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# Toward a Framework for *Visual Nomen*



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# Agenda



01 Background and Aims

02 Literature Review

03 Theory and Methods

04 Dimensions of Visual *Nomen*

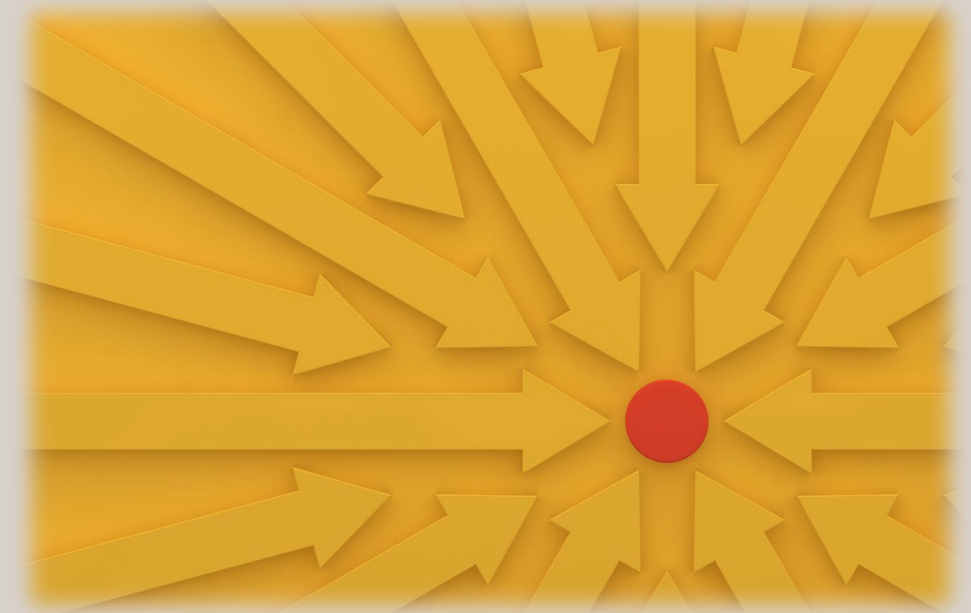
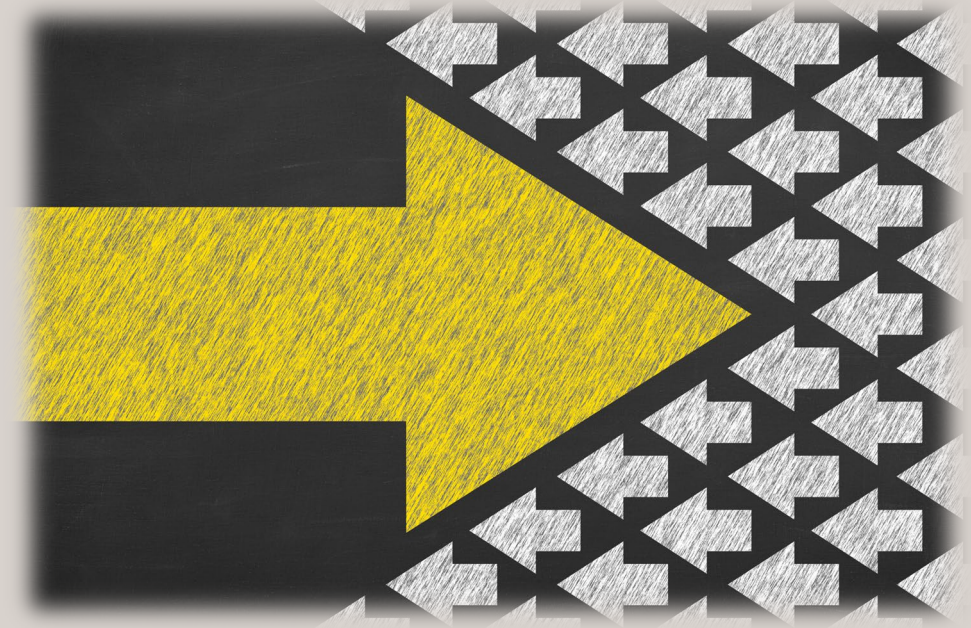
05 Toward a Framework

# Background and Aims

*A nomen* (LRM-E9) is an

**“association between an entity and a designation that refers to it”** (Riva et al., 2017, p. 31)

in which an **arbitrary appellation, designation, or combination of signs or symbols** is assigned to an instance of an entity (any *Res*, or thing) based on cultural or linguistic convention.

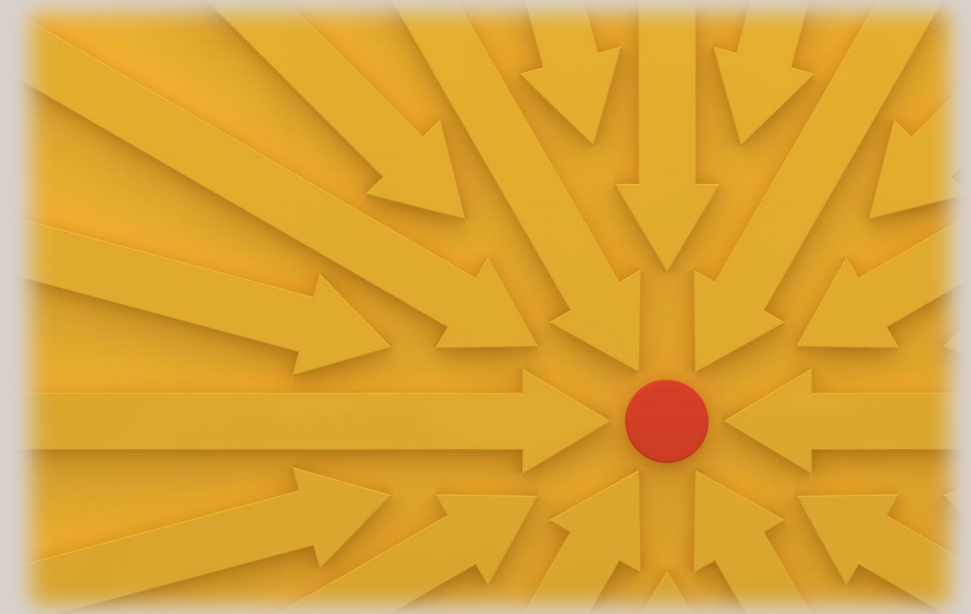
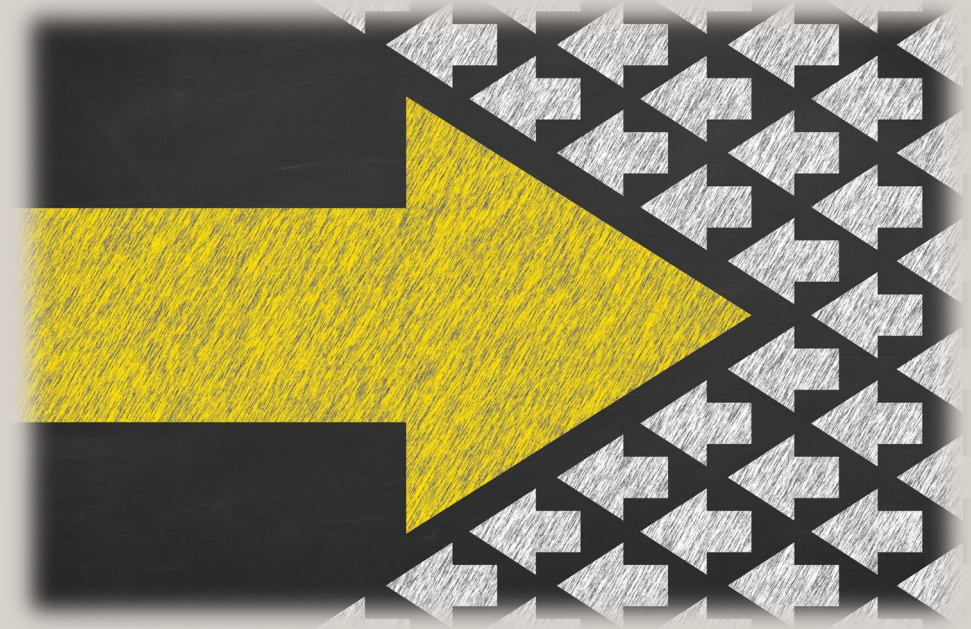


# Background and Aims

Different *nomen* may also refer to the **same entity** within **particular contexts**, such as how

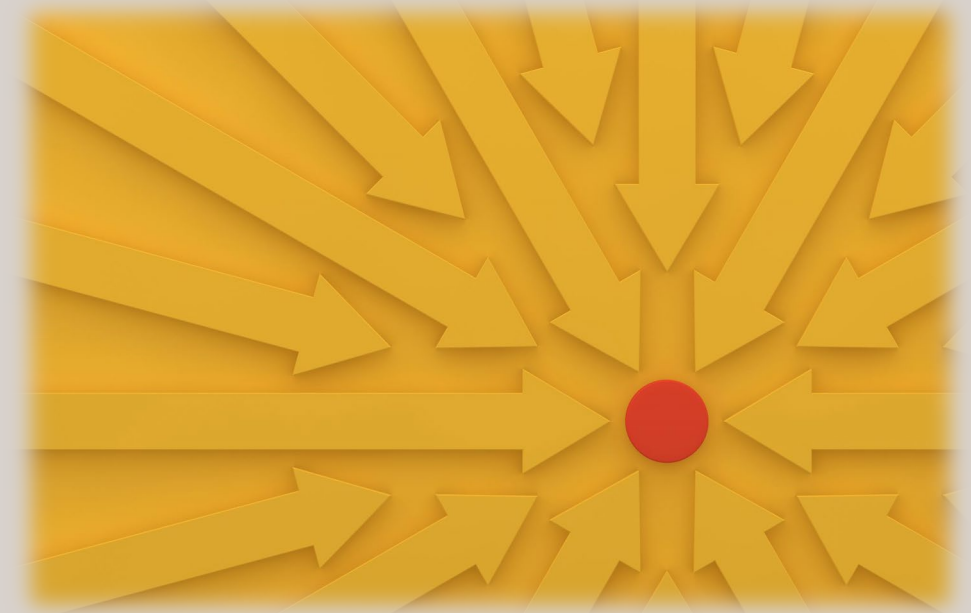
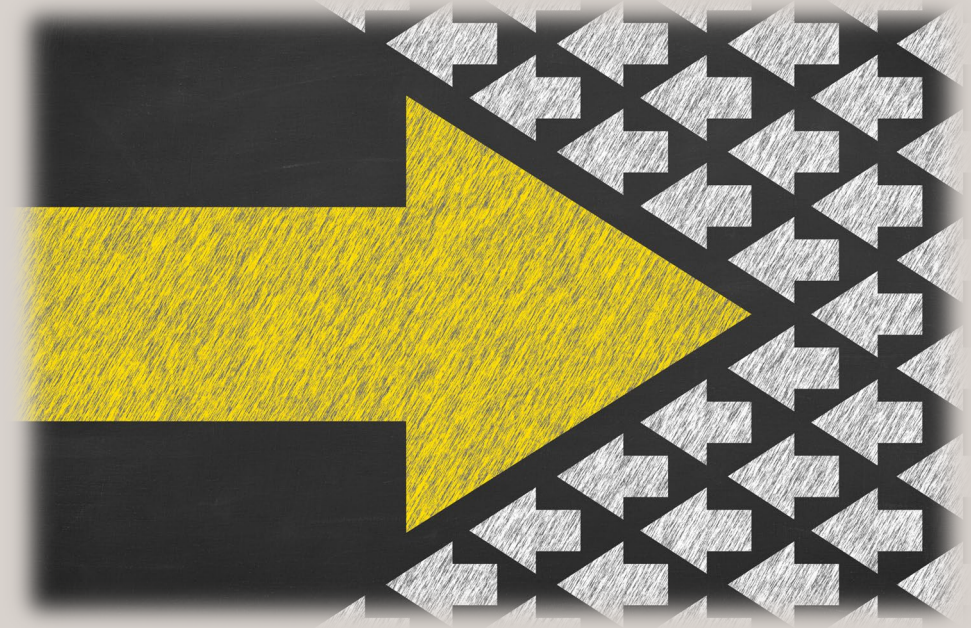
- a subject term,
- a classification number, and
- an identifier (e.g., ID code or URI)

all variously refer to the **same concept in contextually different forms and ways.**



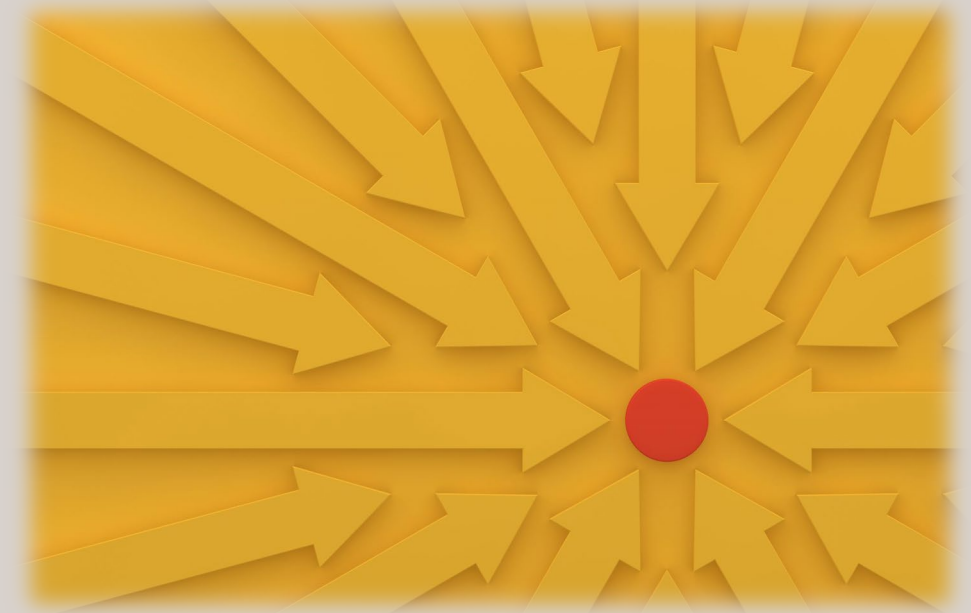
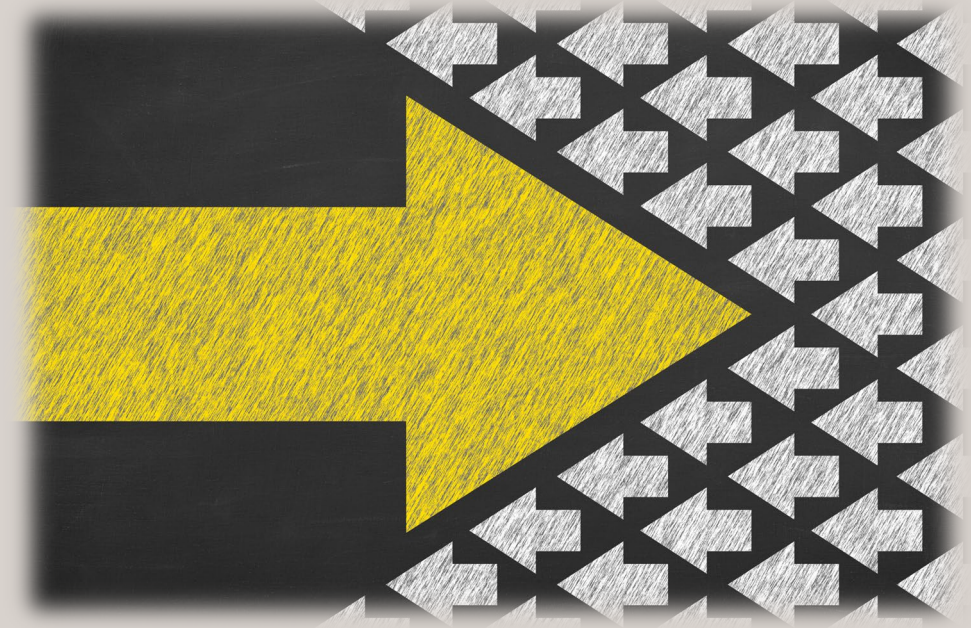
# Background and Aims

LRM specifies explicitly how to make alphanumeric, orthographic, linguistic, and multilingual references to entities (e.g., attributes for *Language* [E9-A7] and *Script* [E9-A8]).



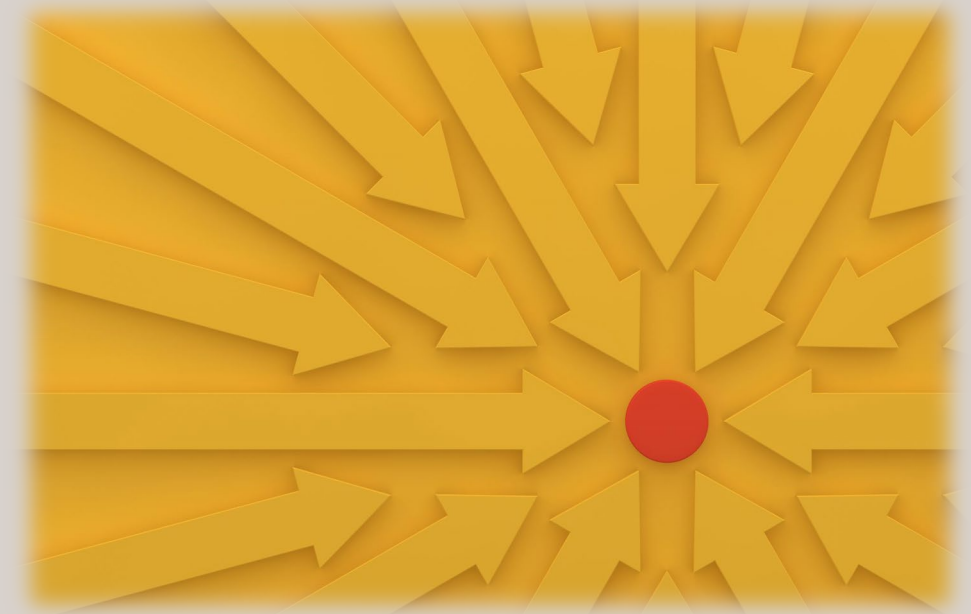
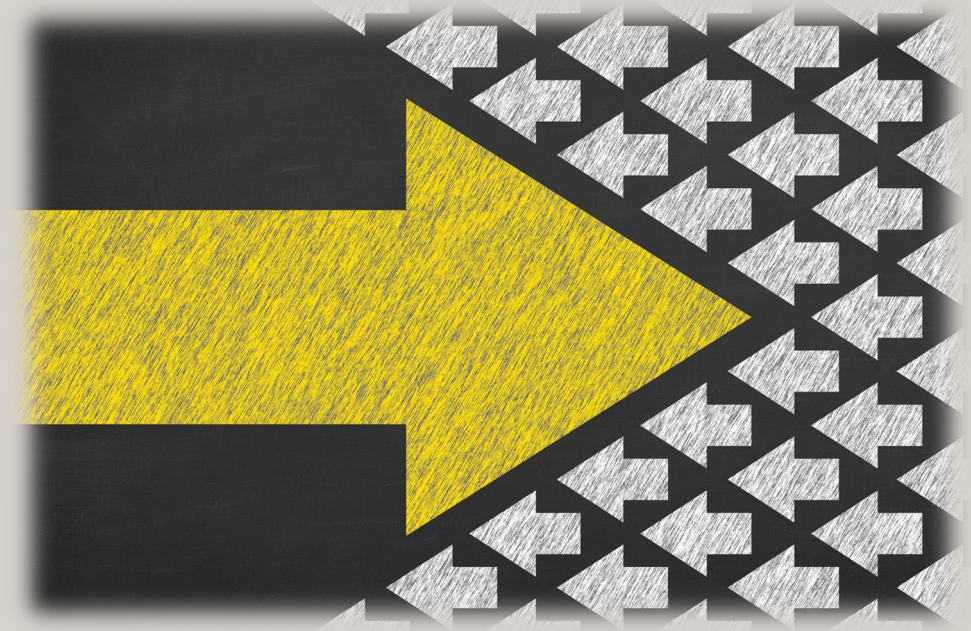
# Background and Aims

- How do non-linguistic or non-alphanumeric signs or symbols act as *nomen* to identify entities?
- What details or attributes are relevant to describe and classify such *nomen* to integrate them into information systems?



# Background and Aims

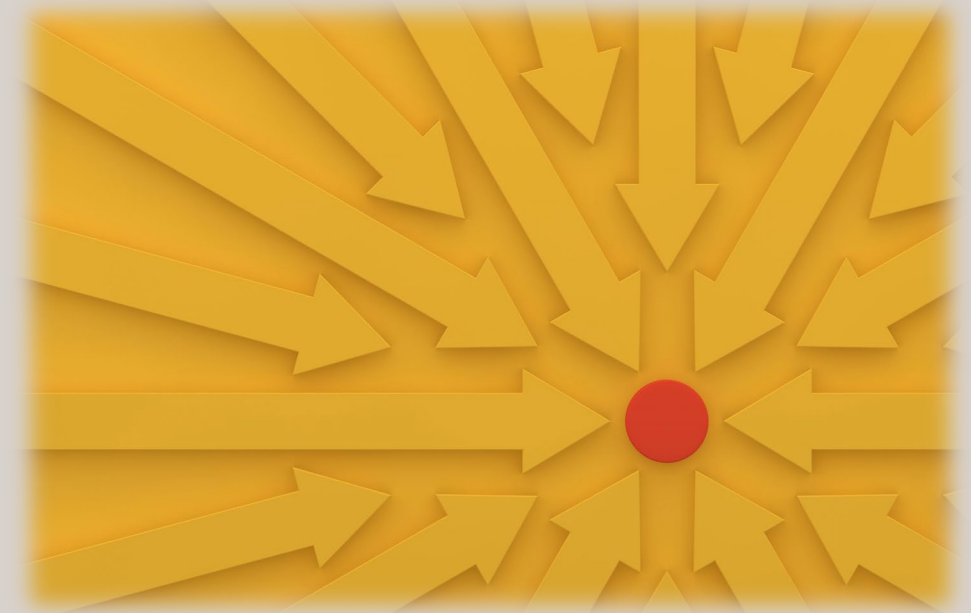
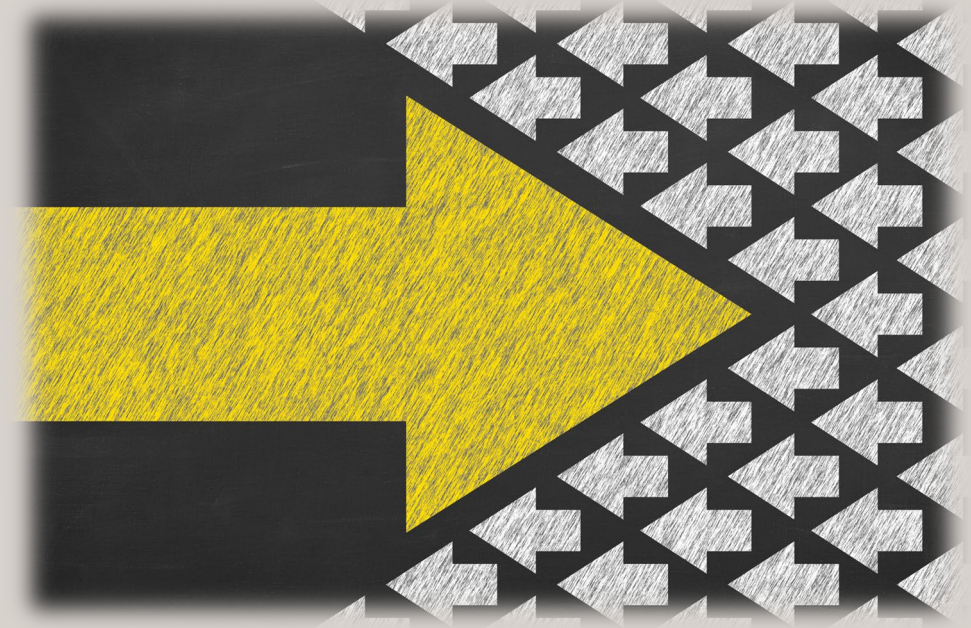
The goal of this research is to examine aspects that would be salient in the consideration of supralinguistic ways of referencing entities using visual *nomen*.



# Background and Aims

**Visual *nomen* are symbolic representations of entities encountered through visual perception in which the representation of entities is not dependent solely on linguistic or alphanumeric features or conventions.**

Examples would include symbols, logos, representative images, video or motion picture depictions, or visual elements which are assigned to reference, designate, or elucidate the specific identity of any *res*.



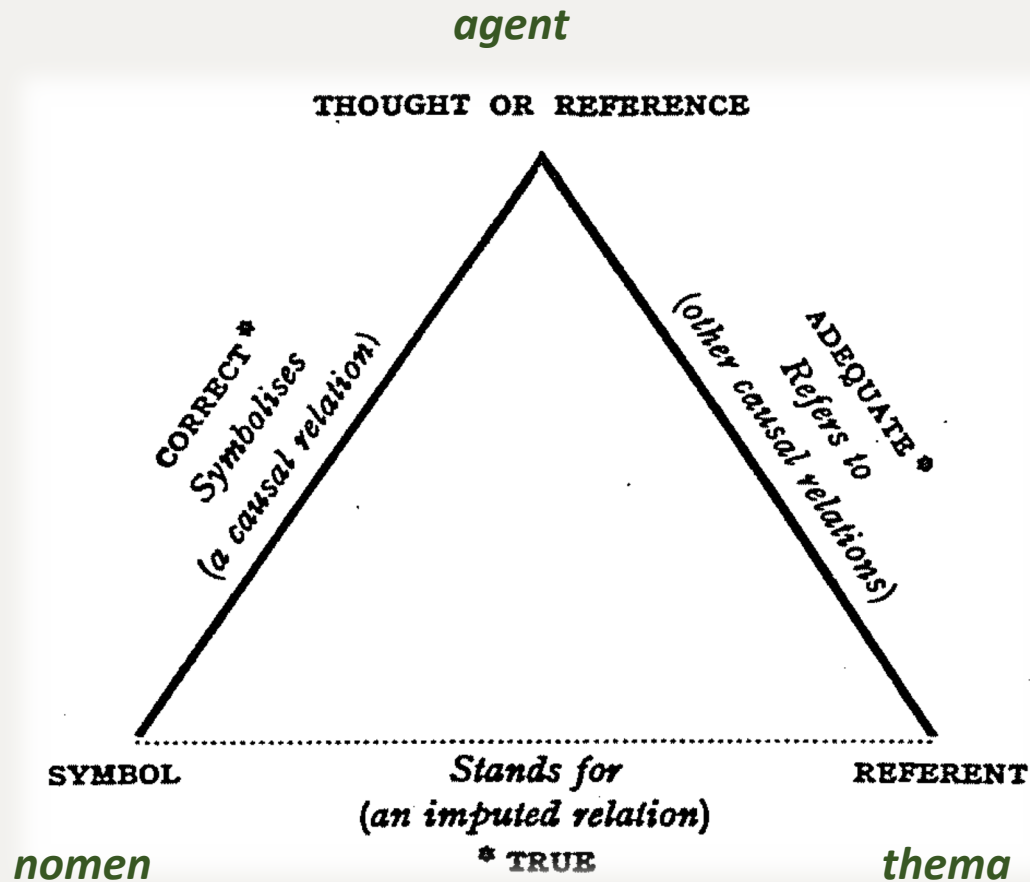




# 02 Literature Review

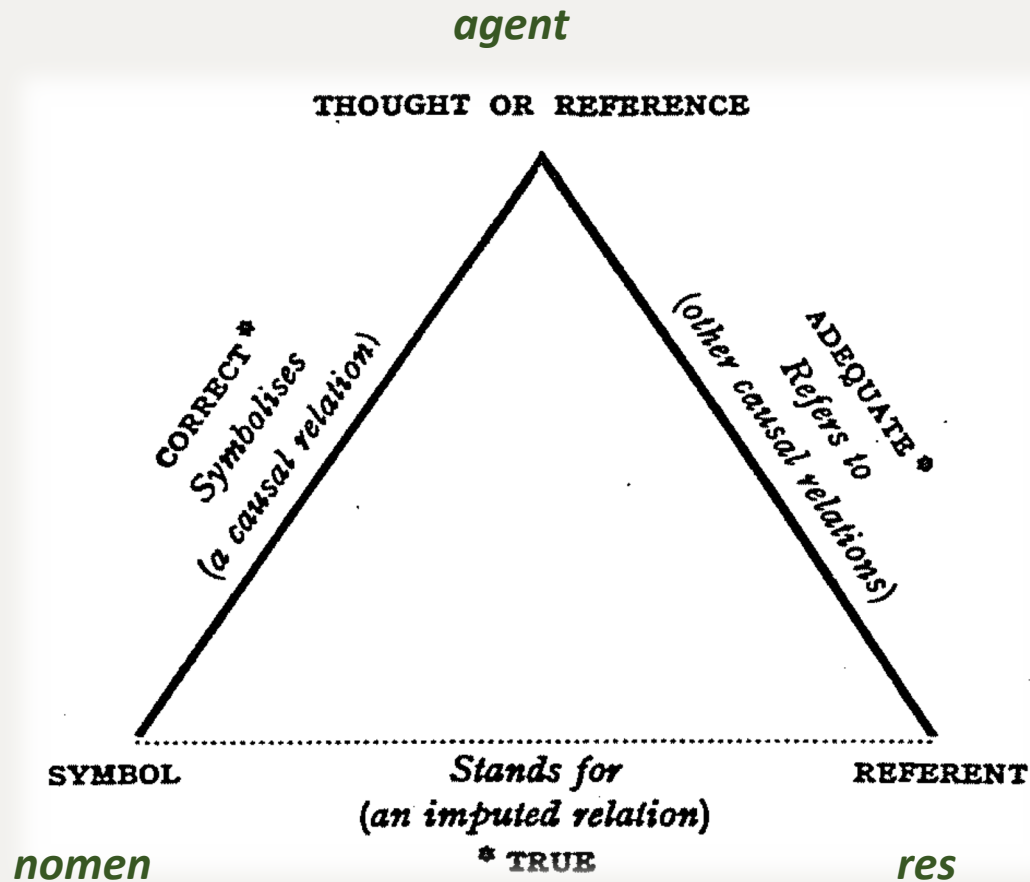


# History of the *Nomen* entity



- development of the Functional Requirements for Subject Authority Data (FRSAD) (Zeng et al., 2011)
  - recognized the inherent semiotic relationships in subject conceptualization (semiotic triangle) (Ogden & Richards, 1923)
- separated *thema* (subject) from *nomen*
  - supported multilingual (contextual) representation for the same concept

# History of the *Nomen* entity



- consolidation of the FR models in LRM
  - strengthened semiotic implications
    - ***nomen* is assigned by *agent* to designate *res* (any thing)**
    - independence and connected natures of *nomen* and *res* (context) (Gemberling, 2016)
  - *nomen* is not an attribute, but is an entity that has attributes unto itself (Žumer & Zeng, 2016)
    - needed for information systems (authority control)

# 03 Theory and Methods












- **LRM *nomen* and its conceptual bases (FRSAD, Semiotic Triangle theory) (Riva et al., 2017; Ogden & Richards, 1923; Zeng et al., 2011)**
- **Qualitative Instrumental Case Study (Creswell & Poth, 2018)**
- **Multiple (Comparative) Cases (Yin, 2018)**
- **Constant Comparative Method (Charmaz, 2014)**
- **Structured, Focused Comparison (George & Bennett, 2005; Mahoney, 2004)**

# 04 Dimensions of Visual *Nomen*

- “Nomen” (Program for Cooperative Cataloging, 2020)
- “Nomen explained” (Zeng, 2020)
- “Using Visual *Nomen* for Enhancing Semantic Consistency, Communication, and FAIRness of Open Cultural Heritage Resources” (Zeng, 2022)

# LRM-defined attributes of *nomen*

HOME / LRM / LRM ENTITY-RELATIONSHIP MODEL

Property					
#		Property	<a href="#">lrmer:E9A1</a>	"has category of nomen"	"Relates a nomen to a type to which the nomen belongs"
#		Property	<a href="#">lrmer:E9A2</a>	"has nomen string"	"Relates a nomen to the combination of signs that forms an appellation associated with an entity through the nomen"
#		Property	<a href="#">lrmer:E9A3</a>	"has scheme"	"Relates a nomen to the scheme in which the nomen is established"
#		Property	<a href="#">lrmer:E9A4</a>	"has intended audience of nomen"	"Relates a nomen to a class of users for which the nomen is considered appropriate or preferred"
#		Property	<a href="#">lrmer:E9A5</a>	"has context of use"	"Relates a nomen to information as to the context(s) in which a nomen is used by the agent who is referred to through it"
#		Property	<a href="#">lrmer:E9A6</a>	"has reference source"	"Relates a nomen to a source in which there is evidence for the use of the nomen"
#		Property	<a href="#">lrmer:E9A7</a>	"has language of nomen"	"Relates a nomen to the language in which the nomen is attested"
#		Property	<a href="#">lrmer:E9A8</a>	"has script"	"Relates a nomen to the script in which the nomen is notated"
#		Property	<a href="#">lrmer:E9A9</a>	"has script conversion"	"Relates a nomen to the rule, system, or standard that was used to create a nomen that is derived on the basis of another, distinct nomen notated in another, distinct script"

# LRM-defined attributes of *nomen*

lrmer:E9A1 “has category of nomen”

**categories for text-based nomen and visual nomen (types)**

lrmer:E9A2 “has nomen string”

“...combination of signs that forms an appellation associated with an entity...”

“The string involved in a nomen **can be expressed as a notation in any form**, such as a combination of signs within a writing system, chemical structure symbols, mathematical notation, or by any other kind of sign, such as sounds, etc.”

**a wide definition of “string”**

lrmer:E9A3 “has scheme”

**controlled vocabularies for visual nomen?**

# LRM-defined attributes of *nomen*

Irmer:E9A4 "has intended audience of nomen"

**user communities and user choice for whom the visual nomen is intended**

Irmer:E9A5 "has context of use"

"Relates a nomen to information as to the context(s) in which a nomen is used by the agent who is referred to through it"

"The context of use attribute includes domains associated with a nomen used by an agent."

**examples like genres, subjects, domains, or situations of use or applicability**

Irmer:E9E6 "has reference source"

"...a source in which there is evidence for the use of the nomen"



# Further dimensions of visual *nomen*

## Form or formal nature

from concrete to abstract

- how directly is visual language (Panofsky, 1939) employed in depicting or representing a res
- the “isness” of information representation (Hjørland, 2017)

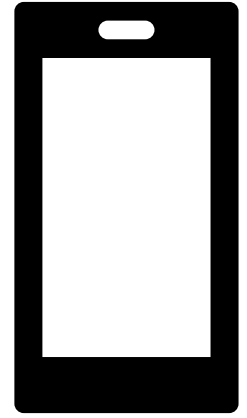
**Colors** (Berlin & Kay, 1969/1999; Kay & McDaniel, 1978; Kay & Regier, 2006)

red	cherry	rose	jam
merlot	garnet	crimson	ruby
scarlet	wine	brick	apple
mahogany	blood	sangria	berry
currant	blush	candy	lipstick








# Form as a dimension of visual *nomen*

## Pictograms/pictographs

- based on their resemblance to their real-world physical referents
  - international signage (Hassan, 2015)
  - emoticons/emoji (Giannoulis & Wilde, 2020)



## HCS Pictograms and Hazards

<p><b>Health Hazard</b></p>  <ul style="list-style-type: none"> <li>• Carcinogen</li> <li>• Mutagenicity</li> <li>• Reproductive Toxicity</li> <li>• Respiratory Sensitizer</li> <li>• Target Organ Toxicity</li> <li>• Aspiration Toxicity</li> </ul>	<p><b>Flame</b></p>  <ul style="list-style-type: none"> <li>• Flammables</li> <li>• Pyrophorics</li> <li>• Self-Heating</li> <li>• Emits Flammable Gas</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>	<p><b>Exclamation Mark</b></p>  <ul style="list-style-type: none"> <li>• Irritant (skin and eye)</li> <li>• Skin Sensitizer</li> <li>• Acute Toxicity (harmful)</li> <li>• Narcotic Effects</li> <li>• Respiratory Tract Irritant</li> <li>• Hazardous to Ozone Layer (Non-Mandatory)</li> </ul>
<p><b>Gas Cylinder</b></p>  <ul style="list-style-type: none"> <li>• Gases Under Pressure</li> </ul>	<p><b>Corrosion</b></p>  <ul style="list-style-type: none"> <li>• Skin Corrosion/ Burns</li> <li>• Eye Damage</li> <li>• Corrosive to Metals</li> </ul>	<p><b>Exploding Bomb</b></p>  <ul style="list-style-type: none"> <li>• Explosives</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>
<p><b>Flame Over Circle</b></p>  <ul style="list-style-type: none"> <li>• Oxidizers</li> </ul>	<p><b>Environment (Non-Mandatory)</b></p>  <ul style="list-style-type: none"> <li>• Aquatic Toxicity</li> </ul>	<p><b>Skull and Crossbones</b></p>  <ul style="list-style-type: none"> <li>• Acute Toxicity (fatal or toxic)</li> </ul>

For more information:



**OSHA**

Occupational  
Safety and Health  
Administration

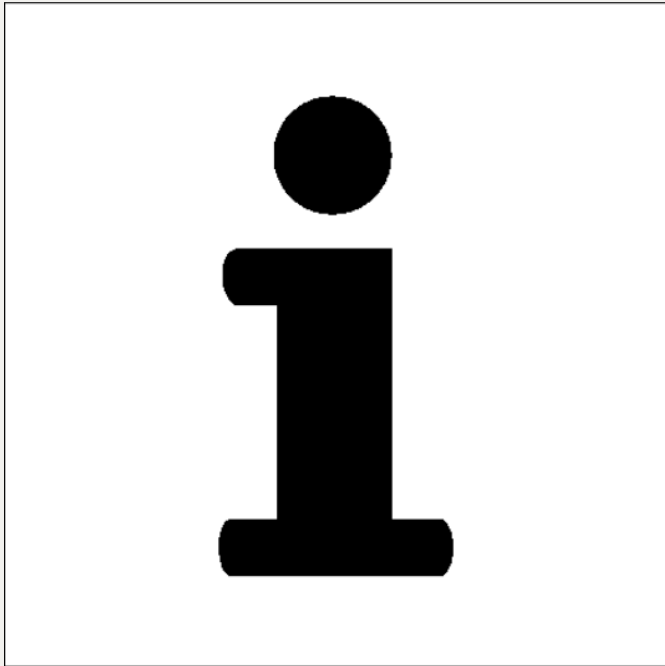
[www.osha.gov](http://www.osha.gov) (800) 321-OSHA (6742)

OSHA 3491-01R 2016

# Form as a dimension of visual *nomen*

## Pictograms, practically

- 9 Pictograms in the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
- Cho et al., 2008 proposed a “*semantic relevance measure*” which calculates how relevant a pictogram is to a given interpretation”
- Use of pictographs as a communication technology for people with intellectual disabilities (Sevens, 2018)

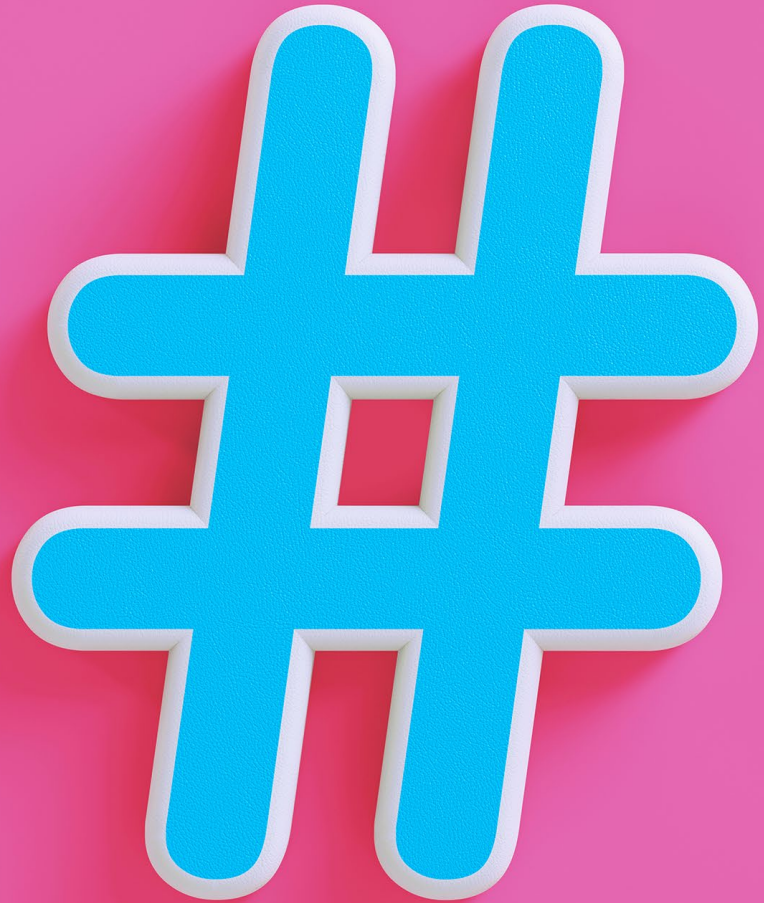


# Form as a dimension of visual *nomen*

## Pictograms, practically

- ISO 7001:2007 – Public information symbols
- United States Department of Transportation (DOT) Symbol Signs, in partnership with the American Institute of Graphic Arts (AIGA)
- ISO 7010:2019 – Registered safety signs
- Color / Pictogram / Text:
  - ISO 3864 - Graphical symbols — Safety colours and safety signs
  - ANSI Z535





## Form as a dimension of visual *nomen*

### Ideograms/Ideographs

- represent more abstract concepts
- more formally complex and language-independent
- rely on either physical similarity or conventional use of visual elements to communicate concepts

# Form as a dimension of visual *nomen*

## Ideograms, ideally

- Numerals
- Mathematical symbols
- Currency symbols
- Alchemical symbols
  - Unicode and the Chymistry of Isaac Newton project
- Western zodiac symbols



Term	Pictogram	Term	Pictogram
Antimony	♁	Ounce sign	℥
Antimony Ore	♁	Pisces	♓
Aqua Fortis	☒	Recipe	℞
Aqua Fortis	h	Regulus	♁
Aqua Regia	☒	Sagittarius	♐
Aqua Regia	℞	Sal ammoniac	⚗
Aquarius	♒	Salt	⊖
Aries	♈	Salt of antimony	♁
Bismuth (Neptune, Trident)	♆	Salt of copper antimoniate	♁
Bismuth ore	♆	Scepter of Jove	⚡
Bismuth ore [variant]	♆	Sublimate of copper antimoniate	♁
Caduceus, sideways	→	Sublimate of salt of antimony	♁
Cancer	♋	Sublimate of salt of copper [probable variant]	♁
Capricorn	♑	Scorpius	♏
Copper (Venus)	♀	Scruple	⊖
Copper antimoniate	♁	Spiritus Vini (Impure ethanol)	☒
Copper ore	♀	Sublimate of antimony	♁
Crucible	⚖	Sublimate of antimony variant	♁
Drachm symbol	℥	Sublimate of copper	♁
Earth	♁	Sublimate of copper	♁
First quarter moon (Silver)	☾	Sublimate of salt of antimony variant	♁
Gemini	♊	Sublimate of salt of copper	♁
Gold (Sun)	♁		

## Symbols

### Constituent Letters

Click the buttons for letters below in order to select them in order to filter for only those monograms that contain the letters (click Refine Search to deselect it).

Latin

\* A B C D E G H I L M N O P R S T V

Refine Search

Records 49 to 55 of 55



Monogram 1 (Zenonis) [Q](#)



Monogram 2 (Zenonis) [Q](#)



Siscia Officina Mark 1 [Q](#)



Siscia Officina Mark 2 [Q](#)



Monogram 1 (Anthemius) [Q](#)

Constituent Letters: A, N, T,  
H, E, and M



Monogram 2 (Anthemius) [Q](#)

Constituent Letters: A, N, T,  
H, E, and M



Monogram 7 (Anthemius) [Q](#)

Constituent Letters: A, N, T,  
H, E, and M



Monogram 1 (Basiliscus) [Q](#)

# Form as a dimension of visual *nomen*










## Symbols and emblems

- Online Coins of the Roman Empire (OCRE) project
  - monogram symbols on Roman coinage

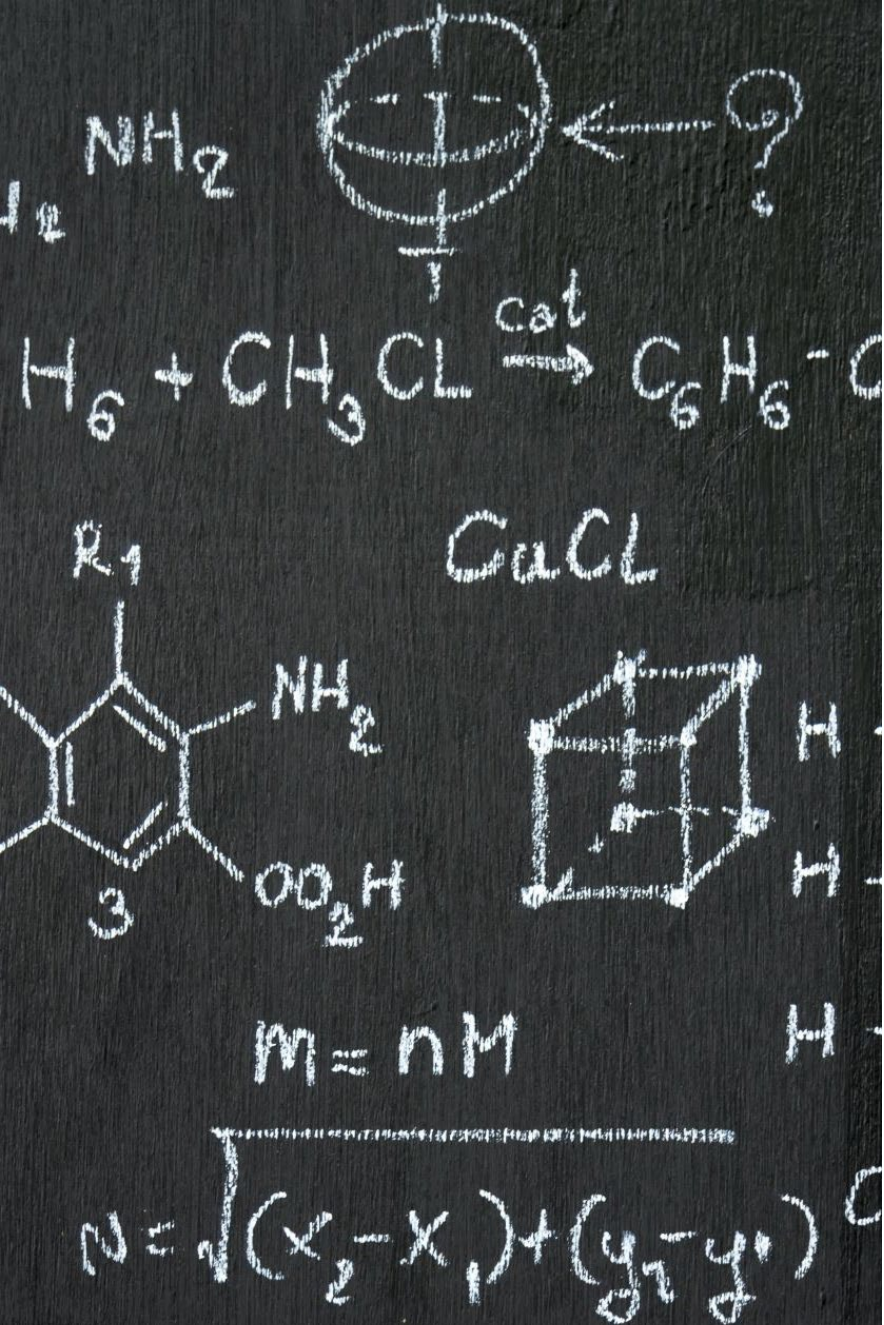
# Form as a dimension of visual *nomen*

## Symbols and emblems

- United States Department of Veterans Affairs (VA) National Cemetery Administration Emblems of Belief
  - for placement on government headstones and markers

(31) United Church of Christ	(32) Humanist Emblem of Spirit	(33) Presbyterian Church (USA)
		
(34) Izumo Taishakyo Mission of Hawaii	(35) Soka Gakkai International (USA)	(36) Sikh (Khanda)
		
(37) Wicca (Pentacle)	(38) Lutheran Church Missouri Synod	(39) New Apostolic
		





# Form as a dimension of visual *nomen*

## Notation systems

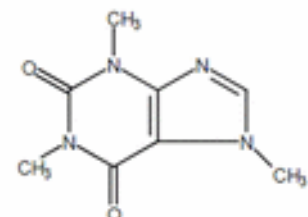
- chemical structural formulas
- graphic representation of the molecular structure of a chemical compound showing the order of atoms and their chemical bonds
- Chemical Abstract Service (CAS)

CAS Common Chemistry

← Return to Results

**Caffeine**

CAS Registry Number®  
58-08-2



CAS Name  
Caffeine

Molecular Formula  
 $\text{C}_8\text{H}_{10}\text{N}_4\text{O}_2$

Molecular Mass  
194.19

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Caffeine. CAS Common Chemistry. CAS, a division of the American Chemical Society, n.d. [https://commonchemistry.cas.org/detail?cas\\_rn=58-08-2](https://commonchemistry.cas.org/detail?cas_rn=58-08-2) (retrieved 2022-01-24) (CAS RN: 58-08-2). Licensed under the Attribution-Noncommercial 4.0 International License (CC BY-NC 4.0).

# Form as a dimension of visual *nomen*

## Notation systems

- musical notation
- dance notation

We're really glad nobody gave us this cake:



... which we transcribed and graded:

**HAPPY BIRTHDAY**

17/100 F

Sounds nothing like "Happy Birthday" - 50

should not have barlines at beginning of systems - 6

barlines at ends of systems too thick - 5

poorly notated syncopations - 2

beaming - 1

only 3 beats - 5

use quarter note - 1

unnecessary time signature - 1

syncopations - 2

missing ledger line - 1

beaming - 1

only 3 beats - 5

use quarter note - 1

beaming - 1

not a final barline - 1

**TO YOU!!**

<https://musictheoryaugmented.tumblr.com/post/137474658194/happy-third-birthday-music-theory-augmented>



**Form** as a dimension of  
visual *nomen*

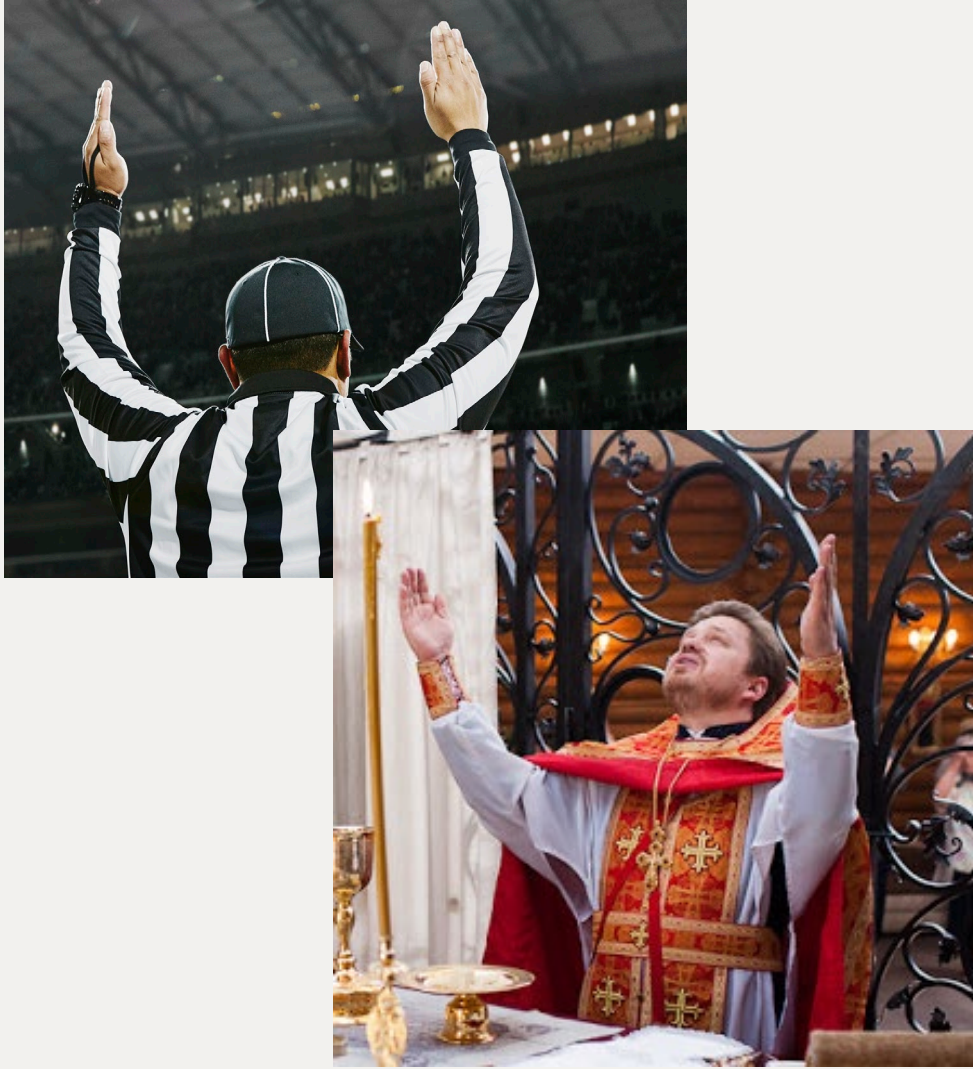
**Representation of abstract  
concepts**

**Iconography**

“ofness” and “aboutness”  
cultural narratives  
interpretation

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# Cultural context as a dimension of visual *nomen*



Shared and differing aspects of representation across systems of gestures and non-verbal signs (expanded notion of “nomen string”)

- Sign languages
- Hand signals
  - Especially in sports domains
- Facial expressions and body language
- Movements in social, ritual, and religious practice and types of performance

# Communicative and interpretive context as a dimension of visual *nomen*



Nautical/maritime signal flags in the International Code of Signals (ICS) have context-dependent meanings within the same domain:

- alphabet letters
- signal for specific concepts
- used in combination to represent additional concepts or to complement (qualify) messages from other flags (Medical Signal Code)

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# Communicative and interpretive context as a dimension of visual *nomen*



Context-dependence for the same  
“string” (e.g., user choices on a website):

- place, nation
- nationality, identity
- language, dialect

# Temporal context as a dimension of visual *nomen*

Time-span, evolution, and validity: *nomen* ontogeny



<https://www.logaster.com/blog/att-logo/>

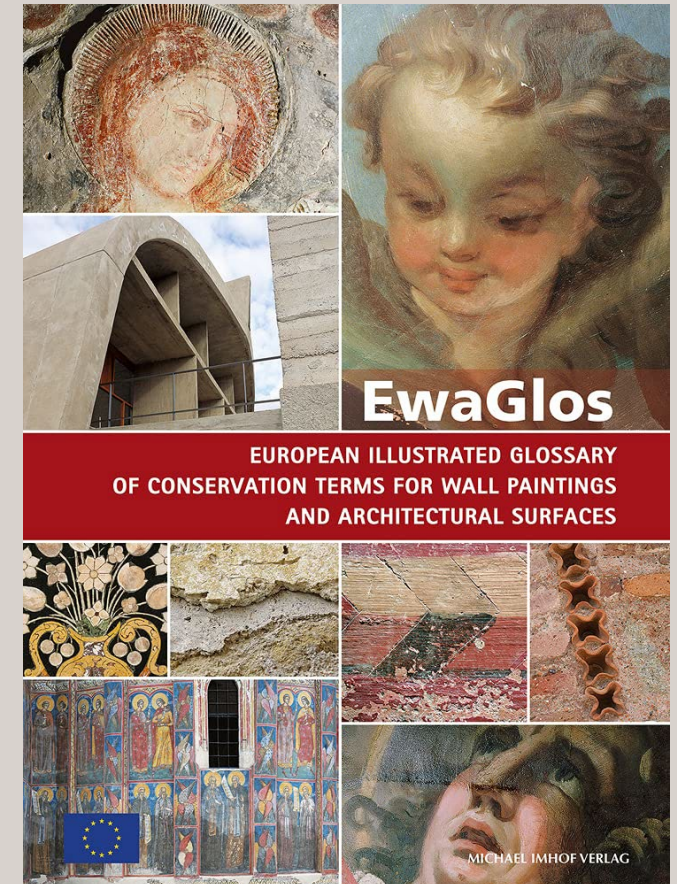
[https://en.wikipedia.org/wiki/List\\_of\\_flags\\_of\\_the\\_United\\_States](https://en.wikipedia.org/wiki/List_of_flags_of_the_United_States)

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# Typicality as a dimension of visual *nomen*

## Representation and reification


- Made to serve as or considered to be (Buckland, 2018) a *nomen* insofar as it is representative of a *res* in some conventional or socially constructed way
- EwaGlos: European Illustrated Glossary for Conservation Terms of Wall Painting and Architectonic Surfaces





# Typicality as a dimension of visual *nomen*


Representative  
images in Getty's  
Art and  
Architecture  
Thesaurus (AAT)

Click the  icon to view the hierarchy.

[Semantic View](#) ([JSON](#), [RDF](#), [N3/Turtle](#), [N-Triples](#))

ID: 300022727

Page Link: <http://vocab.getty.edu/page/aat/300022727>

 **burnishers (tools)** (<surface working and finishing tools and accessories>, <surface working equipment>, ... Furnishings and Equipment (hierarchy name))

**Note:** Implements with a hard smooth rounded end or surface, used for smoothing and shape according to the purpose and trade. In printmaking, burnishers are used on intaglio plate.

**Terms:**

**burnishers (tools)** ([preferred](#), C, U, English-P, D, U, PN)

**burnisher (tool)** (C, U, English, AD, U, SN)

抛光器 (C, U, Chinese (traditional)-P, D, U, U)

磨光刀 (C, U, Chinese (traditional), UF, U, U)

磨滑刀 (C, U, Chinese (traditional), UF, U, U)

pāo guāng qì (C, U, Chinese (transliterated Hanyu Pinyin)-P, UF, U, U)

pao guang qi (C, U, Chinese (transliterated Pinyin without tones)-P, UF, U, U)

p'ao kuang ch'i (C, U, Chinese (transliterated Wade-Giles)-P, UF, U, U)

polijstborstels (C, U, Dutch-P, D, U, U)

polijstborstel (C, U, Dutch, AD, U, U)

brunissoirs (C, U, French-P, D, U, PN)

polissoir (C, U, French, AD, U, MSN)

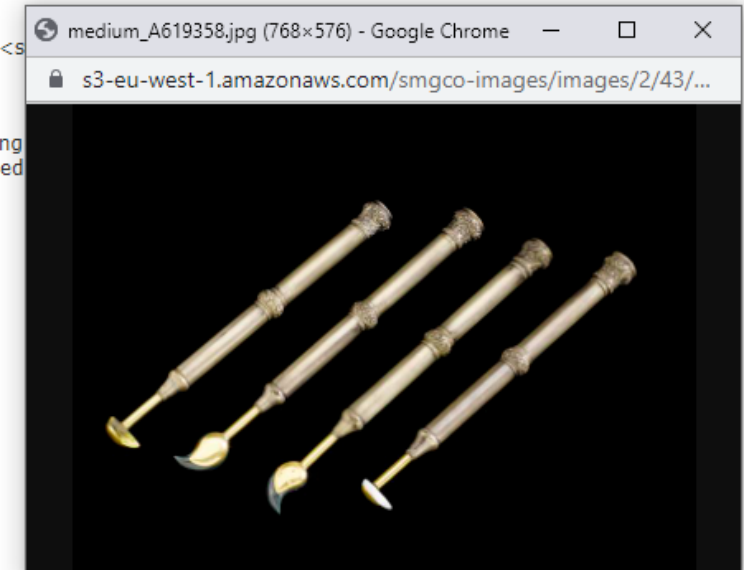
brunissoir (C, U, French, UF, U, N)

Polierstähle (C, U, German, D, PN)

Polierstahl (C, U, German, P, AD, SN)

▪ [Representative Images:](#) 1 2 3

Record Type: [concept](#)



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# Typicality as a dimension of visual *nomen*

## Diagnosis and treatment of medical conditions


- Professional medical training
- Public health strategies
  - Centers for Disease Control and Prevention (CDC) guidance on the 2022 Monkeypox outbreak (<https://www.cdc.gov/poxvirus/monkeypox/symptoms/index.html>)
    - Signs and Symptoms
      - Monkeypox Rash Photos

# Representation as a dimension of visual *nomen*


Title	The Queen in "Hamlet"
Artist	<b>Edwin Austin Abbey</b>
Date	1895
Location	Not on view
Dimensions	sheet: 27 7/8 x 21 7/8 in. (70.8 x 55.6 cm)
Credit Line	Smithsonian American Art Museum Gift of Sen. Stuart Symington and Rep. James W. Symington
Mediums	<b>pastel</b>
Mediums Description	pastel on paperboard
Classifications	<b>Drawing</b>
Keywords	Performing arts – theater – performer
Object Number	1973.28.1
Palette	

[Linked Open Data URI](#)

<https://americanart.si.edu/artwork/queen-hamlet-3>

 Smithsonian American Art Museum **Linked Open Data**  
*Renwick Gallery*

URI: <http://edan.si.edu/saam/id/object/1973.28.1>

Property	Value
<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.cidoc-crm.org/cidoc-crm/E22_Man-Made_Object">http://www.cidoc-crm.org/cidoc-crm/E22_Man-Made_Object</a>
<a href="http://www.cidoc-crm.org/cidoc-crm/P138i_has_representation">http://www.cidoc-crm.org/cidoc-crm/P138i_has_representation</a>	
<a href="http://www.cidoc-crm.org/cidoc-crm/P55_has_current_location">http://www.cidoc-crm.org/cidoc-crm/P55_has_current_location</a>	<a href="http://edan.si.edu/saam/id/object/1973.28.1/location">http://edan.si.edu/saam/id/object/1973.28.1/location</a>
<a href="http://www.cidoc-crm.org/cidoc-crm/P128_carries">http://www.cidoc-crm.org/cidoc-crm/P128_carries</a>	<a href="http://edan.si.edu/saam/id/object/1973.28.1/concept/2027520">http://edan.si.edu/saam/id/object/1973.28.1/concept/2027520</a> <a href="http://edan.si.edu/saam/id/object/1973.28.1/concept/2027521">http://edan.si.edu/saam/id/object/1973.28.1/concept/2027521</a> <a href="http://edan.si.edu/saam/id/object/1973.28.1/concept/2027524">http://edan.si.edu/saam/id/object/1973.28.1/concept/2027524</a> <a href="http://edan.si.edu/saam/id/object/1973.28.1/concept/2027544">http://edan.si.edu/saam/id/object/1973.28.1/concept/2027544</a> <a href="http://edan.si.edu/saam/id/object/1973.28.1/concept/2027547">http://edan.si.edu/saam/id/object/1973.28.1/concept/2027547</a> <a href="http://edan.si.edu/saam/id/object/1973.28.1/concept/2027548">http://edan.si.edu/saam/id/object/1973.28.1/concept/2027548</a> <a href="http://edan.si.edu/saam/id/object/1973.28.1/concept/2027550">http://edan.si.edu/saam/id/object/1973.28.1/concept/2027550</a> <a href="http://edan.si.edu/saam/id/object/1973.28.1/concept/2027551">http://edan.si.edu/saam/id/object/1973.28.1/concept/2027551</a> <a href="http://edan.si.edu/saam/id/object/1973.28.1/concept/2027555">http://edan.si.edu/saam/id/object/1973.28.1/concept/2027555</a>

<http://edan.si.edu/saam/id/object/1973.28.1>

# Representation as a dimension of visual *nomen*



[https://commons.wikimedia.org/wiki/File:American\\_famingo\\_\(Phoenicopterus\\_ruber\).JPG](https://commons.wikimedia.org/wiki/File:American_famingo_(Phoenicopterus_ruber).JPG)

<https://www.audubon.org/birds-of-america/american-flamingo>

Courtesy of the John James Audubon Center at Mill Grove, Montgomery County Audubon Collection, and Zebra Publishing

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# Technical aspects as a dimension of visual *nomen*

## Media types

Still or moving images

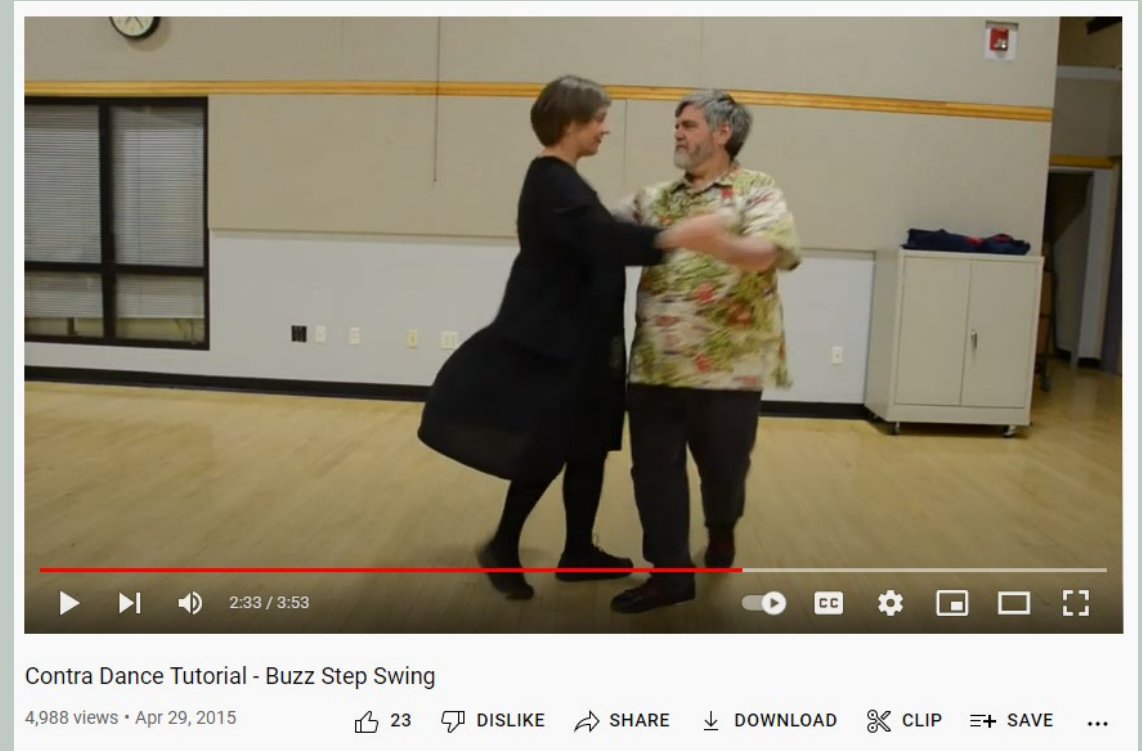
File types

Extents and dimensions

Durations

Created (e.g., illustrated) or obtained from the real world (photographed, recorded)

Fundamental for supporting information systems beyond linguistic terms with the use of visual controlled vocabularies



<https://www.youtube.com/watch?v=jaVSVtPRwIA>

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# Ethics as a dimension of visual *nomen*

## Ethics of access

- Accessibility beyond language: draw, move (gesture, sign, dance), view/see, touch
- Multivocal and multimodal representation and access
- Cultural hospitality and affordances for user preference

## Ethics of representation

- Misrepresentation and systemic harm (vulnerable communities)
- Copyright, ownership, and intellectual property

# Toward a Framework

Identifying salient attributes, dimensions, and aspects

- Controlled vocabularies matching visual *nomen* to concepts/entities

- Classification systems for visual *nomen*

- Ontology or semantic markup standard to link data to visual representations

- Studies to understand effective use of visual *nomen* for user groups

- Support affordances for user choice in systems using visually-based interfaces

  - Beyond multilingual systems toward supralinguistic and multimodal systems

  - Enabling access for users without a need for linguistic representation

  - Enabling additional layers of context and discoverability for other users



# Thank You

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