Commensuration of Visual Art: The Case of the Prairie Home

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“[Linearity] affected virtually every aspect of the residential design—the disposition of the single mass or composite massing, the shape of the low, long hipped or gable roof, the horizontal banding of windows, the emphatic belt course or shelf roof between the storeys—which often continued on one side as a lateral porch—and the broad, often forward-set foundation upon which the building was securely placed. The continuity of line, edge, and surface…lent horizontal unity to the design, and against these horizontals a spirited interplay was established with short vertical accents, such as piers, mullions, and subsidiary masses.

Every feature of the building—from the basic mass to the smallest detail—was clear, precise, and angular. Ornament, per se, was a rarity; enrichment was dependent on the textural expression of materials and the often lively juxtaposition of various shapes and forms. Only in the stylized or abstract patterns of the leaded glass (or zinc strip) windows did one find consistent ornament. The historical styles, as commonly known, were rejected.

The materials employed were generally brick, or wood and plaster…

— Brooks (1972) *The Prairie School*”

Overview

- Why measure art quantitatively?
  - Compare artistic works to one another.
  - Compare artistic movements to one another.
  - Assess growth/diffusion of artistic movements across time and space.
- How?
  - Key: Artistic styles are sets; artistic works are elements of a set.
  - Sets are mathematical types; can compare elements of the same type.
  - A “style coefficient” measures the degree to which a specific work belongs to a specific style.
- Example: The Prairie Home

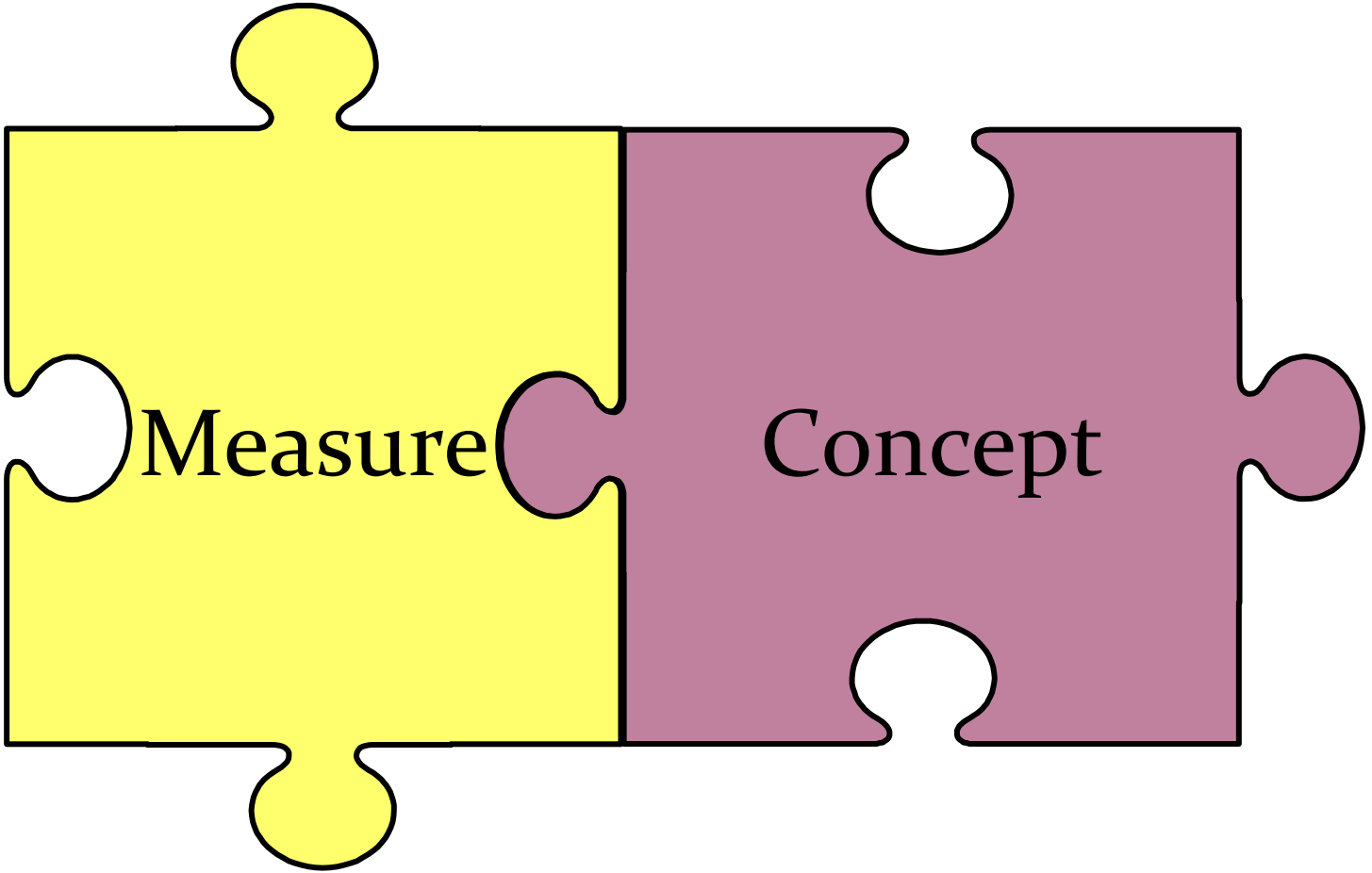
Formalizing Qualitative Assessment of Artistic Styles through Concept Construction

- Artistic styles as conditions
- How are conditions specified and interpreted?
- *The jigsaw puzzle metaphor:*
  - A condition is an adjective phrase composed of an ontological dimension and an epistemological dimension: a concept joined to one or more measures.
  - "Calibration" is a process of re-shaping the concept and/or measures so that they fit together.

Two Types of Concepts: Variables & Conditions

- ***Variables*** are nouns that measure magnitudes: Income measures how much a person earns. ***Adjective phrases*** describe a specific quality such as the condition of being rich.
  - In the qualitative and comparative traditions, adjective phrases are called "conditions."
- An adjective phrase qualifies a noun. Most concepts of interest to social scientists are adjective phrases: "authoritarian country," "post-industrial economy," "highly-educated individual"
- Nouns may be complex:
  - "Sci-fi film" vs "Hard sci-fi film" vs "Popular hard sci-fi film"
- A condition measures the degree to which the object (noun) exhibits the quality (adjective)
- Conditions are difficult to measure b/c you must operationalize:
  (a) the object, (b) the quality, and (c) the expression of the quality by the object.

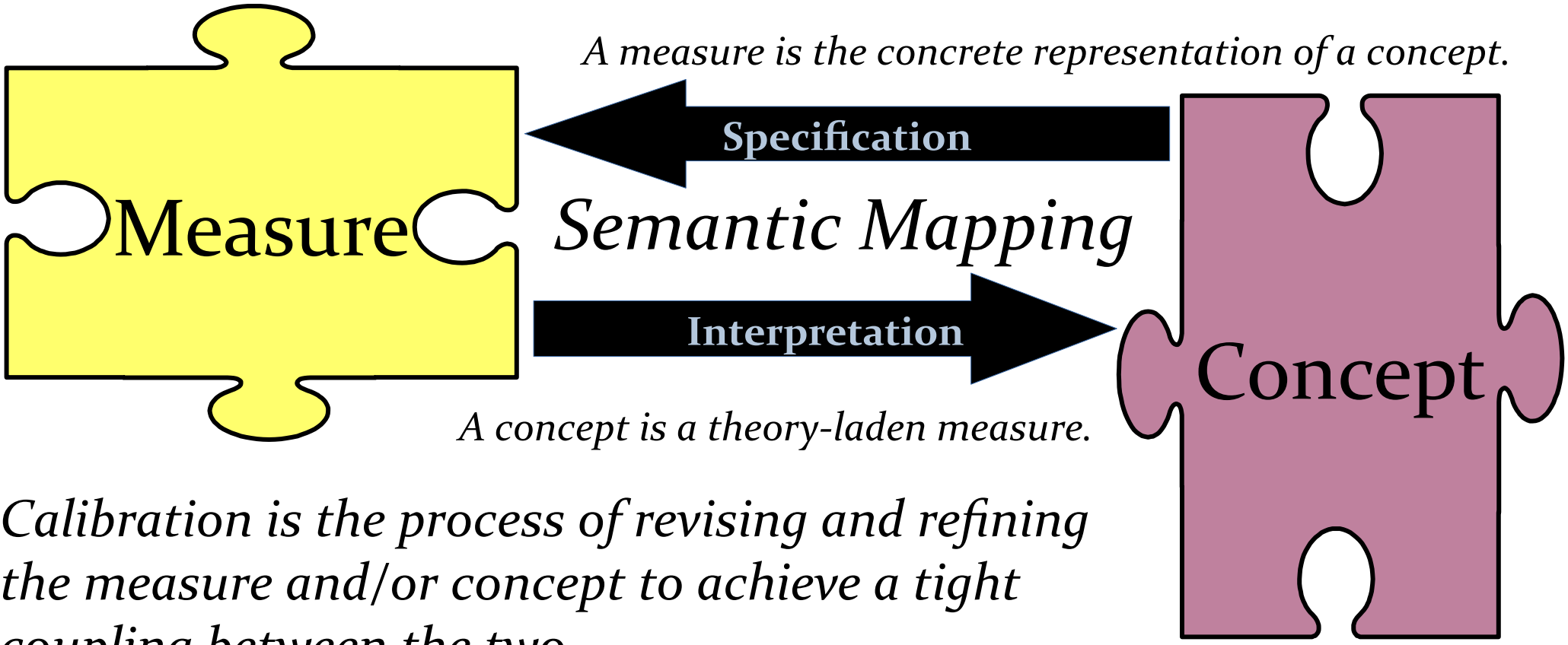
What is a Condition?



What is a Condition?

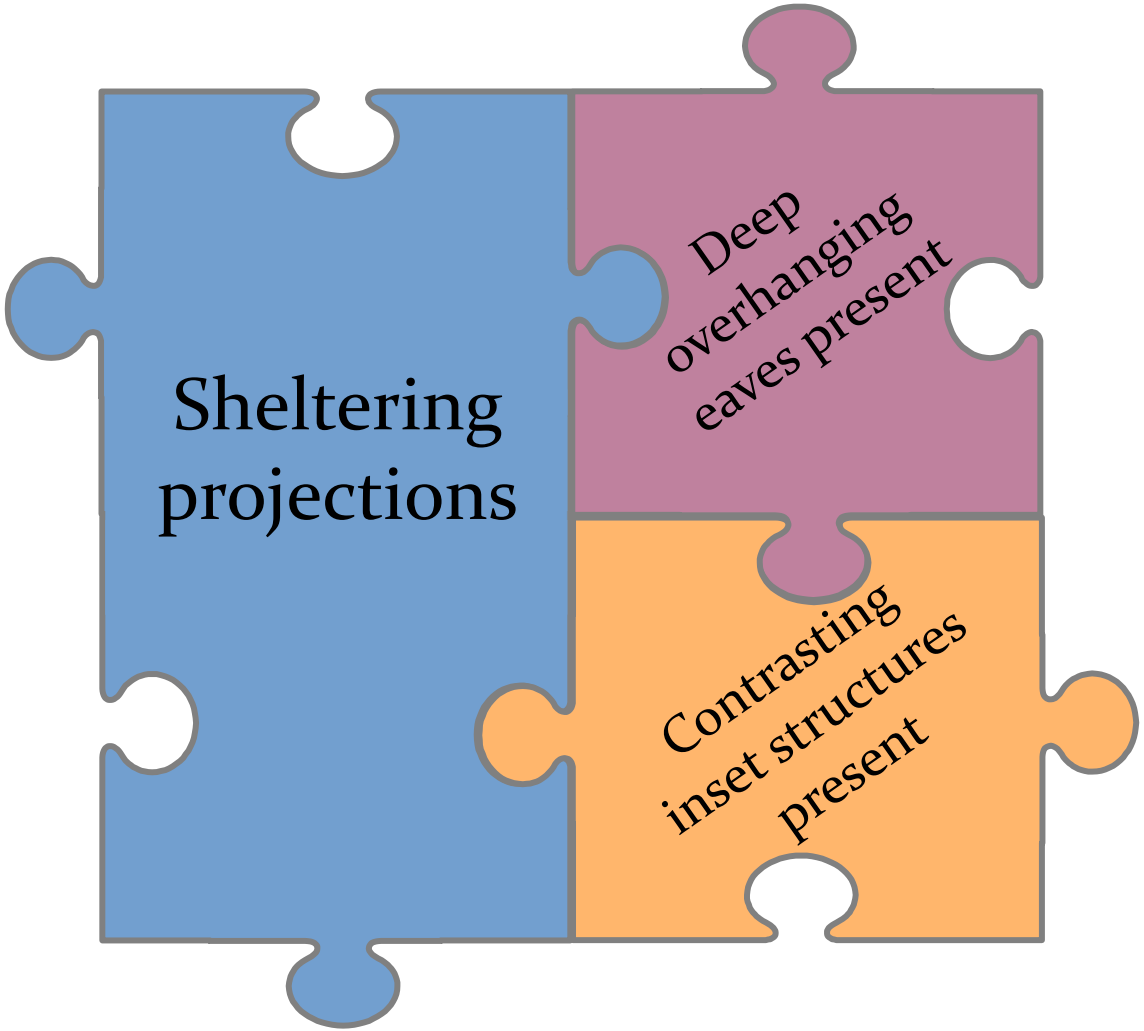
	Quality (Adjective)	**Object (Noun)**
Condition:	"Prairie	Home"
Ontological questions identify *the concept*:	What does it mean for a residential structure to be Prairie?	What is a residential structure?
Epistemological questions identify *the measure*:	How do we assess the degree to which a residential structure is Prairie?	How do we distinguish between residential and non-residential structures?

Calibration: Achieving Fit via Iteration

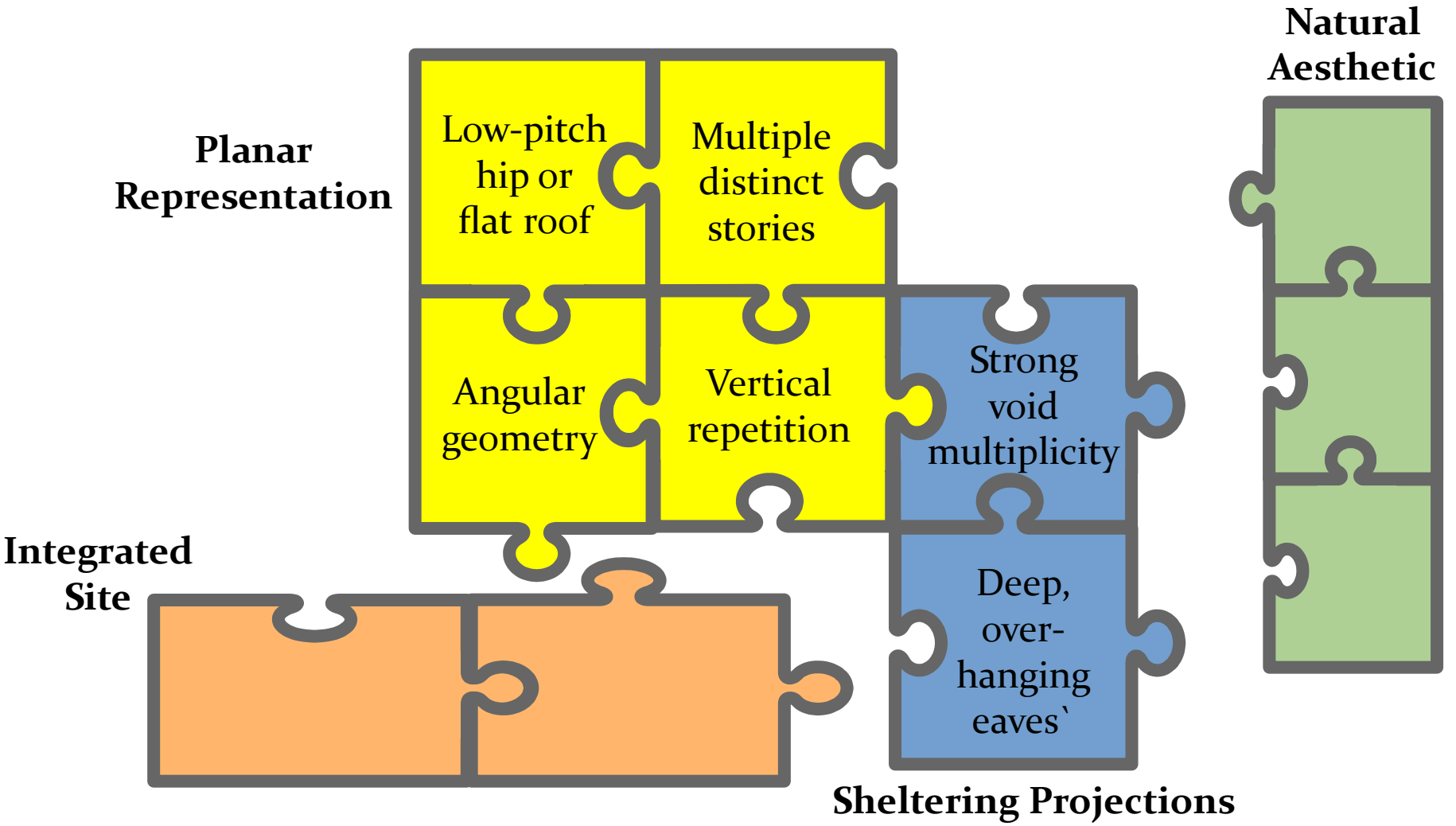


Calibration is the process of revising and refining the measure and/or concept to achieve a tight coupling between the two.

Concepts are usually composed of multiple measures



Macrocondition: A condition composed of conditions



Defining Semantic Thresholds: Mapping Concepts to Measures

Semantic thresholds:

1.0 = full membership (Weberian ideal-typical case)

0.0 = full non-membership (negative case)

0.5 = crossover point (ambiguous case)

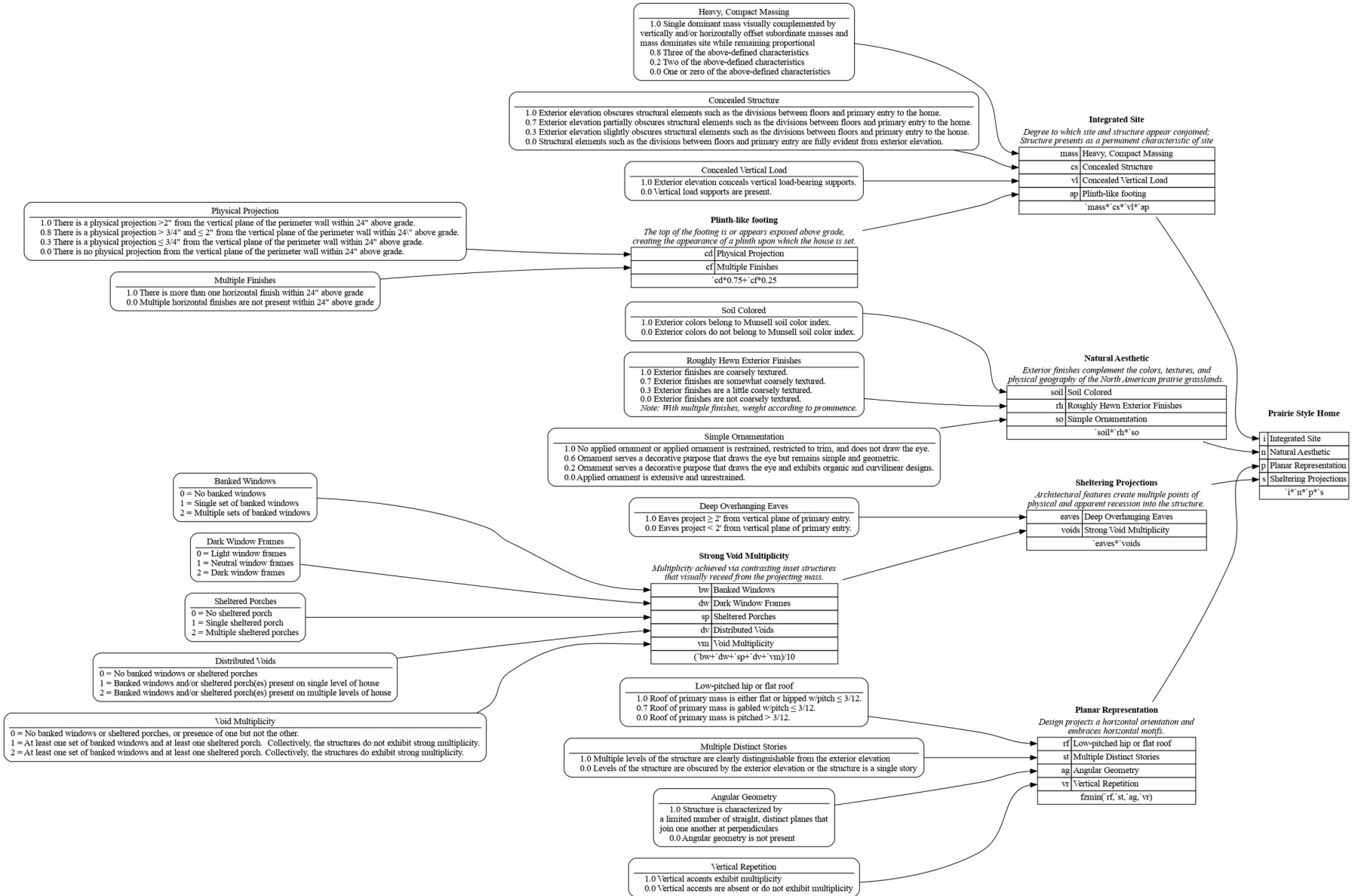
> 0.5 = typical case possesses enough characteristics to be recognized as an instance of the case

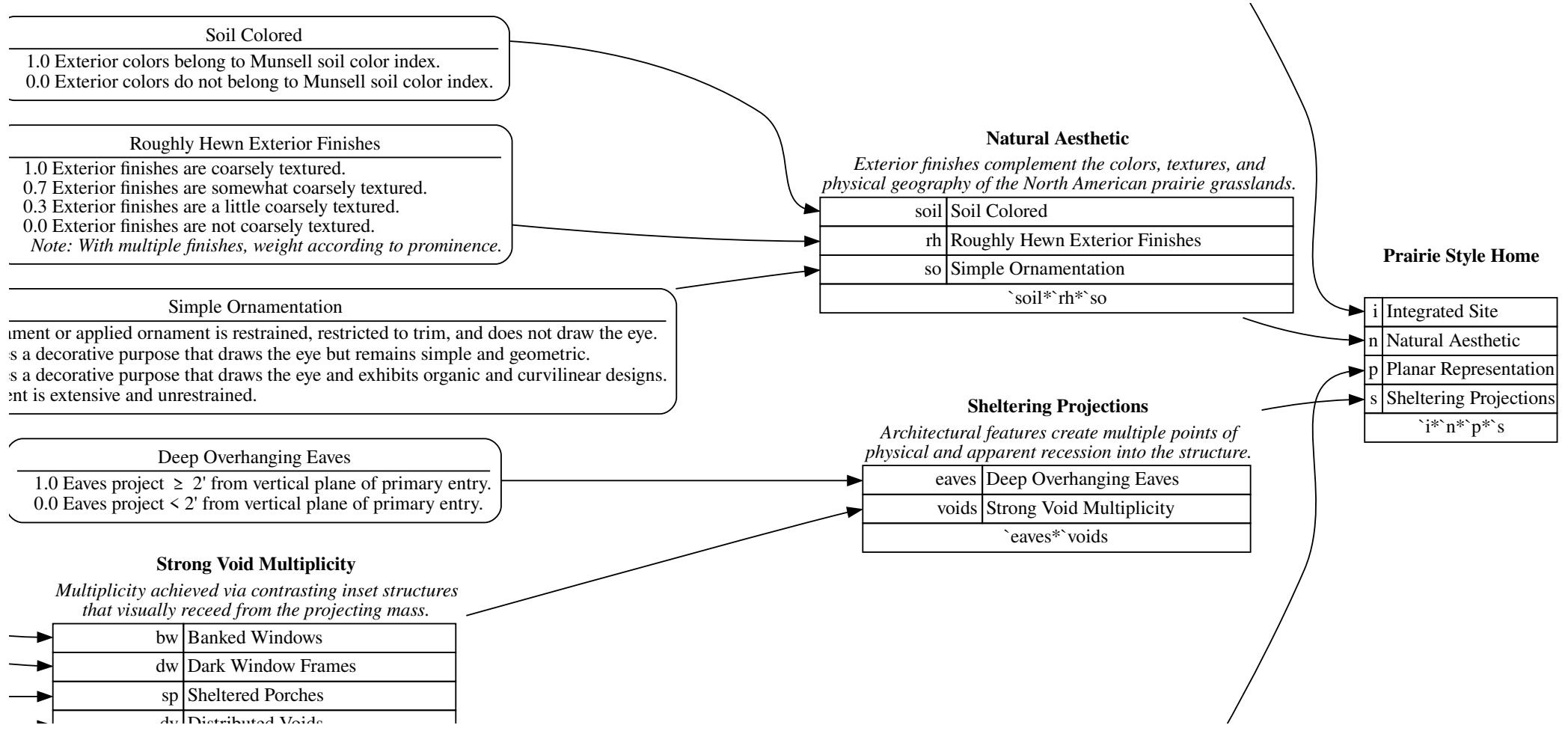
< 0.5 = atypical case possesses some characteristics but is not recognized as an instance of the case

Successful calibration answers two questions:

1. What does each semantic threshold mean ontologically?
2. What are the epistemological rules that produces each membership score?

Crisp set	Three-value fuzzy set	Four-value fuzzy set	Six-value fuzzy set	Continuous fuzzy set	
---------- Ideal-typical case = Fully in = 1.0 ----------					
	More in than out = 0.7	More in than out = 0.7	Mostly but not fully in = 0.8 More or less in = 0.6	Degree of membership is more “in” than “out” 0.5 < X < 1	*Typical cases (Instances of the set)*
---------- Ambiguous case = Crossover Point = 0.5 ----------					
		More out than in = 0.3	More or less out = 0.4 Mostly but not fully out = 0.2	Degree of membership is more “out” than “in” 0.0 < X < 0.5	*Atypical cases Non-instance of the set*
---------- Negative case = Fully out = 0.0 ----------					


Heavy, Compact Massing
1.0 Single dominant mass visually complemented by vertically and/or horizontally offset subordinate masses and mass dominates site while remaining proportional
0.8 Three of the above-defined characteristics
0.2 Two of the above-defined characteristics
0.0 One or zero of the above-defined characteristics
Concealed Structure
1.0 Exterior elevation obscures structural elements such as the divisions between floors and primary entry to the home.
0.7 Exterior elevation partially obscures structural elements such as the divisions between floors and primary entry to the home.
0.3 Exterior elevation slightly obscures structural elements such as the divisions between floors and primary entry to the home.
0.0 Structural elements such as the divisions between floors and primary entry are fully evident from exterior elevation.
Concealed Vertical Load
1.0 Exterior elevation conceals vertical load-bearing supports.
0.0 Vertical load supports are present.
Integrated Site
Degree to which site and structure appear conjoined; Structure presents as a permanent characteristic of site
mass Heavy, Compact Massing
cs Concealed Structure
vl Concealed Vertical Load
ap Plinth-like footing
`mass*`cs*`vl*`ap
Physical Projection
1.0 There is a physical projection >2" from the vertical plane of the perimeter wall within 24" above grade.
0.8 There is a physical projection > 3/4" and ≤ 2" from the vertical plane of the perimeter wall within 24\" above grade.
0.3 There is a physical projection ≤ 3/4" from the vertical plane of the perimeter wall within 24" above grade.
0.0 There is no physical projection from the vertical plane of the perimeter wall within 24" above grade.
Multiple Finishes
1.0 There is more than one horizontal finish within 24" above grade
0.0 Multiple horizontal finishes are not present within 24" above grade
Plinth-like footing
The top of the footing is or appears exposed above grade, creating the appearance of a plinth upon which the house is set.
cd Physical Projection
cf Multiple Finishes
`cd*0.75+`cf*0.25
Soil Colored
1.0 Exterior colors belong to Munsell soil color index.
0.0 Exterior colors do not belong to Munsell soil color index.
Roughly Hewn Exterior Finishes
1.0 Exterior finishes are coarsely textured.
0.7 Exterior finishes are somewhat coarsely textured.
0.3 Exterior finishes are a little coarsely textured.
0.0 Exterior finishes are not coarsely textured.
Note: With multiple finishes, weight according to prominence.
Natural Aesthetic
Exterior finishes complement the colors, textures, and physical geography of the North American prairie grasslands.
soil Soil Colored
rh Roughly Hewn Exterior Finishes
so Simple Ornamentation
`soil*`rh*`so
Simple Ornamentation
1.0 No applied ornament or applied ornament is restrained, restricted to trim, and does not draw the eye.
0.6 Ornament serves a decorative purpose that draws the eye but remains simple and geometric.
0.2 Ornament serves a decorative purpose that draws the eye and exhibits organic and curvilinear designs.
0.0 Applied ornament is extensive and unrestrained.
Prairie Style Home
i Integrated Site
n Natural Aesthetic
p Planar Representation
s Sheltering Projections
`i*`n*`p*`s
Banked Windows
0 = No banked windows
1 = Single set of banked windows
2 = Multiple sets of banked windows
Dark Window Frames
0 = Light window frames
1 = Neutral window frames
2 = Dark window frames
Sheltered Porches
0 = No sheltered porch
1 = Single sheltered porch
2 = Multiple sheltered porches
Distributed Voids
0 = No banked windows or sheltered porches
1 = Banked windows and/or sheltered porch(es) present on single level of house
2 = Banked windows and/or sheltered porch(es) present on multiple levels of house
Void Multiplicity
0 = No banked windows or sheltered porches, or presence of one but not the other.
1 = At least one set of banked windows and at least one sheltered porch. Collectively, the structures do not exhibit strong multiplicity.
2 = At least one set of banked windows and at least one sheltered porch. Collectively, the structures do exhibit strong multiplicity.
Deep Overhanging Eaves
1.0 Eaves project ≥ 2' from vertical plane of primary entry.
0.0 Eaves project < 2' from vertical plane of primary entry.
Strong Void Multiplicity
Multiplicity achieved via contrasting inset structures that visually receed from the projecting mass.
bw Banked Windows
dw Dark Window Frames
sp Sheltered Porches
dv Distributed Voids
vm Void Multiplicity
(`bw+`dw+`sp+`dv+`vm)/10
Sheltering Projections
Architectural features create multiple points of physical and apparent recession into the structure.
eaves Deep Overhanging Eaves
voids Strong Void Multiplicity
`eaves*`voids
Low-pitched hip or flat roof
1.0 Roof of primary mass is either flat or hipped w/pitch ≤ 3/12.
0.7 Roof of primary mass is gabled w/pitch ≤ 3/12.
0.0 Roof of primary mass is pitched > 3/12.
Multiple Distinct Stories
1.0 Multiple levels of the structure are clearly distinguishable from the exterior elevation
0.0 Levels of the structure are obscured by the exterior elevation or the structure is a single story
Angular Geometry
1.0 Structure is characterized by a limited number of straight, distinct planes that join one another at perpendiculars
0.0 Angular geometry is not present
Vertical Repetition
1.0 Vertical accents exhibit multiplicity
0.0 Vertical accents are absent or do not exhibit multiplicity
Planar Representation
Design projects a horizontal orientation and embraces horizontal motifs.
rf Low-pitched hip or flat roof
st Multiple Distinct Stories
ag Angular Geometry
vr Vertical Repetition
fzmin(`rf,`st,`ag,`vr)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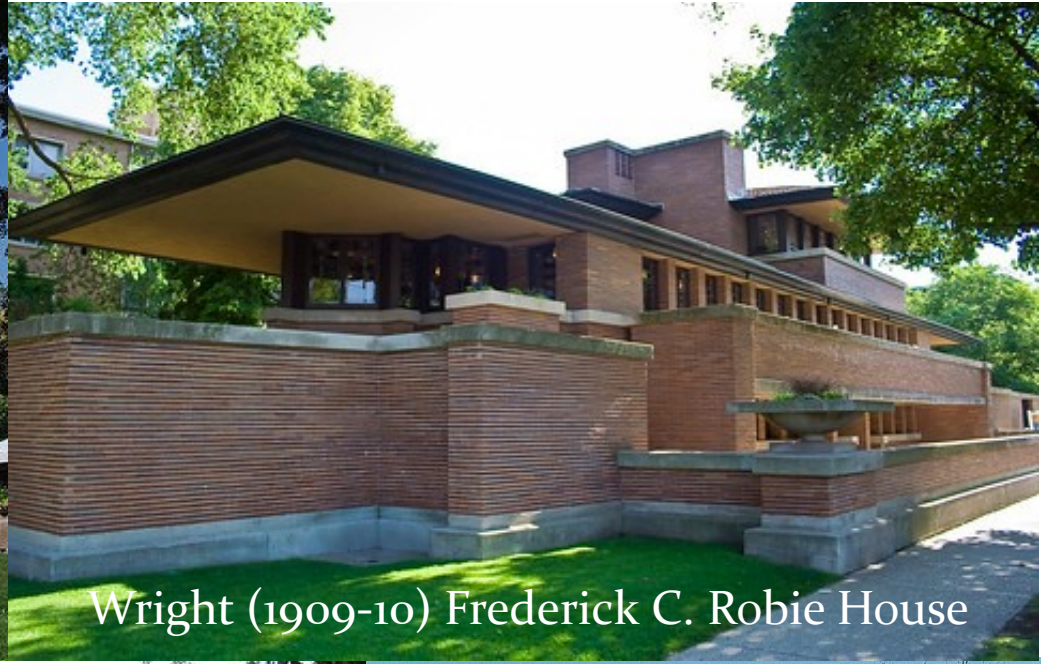
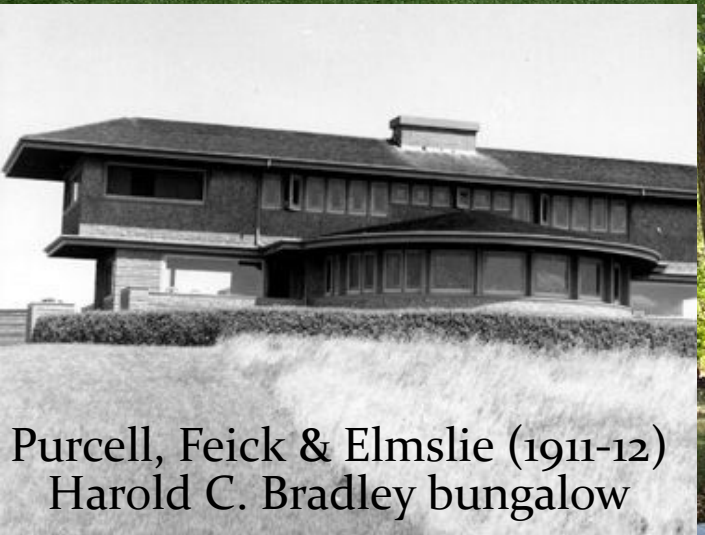
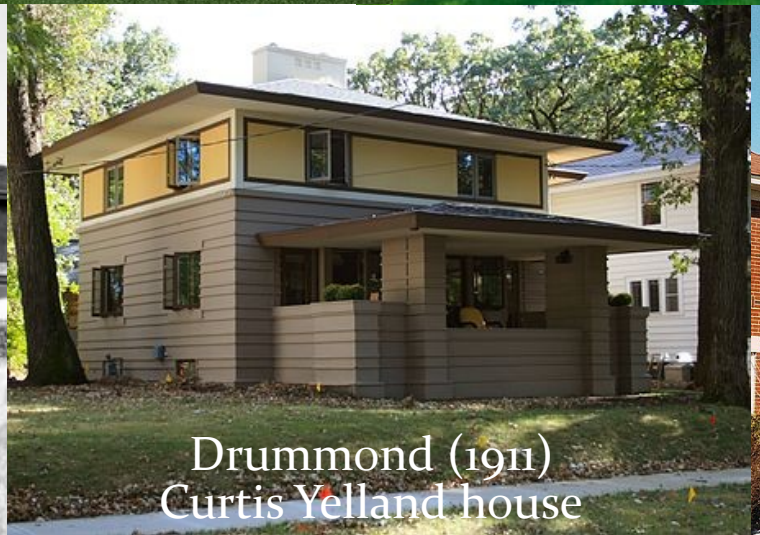
Maher (1899) Pleasant Home



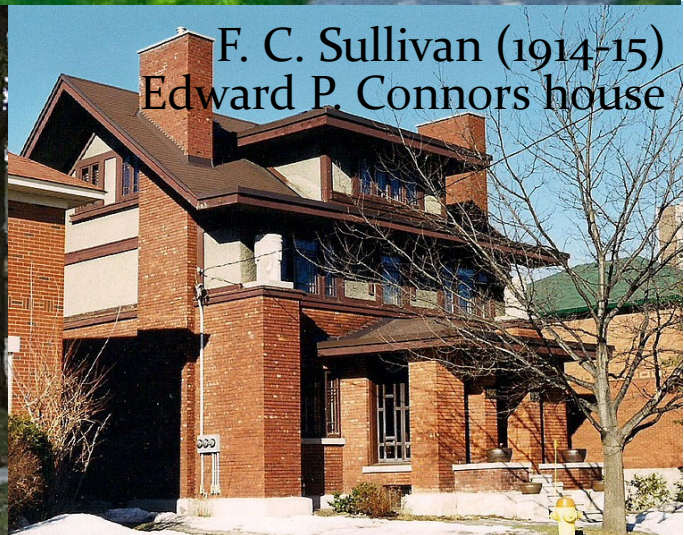
Wright (1909-10) Frederick C. Robie House



Purcell, Feick & Elmslie (1911-12)
Harold C. Bradley bungalow

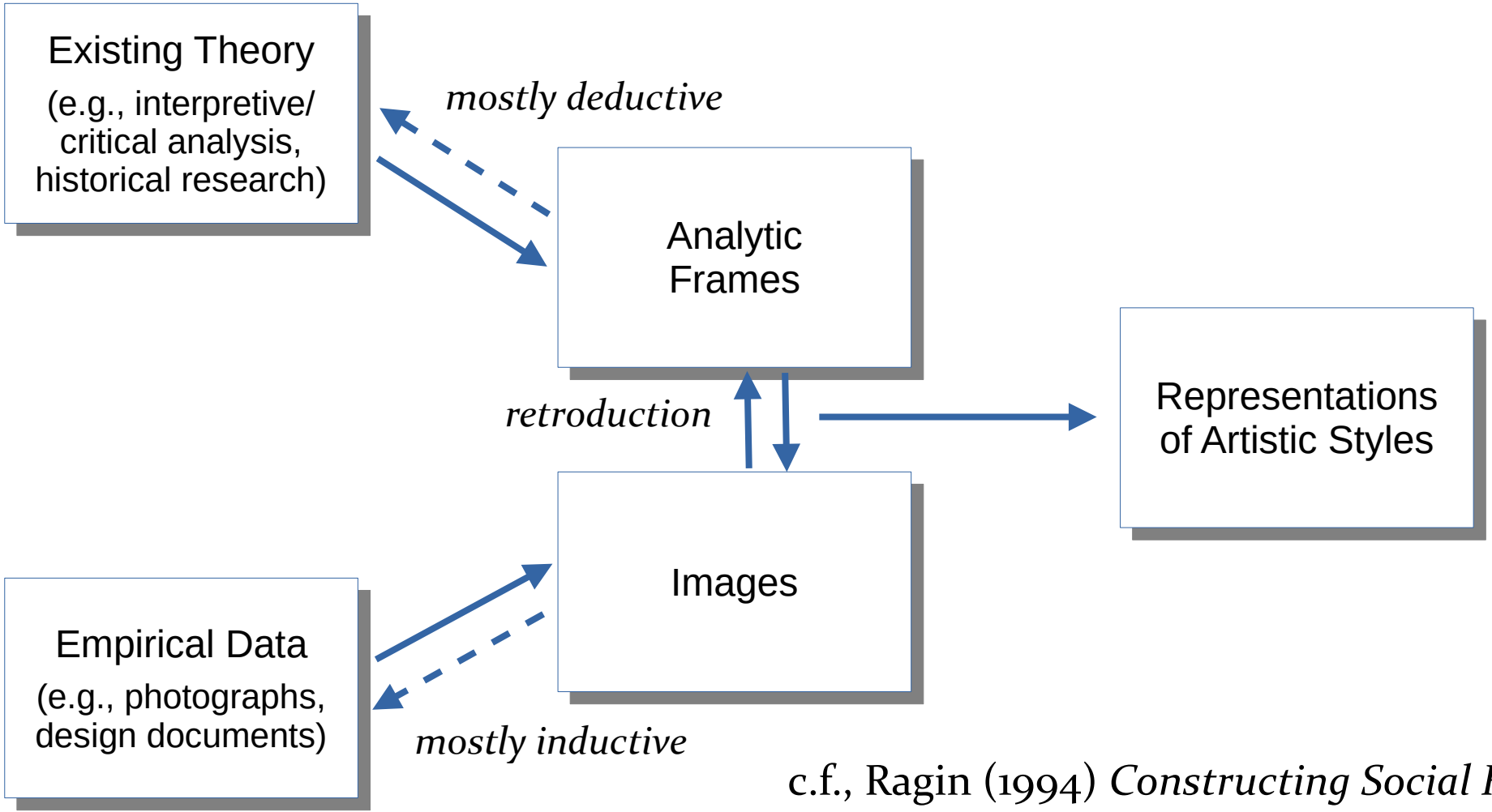


Drummond (1911)
Curtis Yelland house



F. C. Sullivan (1914-15)
Edward P. Connors house

Measuring Artistic Styles



c.f., Ragin (1994) *Constructing Social Research*