olympic event identity is absent but the relevant sport and related event structures remain represented within the National Games system; however, the present data do not establish athlete-level overlap, technical substitutability, or preparation effectiveness. In such cases, structural non-alignment is real at the event-programme level, but the available data do not justify interpreting it as an absence of preparation capacity beyond the National Games. Golf, gymnastics, shooting, tennis, and table tennis illustrate this distinction. Table tennis is particularly informative. Several LA28 event identities are absent from NG15, producing a measurable reduction in structural alignment, while closely related domestic event structures remain within the National Games programme. The observed gap therefore represents a difference in programme configuration rather than evidence of broader preparation incapacity.

Sport-absent structural gaps represent a different form of non-alignment. Cricket, flag football, lacrosse, and squash are absent from NG15 altogether. Consequently, these sports receive no event-level competition supply through the National Games itself. Whether and how this absence is compensated through other competition or training pathways cannot be determined from the present data.

This distinction also clarifies the scope of the present study. The analysis measures structural supply within the National Games, not the total preparation capacity of China's elite sport system. A None classification should therefore be interpreted as the absence of National Games event supply rather than as evidence of national-level incapacity. Future assessments of Olympic preparation effectiveness would require additional evidence concerning athlete pathways, training arrangements, competition calendars, selection systems, and performance outcomes.

4.4 Implications for national multi-sport event governance

The findings have broader implications for comparing domestic competition systems with increasingly flexible international sport programmes. The analysis examines how forms of international programme change coexist with existing domestic structures. First, transition types are associated with different structural requirements. Stable and modified events can often be represented within established structures, whereas new sports may require new athlete pathways, expertise, facilities, and competition opportunities. These are governance considerations rather than effects estimated by this study. Second, event identity, structural continuity, and functional preparation should be separated. Exact programme overlap measures correspondence, not responsiveness or preparation effectiveness. Third, post-exit persistence shows that domestic programmes are not mechanically determined by Olympic status. National multi-sport events may also serve athlete development, territorial representation, participation, and sport continuity. The governance question is therefore how national systems balance external competition demands with internal developmental objectives.

More broadly, the framework developed in this study offers a basis for comparative analysis across national sport systems. Countries may display different combinations of direct replication, pre-existing domestic supply, structural modification, persistence, and pathways outside national multi-sport events. Cross-national analysis combined with policy-process evidence could test whether governance arrangements explain these differences. The present study identifies comparable structural patterns but does not estimate causal effects.

5. Conclusion

This study examined the structural relationship between changing Olympic programmes and China's National Games event supply through four-wave analysis of Paris 2024, LA28, NG14, and NG15. Event harmonisation, static alignment measures, longitudinal transition-pattern analysis, and sensitivity testing provide a differentiated account of structural correspondence beyond simple programme overlap.

Three principal conclusions emerge. First, the LA28-NG15 comparison exhibits lower event-level alignment than the Paris 2024-NG14 benchmark, but this is not evidence of a uniform decline in programme correspondence. Strict alignment decreased from 93.9% to 87.8%, while broader structural supply decreased from 99.7% to 95.5%. The smaller SSR decline and higher event-family similarity show that part of the divergence reflects event reconfiguration. Second, temporal correspondence varies by Olympic transition type. Stable events were usually accompanied by maintained domestic alignment, and all modified events retained structural supply. Among additions and returning events, four were followed by domestic additions, eleven had pre-existing supply, and the remainder showed gaps or retrenchment. Six of eight Olympic exits retained or expanded related domestic supply. These patterns do not establish causal direction. Third, structural gaps differ in meaning. Some occur within represented sports and may coexist with alternative pathways, while others reflect sports absent from the National Games. Structural non-alignment should therefore not be equated with functional failure.

The study contributes conceptually by distinguishing exact programme overlap from broader structural correspondence and defining adaptation as a descriptive pattern rather than a causal effect. Methodologically, it integrates event-level harmonisation, structural indicators, longitudinal transition-pattern classification, set similarity, and sensitivity analysis. Empirically, it provides a four-wave account of the intersection between Olympic programme change and the evolution of

China's National Games programme. Several limitations remain. Because both SAR and SSR use Olympic medal events as their denominator, they are directional measures of Olympic-event coverage rather than symmetric measures of programme alignment. They do not quantify the proportion of National Games events that correspond to the Olympic programme; Jaccard similarity provides a complementary symmetric measure of set overlap. Programme structures do not reveal why changes occurred, whether pre-existing supply reflected anticipatory intent, or whether observed gaps were functionally compensated. The within-sport structural gap classification identifies structural differences within sports represented in the National Games; it does not demonstrate functional substitution or preparation effectiveness. The observed patterns should therefore be treated as transferable analytical propositions rather than established mechanisms across national sport systems.

Future research could link programme structures with athlete pathways, competition calendars, resource allocation, and performance outcomes. Policy documents, decision records, and interviews could test whether subsequent domestic changes reflected deliberate responses and whether pre-existing supply represented intentional anticipation. Cross-national comparison could then examine whether governance arrangements explain different structural correspondence patterns.

Overall, the relationship between international programme change and domestic competition systems is best described here as differentiated structural correspondence. This provides a basis for interpreting adaptation without assuming it. National systems display alignment, modification, persistence, or distance across programme transitions. Determining why those patterns occur requires evidence beyond programme structures.

Declarations

Author contributions

Author 1 contributed to the conceptualisation of the study, research design, and writing of the manuscript. Author 2 contributed to data collection and data analysis. Both authors reviewed and approved the final version of the manuscript.

Competing interests

The authors declare no competing interests.

Ethical Approval

This article does not contain any studies with human participants performed by any of the authors.

Informed consent

Informed consent was not applicable because this study did not involve human participants.

Additional information

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Figures

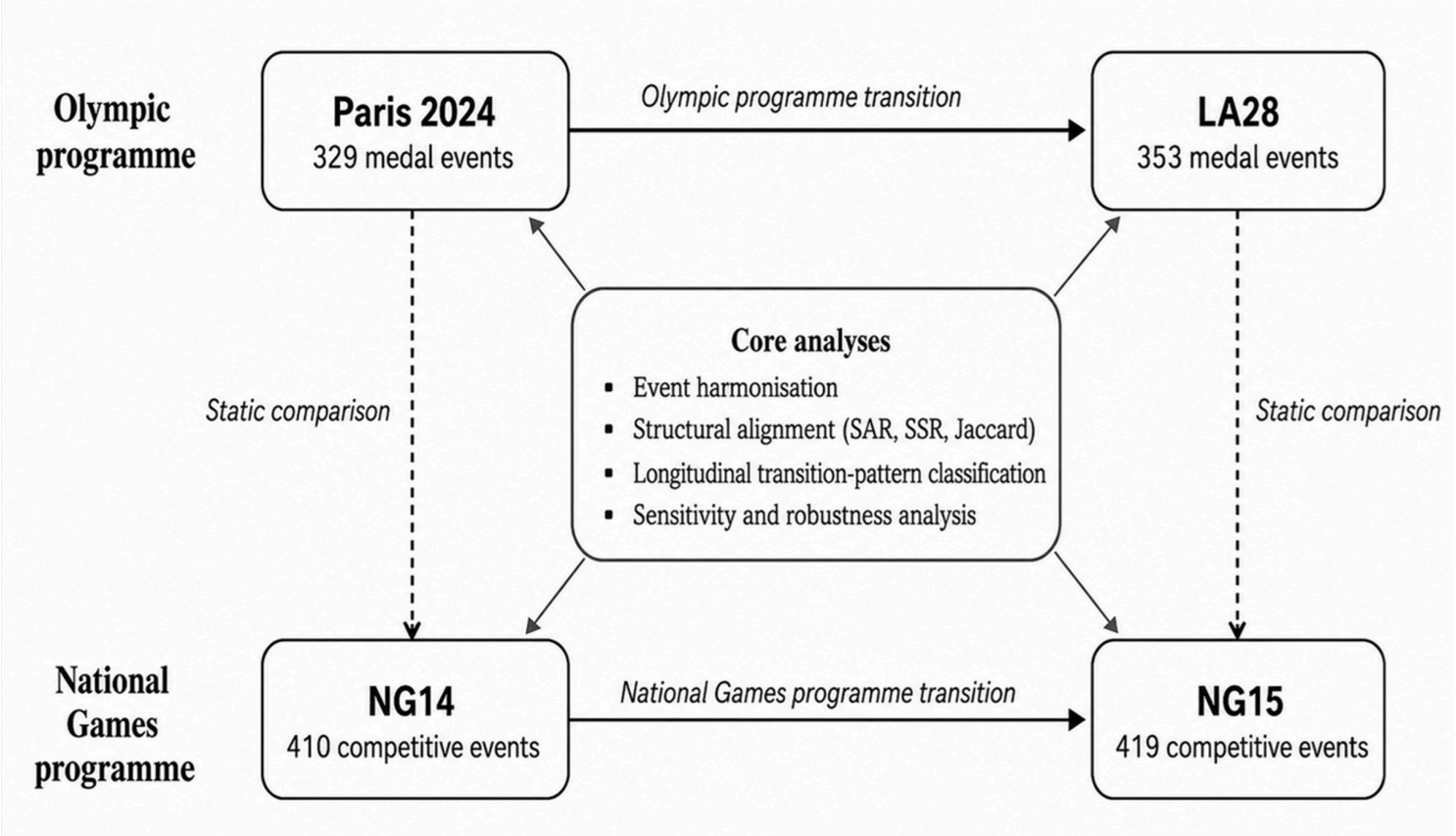


Figure 1

Four-wave analytical design of Olympic programme and National Games supply correspondence

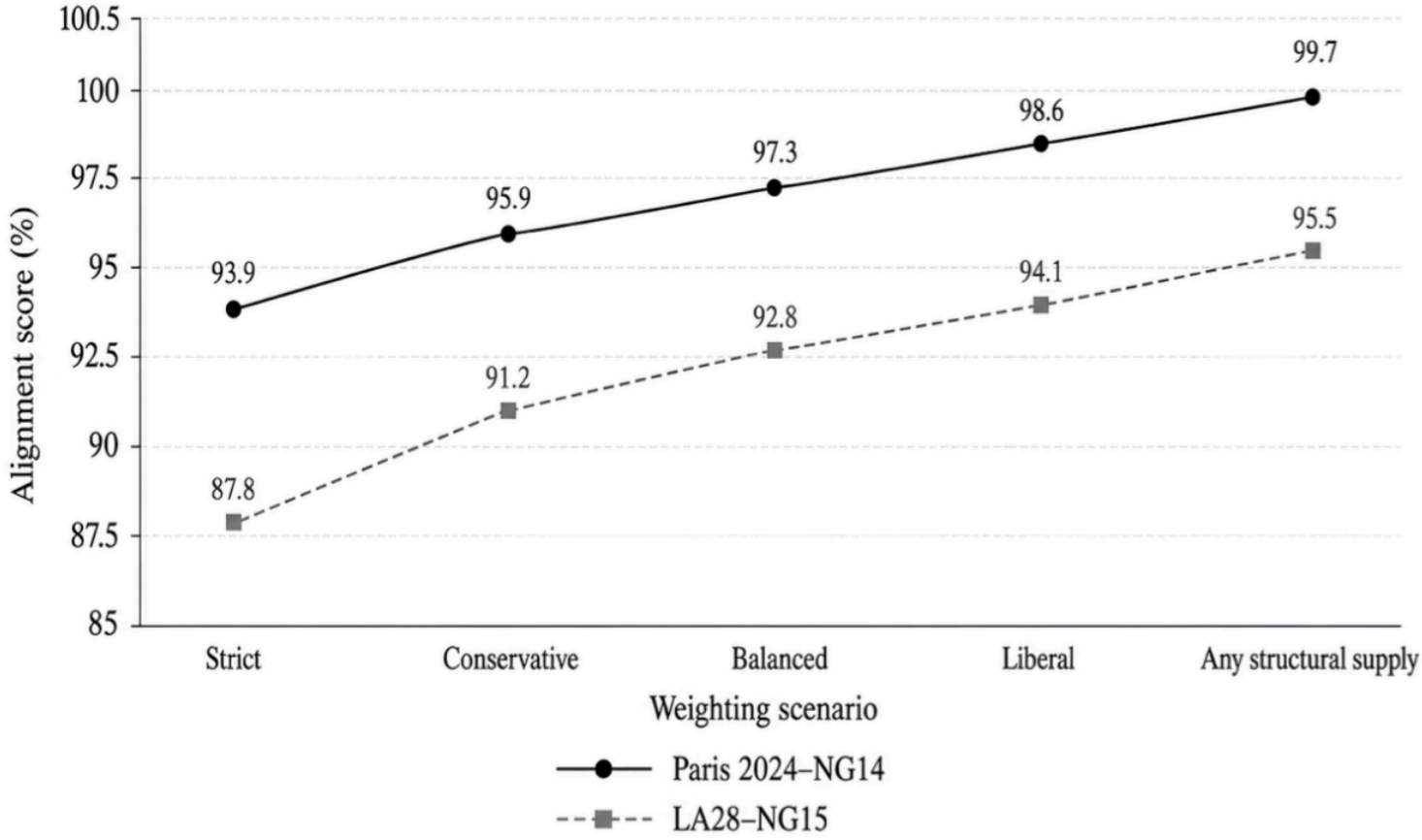


Figure 2

Sensitivity analysis of structural alignment under five weighting scenarios

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