

## Spatial modelling of the void

Poché is an instrument for design in Fernando Martínez Sanabria's work.

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### Abstract

In this research, poché is defined as spatial modelling of the void. It is presented in three conditions (open, closed, and neutral) existing in the history of architecture. But it also shows the operations of spatial modelling (added, inserted and composite) that vary according to the implementation process of the architect who uses it. And finally, this research demonstrates the use of spatial modelling as projective instruments (initial non-structuring, intermediate non-structuring, and structuring) implemented in the work of the Colombian architect Fernando Martínez Sanabria.

Fernando Martínez Sanabria was an architect of the modern Colombian movement. He is recognised for the plastic exploration of his projects. His practice is characterised by an initial interest in resolving similar issues as his modern referents and creating singular spaces in his architecture. The process of spatial transformation of Martínez can be seen in three representative projects of the architect, which were analysed in this research: the Martínez House, the Faculty of Economic Sciences, and the Calderón House.

The research allows us to conclude that poché is a design instrument that can be implemented with different operations. These operations will enable us to recognise conditions that are like those abstracted from the history of architecture, and this proposal places them at the service of the contemporary design procedure. In addition, the poché procedure shows a progressive development in Fernando Martínez's implementation because it appears initially in his work as a non-structuring poché and later as a structuring poché.

**Keywords:** Fernando Martínez, Poché, Form, Space, Category, Instrument.

### Introduction

This article arises from research done as a master's thesis. This was done around poché, a concept that comes before modern architecture. It is possible to find it in the bibliography of the School of Fine Arts in Paris as "the designation of an area in a plane, in which attributes inherent to matter and emptiness concur". However, this research distances itself from the graphic characteristics and focuses its interest on the formal and spatial spheres to approach the poché as a design instrument of spatial incidence and defines it as the spatial modelling of the void through the handling of the matter.

Fernando Martínez Sanabria is a Colombian architect who has generated interest in architectural research because of the singularity of his projected spaces (Figure 1), which have been related to organic architecture for the plasticity of the



*"I imagined the support to be a hollow column that can be used (...)  
Thus, the source of support, the column, became the place that contained the services of the building".  
(Kahn cited in Cook & Klotz, 1973)*



**Figure 1. An interior volume of Facultad de Ciencias Económicas of the Universidad Nacional de Colombia.** In this photo it is possible to see an space which is created by modelling of void in a project of Martínez Sanabria. Source: Hernández J. [Photograph]. 2017.

elements that make up the space.<sup>4</sup> However, his spatial exploration is directly related to the definition of *poché* as spatial modelling of the void, and despite this, no research relates Martínez's architecture to spatial modelling.

This research considers that the relationship between the spatial modelling of the void and the architecture of Fernando Martínez can contribute to contemporary architecture's design strategies by considering the spatial value found in the spaces developed by Martínez and the instrumental character of spatial modelling.

Thus, this research aims to answer whether the spatial modelling of emptiness allows us to propose a design tool in architecture. It also offers to reveal different strategies, operations and *poché* procedures.

To do it, the methodology of this research has considered the existence of other studies. These studies consider *poché* as a historical procedure specific to seventeenth-century architecture. It is possible to find a bibliography and analyses applied to Renaissance and Baroque architecture projects. Some examples are the book "The geometric machine of Borromini" by Alonso García (2003), or the book "Roma di Benedetto XIV. La pianta di Giovan Battista Nolli" by Borsi (1993).

However, this research does not stop at reviewing the historical development of the concept, as there are other studies on the project analysis of *poché*, especially in modern architecture and specifically in Le Corbusier's projects. For example, the essay "Displacement of concepts in Le Corbusier" (Colquhoun, 1978); the book "The concept of architectural space from the Baroque to the present day" (Argan, 1973); or articles like "The inversion of the *poché* paradigm. The *poché* development in Le Corbusier's Dom-Inó system" (Such Sanmartin, 2012). Additionally, a text that brings together these bibliographies and gives value to the *poché* concept as an idea is the doctoral thesis by Raúl Castellanos (2012) called Plan *Poché*. These writings provide some direct findings on the *poché* of these architects and allow for a descriptive comparison with projects by Fernando Martínez. Still, they are not elaborated on the analysis of his architecture.

In addition to considering existing research, this study analyses the modelling of Fernando Martínez's work to identify its impact on the fields of form and space. This has been possible based on categories defined and supported by various bibliographies in the field of morphology, and it proposes a systematic analysis. It is possible to extract operations to understand the *poché* procedure as a design instrument.

The analyses of this research are supported by the planimetric drawing of projects of Fernando Martínez Sanabria's work, which have been reconstructed for this research. These have been created from the original plans available in the collection of the Museum of Architecture Leopoldo Rother's archives at the National University of Colombia.

Respect for *poché*, it can be found even before the existence of the term "*poché*". For example, in the architecture of the 17th century, with Borromini's projects and his spaces of a concave-convex nature where the use of the continuous and wavy surfaces of the walls is remarkable; however, different authors have researched this modelling in different ways and different architectures. For example, the *poché* planning to which Colquhoun alludes refers to a type of "hidden and service space" located within the walls of Parisian hotels. Another example

<sup>4</sup> Zalamea, A.; Niño C., 2008. Fernando Martínez Sanabria. Bogotá. A book about the work of the architect Fernando Martínez Sanabria.

argues that *poché* spaces were not planned but, as Castellanos Gómez (2012) argues in his writing *Piedras Huecas*, "if a space required a service room, it was enough to penetrate its physical limits to locate it discreetly, in spaces of a concave-convex nature".

During the modern movement of the 20th century, it is also possible to find spatial modelling procedures in the architecture of Le Corbusier. In the framework of the five points of modern architecture and the *Dom-Inó* structure, he implements a series of curvilinear walls that irregularly model spaces. Also, in Louis Kahn's architecture, he recognises the similarity of his hollow columns to St. Peter's Pillars.

These analyses suggest that *poché* is a morphological strategy that significantly influences the design of space, that it is not just a simple graphic tool, and that it is not just a residual effect in the design process. The *poché* is spatial modelling of void and will be approached in this research as a design instrument.

A design instrument in which different conditions exist; a design instrument in which various *poché* operations produce effects in architecture; a design instrument that has been implemented by Martínez and can be implemented in contemporary architectural design.

In the modern Colombian movement, there is research on the existence of the spatial modelling procedure. Several have resulted from the interest in the singularity of Fernando Martínez's architecture. The three projects covered by this research are the ones that mark key points in the progressive transformations of this architect's work: *La Casa Martínez*, *La Facultad de Ciencias Económicas* and *La Casa Calderón*.

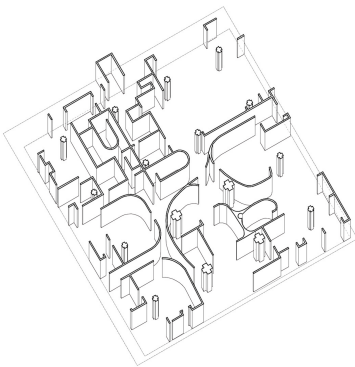
## Condition

This research shows the three conditions of *poché* (open, closed and neutral) present in the history of architecture and implemented by Martínez. This allows us to define the states in which the spatial modelling of the void is found in the work of different architects.

Form in spatial modelling is the tangible and intangible matter that shapes and gives the order to the singular space. Space, concerning *poché*, is what can be habitable, including the elements that make it up and create a relationship with those who habit it. However, these two terms are not conceived as independent but are interpreted from their inherence. They frame the condition that has to do with *indoles*, *natures* or *properties* that propose differentiated states or situations of *poché*; in this case, applied to the work of Fernando Martínez Sanabria but found in projects of the history of architecture.

The conditions of the spatial modelling of the void vary between the works of 17th and 20th-century architects, and thanks to them, it is possible to establish three *poché* conditions: the open *poché*, the closed *poché* and the neutral *poché*. To approach them, this research proposes the development of five formal categories and five spatial categories. The most revealing spatial modelling relationships in Fernando Martínez Sanabria are surface and volume about spatial structure.

The categories set out above make it possible to establish a common ground between the three *poché* conditions mentioned and the work of Fernando Martínez. Here we find the same conditions but developed in a progressive process contrary to architecture's history. Fernando Martínez Sanabria begins with the modelling done by his contemporaries but ends with a *poché* of similar conditions to that of baroque architecture.



**Figure 2. Poché in Le Palais du Gouverneur.** This schema shows the walls of a floor of this Corbusier's project. Source: Own elaboration [Diagram based on Le Corbusier's plans.]. 2021.

### Open.

This section focuses on open modelling as an autonomous and superimposed *poché* condition by analysing the work of two architects (Le Corbusier and Fernando Martínez Sanabria). This section demonstrates the existence of autonomous modelling consequent with the prevalence of a recognisable spatial structure typical of the modern movement.

The beginning of Martínez's spatial modelling process has also been identified by some research in the work of Le Corbusier (Figure 2). For example, the *poché* is inserted within a common framework and a homogeneous constructive grid in projects such as The Governor's Palace. In this project, the walls construct concave and convex relationships by arranging themselves to create continuous and irregular surfaces that define the spaces and shape the routes.

In the article "Inversion of the *poché* paradigm" (Such Sanmartín, 2012), the incorporation of a series of formal principles contradicted the principles of the free plan of the modern movement is described. Le Corbusier explores these principles, which stem from the Beaux-Arts mural traditions. In the Governor's Palace, the space is located between the different limits provided by the floor, ceiling and walls but fluidly articulates the other building rooms.

Fernando Martínez Sanabria proposes a similar procedure in the Martínez House. The continuous, irregular surfaces are conceived autonomously and are inserted into the corridors that form part of the characteristic layout of his projects. With this project, Martínez begins his transformation centred on the search for intentional modelling. (Figure 3)

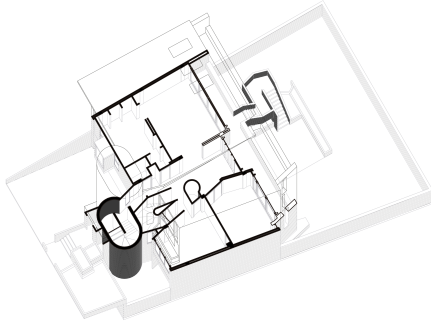
This open *poché* is a *poché* conceived autonomously to be superimposed on other categories that make up the building and is a *poché* that can react to this superimposition depending on the relationships generated between categories. This *poché* proposes the insertion of elements that model the space punctually in which a previous and recognisable spatial structure prevails. The open *poché* is in Fernando Martínez. This *poché* pursues the interest of modelling the space in the changes of direction and circulations, but without putting at risk other categories of the building such as the spatial structure of corridors.

In the open *poché*, the categories start to demonstrate specific recognisable effects: (1) the spatial structure demonstrates the predominance of a previous and recognisable structure; (2) the volume remains legible in correspondence with the spatial structure. And (3) the surface makes it possible to identify three types, the curvilinear, the separated and the folded. This is how Martínez's journey begins.

### Closed.

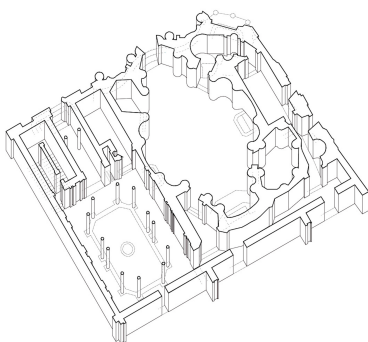
The second *poché* condition is the closed *poché* which is approached as modelling governed by specific compositional rules thanks to the analysis of the work of two architects (Borromini and Fernando Martínez Sanabria). This section demonstrates the dominance of the modelling that imposes itself as a spatial structure and the disappearance of the previous spatial structure and modern ideals found in the open *poché*.

Fernando Martínez Sanabria develops this condition of *poché*, which corresponds to conditions very similar to the *poché* of 17th-century architecture in which the undulating surfaces of Francesco Borromini stand out, for example, San Carlo Alle Quattro Fontane, where the *poché* is part of the pieces of which the building is composed. In this project, the serpentine walls envelop all the spaces, defining primary and secondary spaces and containing some hidden spaces in the interior that resulted from the construction conditions of the time



**Figure 3. Poché in Casa Martínez.**

This schema shows the walls of the social floor of Martínez' project. Source: Own elaboration [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

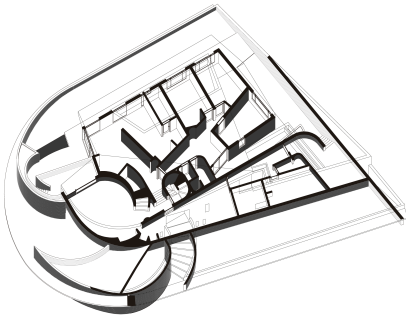


**Figure 4. Poché in San Carlo alle Quattro Fontane.** Source: Own elaboration [Diagram based on Borromini's plans]. 2021.

but which served as a complement to the activity of the hierarchical spaces. (Figure 4)

Sanmartín (2012) tells how Borromini in San Carlino introduced a curvilinear plan into a body of rectangular proportions. The oval layout of the church seemed to have been modelled with clay in a work of interior casting. According to him, for the first time in history, the interior of a church appeared to have been chiselled by the hand of a sculptor. Gideon (n.d.) had also explained that this approach made the walls flexible and turned the stone into a material of apparent elasticity, infusing dynamism and movement into the whole ensemble, which was a characteristic of Baroque architecture of the period.

The Calderón House, one of Fernando Martínez's latest works, is also recognised for its walls developed using continuous, articulated surfaces that envelop the spaces. The routes and spaces of the project are made more complex by the spatial modelling that proposes environments discovered as one walks through the building. The spatial structure of the building is built thanks to the handling of the walls; there is no previous structure but rather the surfaces that envelop the space. With this project, Martínez marks the culmination of his search for spatial modelling. (Figure 5)



**Figure 5. Poché in Casa Calderon.** This schema shows the elements and spaces of this Martínez' project. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

This closed poché is a poché created in conjunction with the other building categories and is a poché governed by compositional rules resulting from formal experimentation achieved through space modelling procedures. This poché dominates the project and takes over the elements that shape the space. The closed poché is, in Fernando Martínez's case, a poché that pursues the interest of modelling the space in its totality and with no reservations about other categories of the project. It is a poché that dominates and imposes itself as a spatial structure, proposing curvilinear and dilated walls throughout the project.

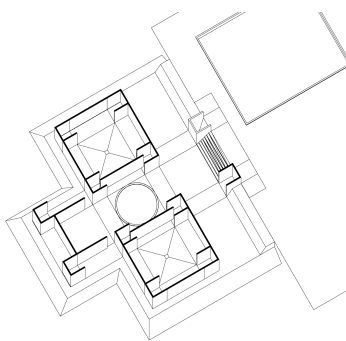
In the closed poché, the categories show different effects than the open poché: first, the previous spatial structure is no longer dominant. Second, the volume is no longer legible and regular. And third, the surface reaffirms the existence of curvilinear surfaces, the separated surfaces, and the folded surfaces.

Fernando Martínez's work creates a dichotomous relationship showing a relationship of opposites that is always present in his architecture. Thus, this research is based on the poché ouvert, and poché fermé enunciated by Lucan (2004) and adapted not only to an urban notion but also applied to the spheres of form and space in architecture. Additionally, it proposes the existence of an intermediate condition between the closed and the open that is demonstrated in Martínez's architecture.

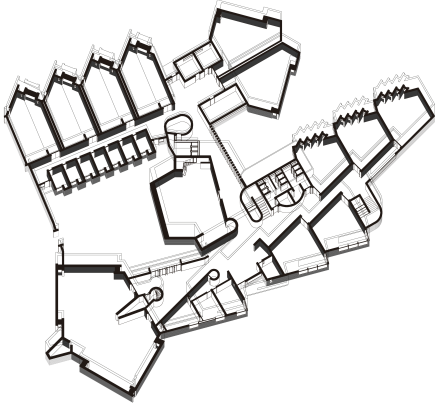
### Neutral.

The third condition corresponds to that developed as a neutral poché. Modelling resulting from spatial experimentation is evident thanks to the analysis of the work of two architects (Louis Kahn and Fernando Martínez Sanabria). This section demonstrates the results of morphological and spatial experimentation under which the poché's effects are systematised.

Fernando Martínez experiments with the procedures identified by some research in the work of Louis Kahn. For example, in The Trenton Bath House, the piece itself becomes a poché by creating spaces within its columns, adding the poché to a predefined spatial structure, but intentionally, considering that the poché is conceived autonomously and superimposed on the other systems of the building, making them coincide and producing specific relations between them. (Figure 6)



**Figure 6. Poché in The Trenton Bath House.** This schema shows the spaces within the columns of this Louis Kahn's project. Source: Own elaboration. [Diagram based on Kahn's plans]. 2021.



**Figure 7. Poché in Facultad de Ciencias Económicas.** This schema shows the modelled pieces of this Martínez' project. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

Kahn's *poché* procedure as going beyond his Beaux-Arts heritage. He has explained to John W. Cook and Heinrich Klotz in an interview<sup>5</sup>: "Poché taught me the difference between a hollow wall and a solid wall. I made the wall a container instead of a solid one...". To illustrate this difference, Kahn evokes the pillars in St. Peter's Basilica in Rome, where corridors and staircases are placed. Thus, pillars can become refuges; columns can become spaces. Kahn explained, "I imagined the support to be a hollow column that can be used (...). Thus, the source of support, the column, became the place that contained the services of the building". This is how Kahn experiments with the *poché* and fully understands its existence as a design instrument.

Fernando Martínez also uses this neutral procedure in the development of his work, a reflection of the process of experimentation with this spatial modelling, which results in the same neutral *poché* approach in projects such as the Faculty of Economic Sciences of the National University of Colombia in Bogotá, in which the *poché* is not explicitly added to create specific compositional layouts, neither is it superimposed as an autonomous system. (Figure 7)

In Martínez, the wall becomes a container; this is evident in the niches on the façades and the dilations in the corners of each room. The spaces are irregular and folded. The curved walls house bathrooms, storerooms and staircases. The large cylinders that are revealed as you walk through the project also contain spaces in the way of hollow columns. This is how Martínez, like Kahn, experiments with space and leaves a record of the operations he put to the test in his projects and the effects achieved.

The neutral *poché* is a *poché* resulting from spatial experimentation, which proposes diverse interactions between the *poché* and the other formal and spatial categories of the project. The neutral *poché* is, for Fernando Martínez, the search (not yet found) for the modelled space as the principle of his architecture.

In the neutral *poché*, the categories result in innumerable effects, some already identified in the open *poché* and others in the closed *poché*. First, the previous spatial structure is recognised but not dominant. Second, the volume is legible but irregular. And thirdly, the dilated, continuous and articulated surfaces are used at different points in the project, obtaining varied effects.

## Operation

The *poché* conditions do not allow us to understand the design procedure carried out in the projects to achieve each state set out in the previous section. So this section shows the operations detected in each of these conditions. The *poché* operations (added, inserted and composite) are established and vary according to the architect who works on them. Thus, it is possible to understand three procedural actions that make it possible to design with *poché* and how they relate to the spatial structure of each of the projects.

The concept of operation can be defined as the action developed on a body by using appropriate instruments that perform various acts to produce an effect for which it is intended. For this research, it is the handling of form through the *poché* as a design instrument which aims to achieve spatial modelling of the void. For Fernando Martínez, the operation is the strategy he uses to transform an initial and recognisable structure to generate singular spatialities in his architecture.

The open, neutral and closed *poché* conditions proposed by this research correspond respectively to the operations of insertion, addition and composition.

<sup>5</sup> John w. Cook, Heinrich Klotz, *Conversation with architects*, New York – Washington, Praeger Publishers, 1973. P.364.

The analysis of these three operations allows: firstly, to construct a classification of surface relations; secondly, the addition of volumes demonstrates the capacity to generate complex systems; and thirdly, the composition of *poché* space allows to establish defined rules that model space.

#### Inserted.

The first operation proposed by this research is the insertion of *poché*, defined as *poché* projected punctually and using the surface as the primary formal instrument. This way of operating has allowed this research to propose a "metaxography" of *poché* surfaces (continuous, articulated and dilated), which are arranged within a predefined spatial structure.

The open *poché* characterised by operating by insertion mainly involves a spatial structure and a series of surfaces represented in walls, floors and roofs that model the space. (Figure 8) This insertion operation is characterised by actions such as including, introducing or accommodating the *poché* as a surface within another existing body, in this case, the pre-existing spatial structure.

In terms of spatial structure, Fernando Martínez worked from 1951 on projects for row housing with a system of bays of parallel supporting walls that explain his relationship with this compositional typology, but in which the use of *poché* is imperceptible. In 1957 the Casa Martínez was the first reference for all his later projects, in which he established a pattern with which he initiated a process of transformation in the spatial structure of bays of parallel walls, inserting a series of curvilinear and dislocated elements in which the intention of modelling the space with *poché* strategies begins to be strongly manifested.

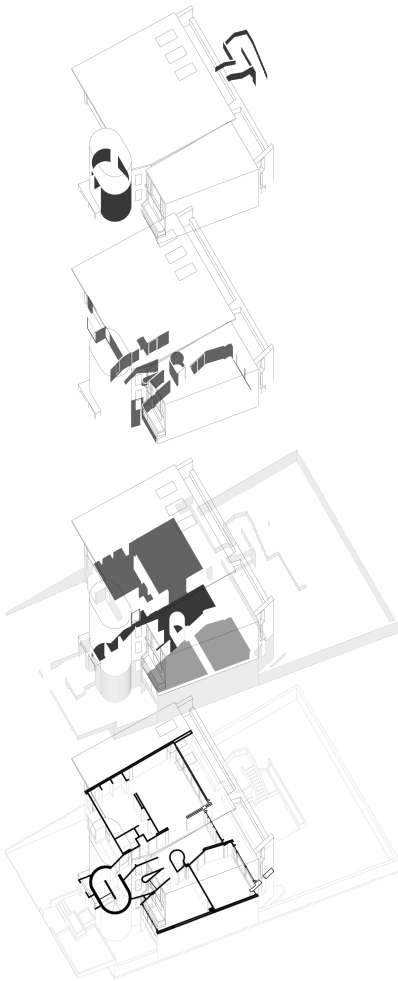
In Martínez, analysing surfaces means abstracting the elements that limit space, specifically those that generate singular spatialities. In the Martínez House, it is mainly the walls, both of the façades and of the partitions, which stand out for their changes of direction in differentiated angles, others inscribed in geometric curvatures, and some which expand to envelop one another.

The surface generates a series of relationships that allow the modelling of space through aspects such as continuity, changes of direction, or the separation of spaces. This is how this research proposes a "metaxography" of the *poché* surface. Metaxography (Ahlava,2021) is a term used by some architectural researchers to refer to the analysis and study of relationships and suggests the existence of types of relationships that can be classified by groupings that make it possible to highlight their internal logic and place them at the service of the theory and practice of architecture.

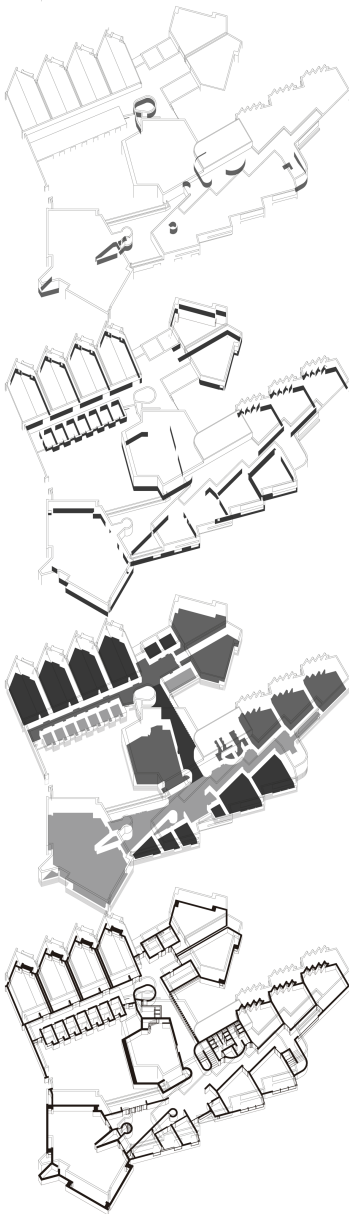
For this research, the *poché* surface expresses three typologies of the surface. Firstly, the continuous surface corresponds to the surfaces that establish relationships between spatialities, allowing fluidity in the route and openings in the perspectives. This continuous surface is proposed by Martínez thanks to the projection of curvilinear walls that accompany the vertical circulation of the staircase on the front façade and also in the wall of the concave storage room in the kitchen, which in turn accompanies the circulation of the central hall thanks to the convexity of its other side.

Secondly, the articulated surface corresponds to surfaces that mark direction changes and intentionally direct the routes and visuals. This surface is proposed by Martínez in the dislocated walls of the façades and also in the partition walls that separate the living spaces and the central circulation corridor.

Thirdly, the dilated surface corresponds to isolated surfaces. In this case, they are surfaces that are separated to mark subdivisions of the space thanks to the



**Figure 8. Overlapping of categories in Casa Martínez.** The spatial structure is essential and the surfaces and volumes have been inserted. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.



**Figure 9. Overlapping of categories in Facultad de Ciencias económicas.** The spatial structure is not closed but the surfaces and volumes are still added or inserted. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

virtual insinuation of limits, allowing zoning without physically separating. Martínez proposes this surface in this project to break up one of the corners of the dining room and allow light to enter the space.

The Casa Martínez is the first transformation to the spatial structure of Martínez's work; however, it maintains the structure and inserts the *poché* surfaces that mould the space. Moreover, in terms of surface analysis, this insertion operation reveals three surface relations that continue to be explored in Martínez's work.

#### **Added.**

The second operation is the addition of *poché*, defined as the spatial modelling generated through the repetition of modelled volumes that form modelled space between them using volume as the primary formal instrument. The added *poché* allows this research to propose the existence of complex systems of *poché* volume that can be arranged along with diverse spatial structures.

This operation is identified in projects such as the Faculty of Economics, which is recognised by the repetition of multiple singular spaces in its volume, which are repeated throughout the building proposing a complex system of volumes that, in turn, give unity to the project. (Figure 9)

Modelling space by addition corresponds directly to the category of volume. This category allows us to analyse the existence of volumes modelled using different operations that are subsequently repeated and related by simple addition to forming a complex system of volumes.

By using *poché* addition, the volumes propose complex systems of relationships. A Complex System (Hofstadter, 1982; Heylighen, 1988; Holland, 1996; Johnson, 2001) is a concept approached by some researchers who define it as a set that requires two or more different parts or elements and that these must be connected in such a way that it is difficult to separate them. A complex system of *poché* volumes could be defined as a set of volumes that model the space but which, added in a repeated way, make the spatial modelling of the whole complex thanks to the modelling of the unit.

Thus, this *poché* operation does not propose a volume classification but allows us, through experimentation, to understand the existence of the modelling of the part and the whole that results from the addition and repetition of elements. Firstly, modelling the volume as a part corresponds to modelling using simple operations of the surface that makes up the volume. Secondly, the modelling of the volume as a whole result from the relationships generated between the geometric but intentional incompatibilities of the modelling of the parts.

The Faculty of Economic Sciences proposes another *poché* procedure in Martínez's work. In addition, the analysis of the addition of *poché* volumes highlights the modelling of the volume as a part of the modelling of the whole building.

#### **Composed.**

The third operation proposed by this research is the *poché* composition as the spatial modelling projected using specific rules achieved thanks to the spatial experimentation of the inserted and added *poché*. In this way of operating, the *poché* volume and surface create their structure thanks to the metaxography of the surface and the complex volume systems achieved in the inserted *poché* and the added *poché*. A predefined spatial structure is no longer required; thus, independence from previous spatial structures is possible.

This operation is identified in projects such as the Calderón House, which is recognised for the complexity of its spatialities, in which the walls envelop one



another and expand to form differentiated spaces within a fluid totality. With this *poché* operation, the implementation of *poché* as a design instrument with specific actions and expected effects is reaffirmed. (Figure 10)

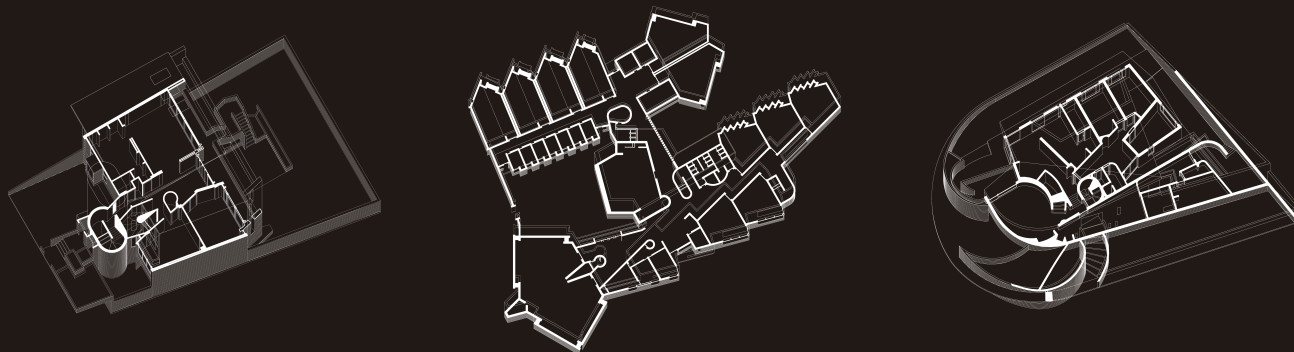


**Figure 10. Overlapping of categories in Casa Calderón.** The spatial structure is imperceptible. The surfaces and volumes take over the project. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

Modelling space by a compound *poché* means that it operates intentionally and with specific actions, giving a structuring character to the spatial modelling within the composition. This operation involves both the category of surface and volume, and it is these that generate a spatial structure. The analysis of the two previous projects (La Casa Martínez and La Facultad de Ciencias Económicas) allows Martínez to understand the handling of the surfaces that model space and to use them to create volumes that form a whole in which the spatial modelling is hierarchical. Thus, the composite modelling is based on the effects achieved in the *poché* inserted and added to the project without requiring a different spatial structure to that produced by the *poché*.

In the Calderón House, Martínez works with *poché* more convincingly, making the structure of parallel bays imperceptible. All the spaces are modelled in a particular way; the volumes are attached while the surfaces model the main spaces and vary in height, generating both compartmentalised and open, fluid spatialities.

Thus, in the composite *poché*, the application of specific rules to model the space dominates; rules abstracted from experimentation produce expected and well-achieved effects in the inserted and added *poché*. There are effects produced by the operations of insertion and addition, which support the compositional procedure of this *poché*, and are materialised in the façades, the staircases, the walls and the furniture. For example, the façade is not an element but space, the stairs not only connect but articulate the space thanks to the walls that form them, the walls do not change direction abruptly but accompany the route and form space inside them, and the corners are not surfaces that turn around but envelop the space and reaffirm its containment and the furniture is not an accessory but part of the architecture and is projected as a whole.



**Figure 11. Three projects of Martínez Sanabria.** Shows a linear development of the *poché*, from non-structural in 1957 to structural *poché* in 1963. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

## Implementation

Although it has been possible to define the three states in which the *poché* exists and to delve into the operations that make up a project procedure, it has not yet demonstrated the possibility of proposing them as a project instrument available for implementation. This section presents the use of spatial modelling for the architectural project through three types of implementation (initial non-structuring, intermediate non-structuring and structuring) in this case, implemented in the work of Fernando Martínez Sanabria. The first part shows the initial non-structuring *poché* development in the Martínez House; the second part highlights the intermediate *poché* that remains non-structuring and is found in the Faculty of Economic Sciences. The third part deals with the structuring *poché* in the

Calderón House. In this way, this section makes it possible to demonstrate a procedure in Fernando Martínez's work that is not only progressive but also makes use of all the conditions and *poché* operations of this research.

Implementation refers to putting a procedure into operation through specific methods, operations or strategies. In this case, *poché* implementation refers to Fernando Martínez's project process, as this research has based its argumentation on the analysis of the projects and how they construct a procedure recognised throughout this work.

Martínez's process begins in his first buildings, in which he modifies specific elements that do not structure the space but complement it. Subsequently, the projects contain *poché* operations that, as they become more expert in their handling, result in spaces in which the modelling is structuring in the composition of the whole building. To achieve this, Martínez has found a procedure based on his learning process, which allows him to put at the service of contemporary architecture a design instrument that is concerned with converting the void into a singular space using specific operations that generate effects achieved in his work. (Figure 11)

### **Non-structuring and initial.**

The first implementation evidenced by this research is shown in this section as the initial *poché* exploration of Martínez's work, evident in his initial projects and, precisely, in the Casa Martínez. In this implementation of *poché*, the modelling does not structure. Still, it demonstrates specific affects and effects on the walls and stairs of his projects, which are the beginning of the spatial research he develops throughout his work.

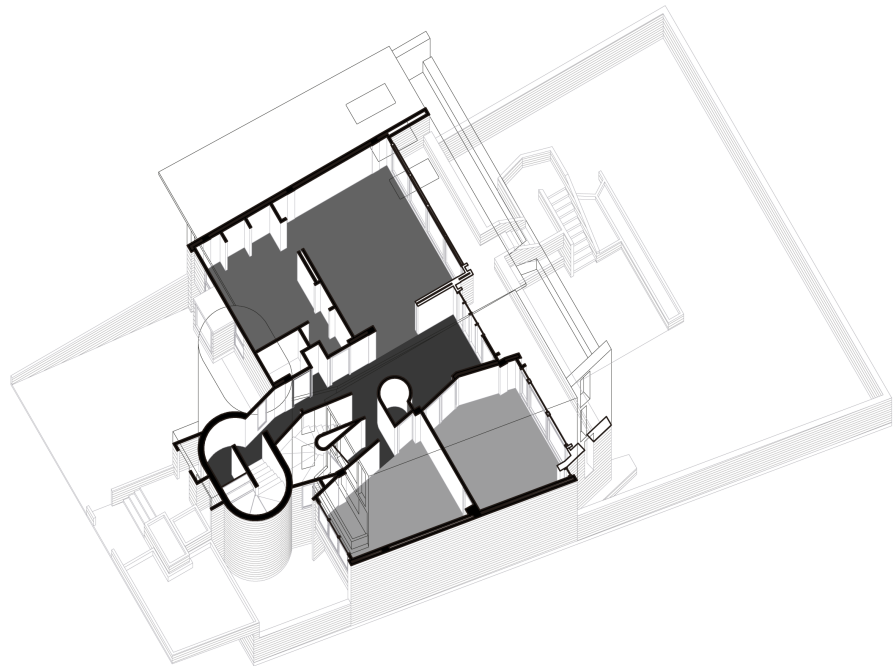
The implementation of Fernando Martínez's spatial modelling began at a stage in which his architecture was linked to a previous spatial structure that ordered the elements. In this structure, Martínez began to include some details, mainly curved or folded walls, which showed his interest in modifying the space and, perhaps, in endowing it with specific intentions. Among his initial projects, the Santodomingo House, the Oligastri Building, the Martínez House and the Giraldo Building stand out; of these, the Martínez House has been one of the case studies of this research thanks to the number of modelled spaces which allow us to analyse not only the structure, volume and surface but also other categories proposed at the beginning of the research. The implementation of *poché* in Martínez's initial projects is non-structural modelling. However, modelling shows specific effects as the same strategy is implemented in different projects.

Structuring refers to the ability to give form and order to space to form a whole since the architectural project is not just the sum of its parts. For example, there can be an invisible network of elements that make up a whole thanks to the grids, proportions and rhythms with which the elements that delimit the space are arranged horizontally and vertically. Thus, a non-structuring *poché* refers to a *poché* that does not play a decisive role in the arrangement of space or the conformation of a whole.

In 1957, the Casa Martínez, as already described, is the most obvious reference to the affectation of the spatial structure of bays. This three-storey house with a basement maintains the spatial structure of bays, but the spatial modelling is more evident. The surface is present in the internal and façade walls, and volume is apparent in the handling of the façades and in the addition of the two façade staircases already described. Thus, in the previous sections of this research, this project has already been catalogued within the open and inserted *poché*, taking into account the *poché* condition and the most significant operation in its spatial modelling. All the spaces in this house could be developed while maintaining the

three clean and regular centrelines, but the curved and folded walls make this project stand out from the previous ones. (Figure 12)

Non-structuring in Fernando Martínez is a *poché* that does not order the space; it is punctual or local modelling that cannot yet affect the spatial structure, which in this stage of the Martínez process corresponds to that described in the open *poché* of this research. In this case, it is initial because it compares to the first stage of this architect's process, where it is possible to evidence his interest in spatial modelling, but without affecting the whole of the project, even though his modelling strategies already make it possible to determine some of the effects and effects resulting from his modelling.



**Figure 12. The three bays of Casa Martínez.** It is possible to see the respect for the distribution and the transgressions made by the insertion of *poché*. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

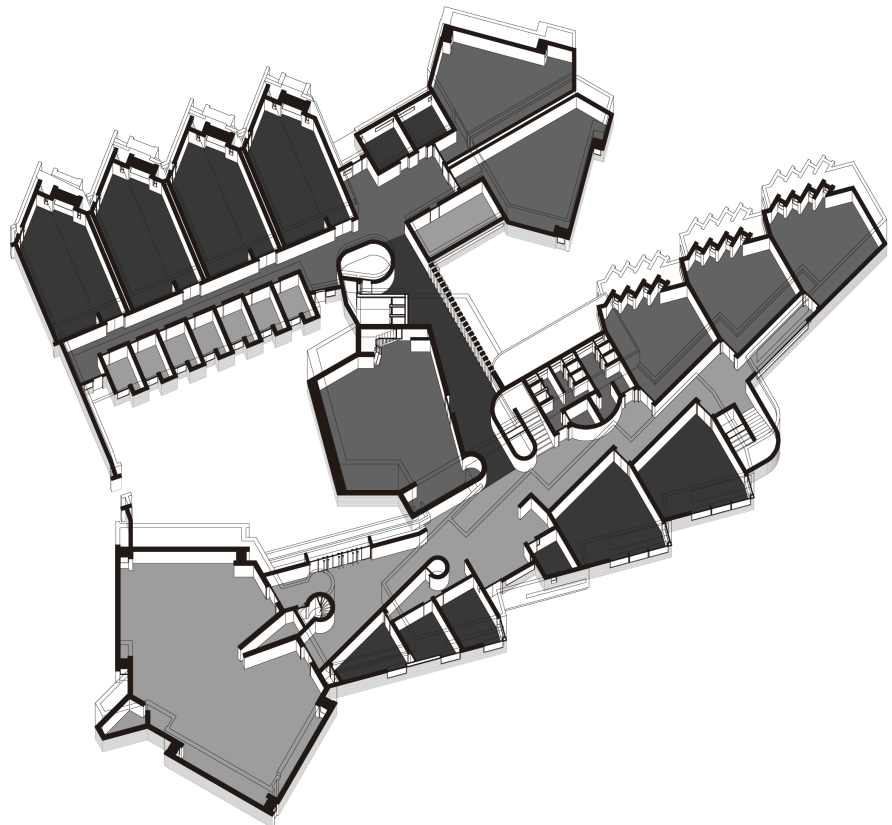
Now, affect refers to the perceptions conveyed by the form and the modelled space. For example, some sensations are given by the form as if they are embedded in the form itself and do not depend on other external factors such as its use or its material. These perceptions are processed in multiple ways. This research does not aim to classify them since forms can produce sensations created by individual experiences, thoughts, feelings, emotions or moods. Still, it does seek to highlight some of them. Thus, by focusing on the optical perceptions of form in the manner of Farshid Moussavi (2009) in his text *The Function of Form*, it is possible to assign some words to the affects produced by specific strategies of Fernando Martínez's spatial modelling and to submit them to the discussion that this research encourages.

On the other hand, the effect no longer refers so much to perceptions but to tangible results, i.e. that followed by a cause. In this case, the reason is those strategies implemented to shape the space; for example, the modification of the spatial definition, which, although it could be of a free façade and sliding window following the modern movement, in the case of Martínez, the results of the modelling are materialised in it by evidencing the articulated surfaces that give rise to built-in furniture and intermediate spaces in the windows.

From this initial *poché*, and even though it is a *poché* without structure, it is possible to determine a series of affects and effects typical of the modelling strategies implemented by Martínez in his projects. For example, the surfaces of the curved walls that end up indicating, announcing and accompanying the turns that people have to make when walking the two flights of stairs of the Santodomingo House, the Oligastri Building, the Martínez House, or the helicoidal stairs of the Giraldo building. Also, the convex walls that mark and reveal the entrances or the concave ones contain the privacy of the service spaces in the Oligastri Building, the Martínez House and the Giraldo Building. Likewise, the walls are articulated at acute and obtuse angles that produce expansion or compression in the spaces of the circulations of the Oligastri Building, the Martínez House or the Giraldo Building, guiding people along the route through the space.

### **Non-structuring and Intermediate.**

The second implementation that allows us to study this research is the intermediate development of *poché* in Martínez's work which is achieved in several projects with which Martínez experiments with space. This case is especially evident in the Faculty of Economic Sciences. In this implementation of *poché*, the modelling does not yet structure but confirms similar affects and effects to those of the Casa Martínez, as well as new ones that remain throughout his work.



**Figure 13. The bays of Facultad de Ciencias Económicas.** It is possible to see the flexible spatial structure of bays and the transgressions made by adding *poché*. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

His intermediate projects include the Faculty of Economics, the Sesquilé Children's Rehabilitation Centre and the Caja Agraria de Barranquilla. The Faculty of Economic Sciences is the second case study of this research, as it emphatically repeats the modelling strategies at different points in the project.

The Faculty of Economics (1959) is recognised for the repetition of serpentine in its exterior walls and interior routes. The project comprises several volumes that form the spaces of permanence, fixed points and circulations that link its two and three levels. Three volumes or hierarchical pieces are identified to which the classrooms and offices are attached by repetition, distributed in three naves around a courtyard which in turn are divided into three bays, each one maintaining the circulation of each bay in the central one. These classrooms and offices are irregular volumes repeated several times along the circulations in the form of bays that wrap around the courtyard and form an irregular mass from smaller units added. Between the repetition of pieces and between the hierarchical elements, as well as in the changes of direction of the bays, certain irregular surfaces are inserted to form vertical circulations of predominantly curved shapes (Figure 13). On the outside, the enclosures are read as folded and overlapping surfaces. In this case, the figure-ground is defined between the identifiable and repeated pieces immersed in an irregular circulation. Walking through the building means passing through an undulating circulation that accompanies the corridors arranged around the courtyard and leads to 3 types of parts: the hierarchical parts of the auditoriums and libraries, the repeated parts corresponding to classrooms and offices, and the only vertical circulation parts that articulate the horizontal circulations. The surface of the building is a folded surface that, through the articulations, gives an appearance of continuity in the form of a meandering ribbon that acts in the same way both on the outside and inside of the building. The discontinuities of this surface overlap each other to conceal this discontinuity, and it shows the independence between volumes.

The Faculty of Economic Sciences is the object of study because it allows for the analysis of a large number of singularities, transcending a specific use, scale or context.

Non-structuring in Fernando Martínez is, as has already been said, a *poché* that does not order the space. In this case, it is intermediate because although it does not structure, neither does it privilege the previous spatial structure, but rather this begins to lose dominance over the project, showing itself to be more flexible when relating to the modelling and allowing certain modifications when the *poché* is added.

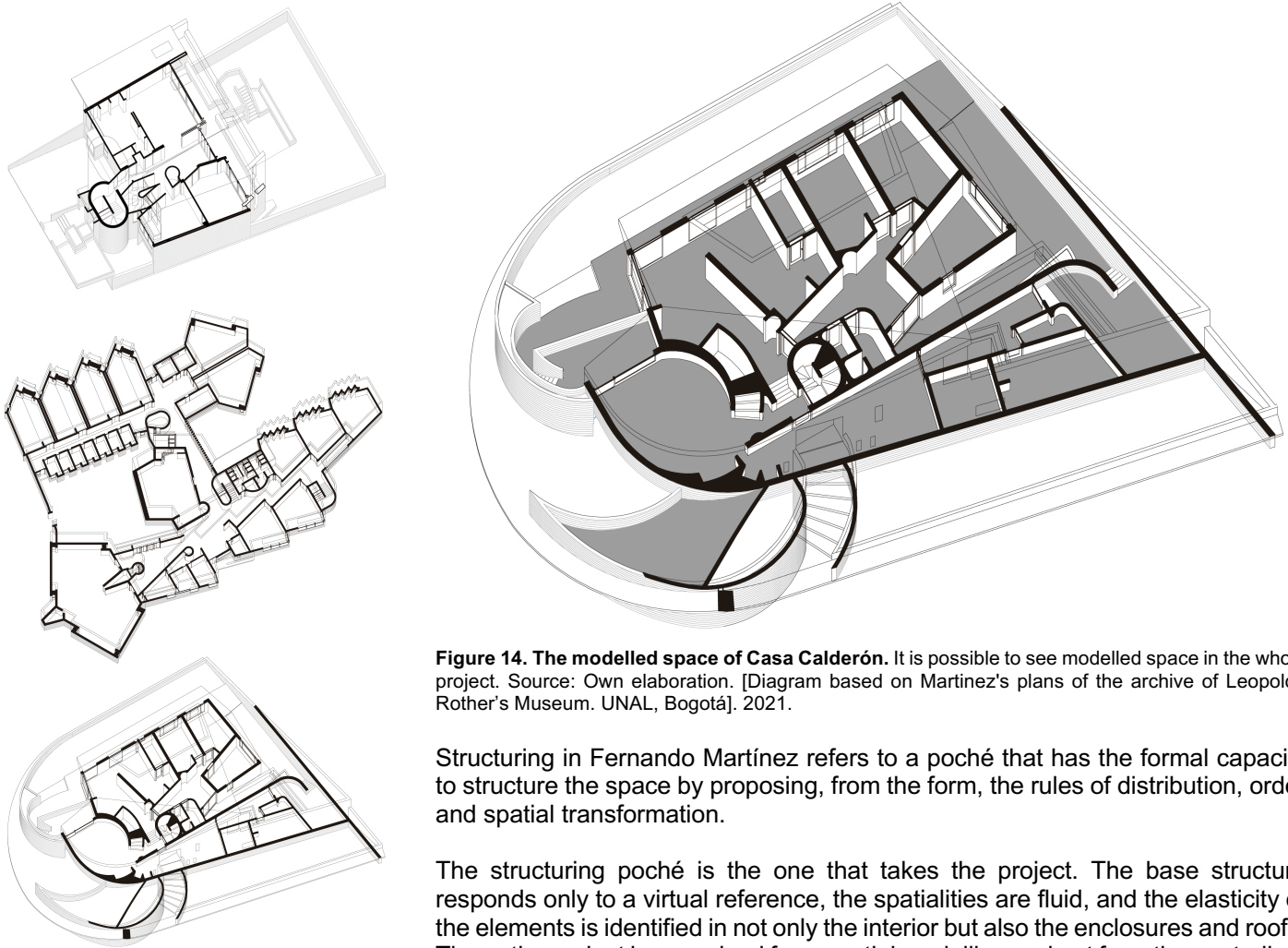
In this intermediate *poché*, which is also non-structuring, there are some effects and effects that confirm those already discovered in the initial non-structuring *poché* and others that appear thanks to the new modelling strategies implemented by Martínez at this stage of his work. For example, the surfaces of the curved walls also indicate, announce and accompany the turns of the staircases of the Faculty of Economic Sciences and the Caja Agraria. Also, the convex walls that mark and reveal the entrances, which on their concave side contain the service spaces, are evident in the three projects of this *poché*. The walls are articulated at acute and obtuse angles, producing expansion and understanding in the three projects. And the repetition of volumes not only models their interiors but also models the intermediaries between them, making the perspectives of the buildings' circulations more complex.

### **Structuring.**

The last implementation of *poché* found in this research is shown in this section under the name of structuring *poché*, which is evident in Martínez's late and peak architectural work, such as the Calderón House. In this implementation of *poché*, the modelling structures the space with complete dominance of the affects and effects of which we are already specific, thanks to the diverse spatial experimentation achieved throughout the progressive projectual process of his work.

*“The composition of the space leaves behind the use of the orthogonal grid; the volumetry breaks the prism, and converging lines, diagonals, and curves appear (...)” Niño, C. 1979.*

With the Calderón House in 1963, he proposed a definitive change in the spatial modelling procedure. From this project onwards, his work no longer recognises the spatial structure of parallel bays as a fundamental aspect of the composition. In this house, the shape of the walls and the roof operate using rules defined by the skill acquired and the effects found in the operations applied to previous projects. In the Calderón House, the curvilinear and folded walls take centre stage and involve the entire project. (Figure 14)



**Figure 14. The modelled space of Casa Calderón.** It is possible to see modelled space in the whole project. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

Structuring in Fernando Martínez refers to a *poché* that has the formal capacity to structure the space by proposing, from the form, the rules of distribution, order and spatial transformation.

The structuring *poché* is the one that takes the project. The base structure responds only to a virtual reference, the spatialities are fluid, and the elasticity of the elements is identified in not only the interior but also the enclosures and roofs. The entire project is conceived from spatial modelling and not from the centreline.

## Conclusion

This research demonstrates the existence of a design instrument in the *poché* concept. In addition, it proves the existence of different types of *poché*, from the conditions, the operations, and the implementation of spatial modelling.

It is possible to conclude that three conditions establish a common ground between Martínez's work and the history of architecture. Martínez begins in an open *poché*; he goes through an intermediate stage of neutral *poché*; and finally, he ends up operating with strategies characteristic of *poché* composition. (Figure 15) It is also possible to determine an evident change in the relationship between the spatial structure of the projects concerning the surface and the volume that models the space: first, in the open *poché*, the spatial structure demonstrates the predominance of a previous and recognisable structure; the volume remains legible in correspondence with the spatial structure; and the surface proposes

**Figure 15. The modelled boundaries of three projects of Martínez.** It is possible to see how the facades become spaces more relevant each project. Source: Own elaboration. [Diagram based on Martínez's plans of the archive of Leopoldo Rother's Museum. UNAL, Bogotá]. 2021.

poché through strategies of continuity, articulation and dilation. Second, in the closed poché, the spatial structure is not recognisable; the volume is no longer legible and regular; and the modelling surface reaffirms its existence by implementing itself in a continuous, dilated and articulated manner. And in the middle, the neutral poché maintains the previous recognisable spatial structure, but it is not dominant; the volume is legible but irregular; and the dilated, continuous and articulated surfaces are used punctually but repeated way. (Figures 16, 17).



**Figure 16. The curvilinear walls of façade Facultad de Ciencias Económicas.** Source: Hernández J. [Photograph]. 2017.

It is also evident that there are different poché operations, and the change between the insertion and the addition of poché is apparent in the spatial structure of the projects, where there is a change from a closed, dominant and framed structure to an open structure that facilitates the transgression of this. And it concludes in the poché composition in which the previous spatial structure disappears, and the modelling becomes the structure itself. Thus, in the inserted poché, it is the surface that models space; there is a metaxography of this: the continuous, the dilated and the articulated; each produces different spatial effects. In the added poché, the volumes model the space; they propose complex relations systems and start from modelling the part to form the whole. In the composite poché, the application of rules abstracted from experimentation dominates, producing effects expected and achieved in the inserted and added poché, which are implemented as a design instrument but in a precise and concrete manner.



Figure 17. The folded walls of façade of Facultad de Ciencias Económicas. Source: Hernández J. [Photograph]. 2017.

Finally, the poché implementations highlight the spatial modelling that is the product of the design process of the work of an architect like Martínez, which goes from the modification of specific elements that do not structure the space and subsequently, the projects contain poché operations that, as they achieve expertise in their handling, result in spaces in which the modelling is structuring. This implementation process makes it possible to put at the service of contemporary architecture a design instrument concerned with converting the void into space using specific operations that generate controlled effects.

In the initial non-structuring implementation, it is possible to determine a series of affects and effects that are repeated in the intermediate non-structuring implementation and fully mastered in the implementation of the structuring poché.

This is how this research proposes poché as a design instrument available for contemporary architecture practice. First, the relationship between spatial structure, volume and surface is studied in poché conditions. Also, proposing a metaxography of poché surface, a proposal of complex systems of poché volume, and rules of composition that model the space thanks to the application of specific operations. And finally, by highlighting the effects and effects of the conditions, operations and modes of implementation of poché, the spatial results generated thanks to the formal materialisation of the strategies that model the void to turn it into space are demonstrated.

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