

Energy Renovation and Inhabitants' Health Literacy: Three Housing Buildings in Paris

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Abstract

Today, whether condominiums or social housing, Parisian buildings are undergoing a series of renovation processes aimed at enhancing their construction quality. This renewal, however, impacts the social life of the buildings, which has consolidated over the years. As a socio-technical process, renovation transforms existing architectural forms based on current housing standards. However, while a building may be composed of materials and populations, it is also the result of history, from its construction to its daily maintenance or degradation. Interpreted as such, this article posits that people with no control over their living environments are more likely to suffer from health problems, due to a lack of knowledge about underlying causes or low health literacy regarding living spaces. Consequently, their inability to adapt raises the question: How does an individual's ability to control their living space influence their health? As part of the SAPHIR program, this article explores this by seeking to understand residents' abilities, actions, and feelings concerning the tension between individual satisfaction levels and their impact on physical and mental health. It does so through three case studies of buildings constructed prior to 1973, focusing on their design, morphology, location, legal status, norms, and population types. Conducting individual interviews and collective focus groups allowed us to highlight the links between these elements by creating inhabitant and building typologies from different historical periods and standards.

Keywords

health; housing quality; Paris; renovation; social housing

1. Health Literacy in Housing

In France, the 2020 Covid-19 crisis was followed by a heightened debate surrounding housing, with three official reports denouncing its low quality, and the Minister of Housing launching a special concourse of ideas entitled *Engagés Pour la Qualité du Logement de Demain* (Committed to Quality Housing for the Future). The Lemas/Badia report (Lemas, 2020), for one, criticizes surface area reduction in social housing, along with its adaptability, lighting, and relationship to the outside world. Further, the report by Laurent Girometti and François Leclercq (2021) proposes a reference framework for improving the quality of housing used to meet new inhabitants' needs. The report by the Institut des Hautes Études Pour l'Action Dans le Logement (2021), on the other hand, highlights designers' lack of understanding of uses and lifestyles.

Nevertheless, housing quality cannot be determined solely based on its technical dimensions. This article thus postulates that the World Health Organization's definition of health (i.e., a feeling of physical and mental well-being; Fijalkow & Wilson, 2023) can be used as a basis for studying housing quality. The idea is to consider health beyond the absence of disease (Boorse, 1977), which implies considering health research as a way of mitigating the vulnerability of populations (Giroto, 2023). In this way, the notion of "care" is defined as "activities we do to remain, continue, and repair our world so that we may live in it as well as possible" (Tronto, 2015, p. 3). "Health literacy," on the other hand, is defined according to Professor Scott K. Simonds' definition, who coined the term at an academic conference in 1974 (Dignard, 2015). Many researchers have examined the notion of health literacy over the last 20 years. Krystine Sørensen, for example, compiled a body of academic work in 2012, proposing that this notion involves the knowledge, motivation, and competencies that individuals may possess to identify, understand, and evaluate health-related information, the mastery of which could enable them to make better decisions about disease prevention and their overall health (Sørensen et al., 2012). Rootman and Gordon-El-Bihbety (2008) suggest that this notion refers to the ability to access, understand, assess, and transmit health-related information in various contexts throughout life, without specifying the physical environment or living space. Along with the other criteria mentioned above, Nutbeam (1986, p. 357) considers the "cognitive and social skills that determine motivation and ability of individuals to gain access to, understand and use information to promote and maintain good health." Furthermore, surveys define different "determinants" and "levels" (Swope & Hernández, 2019) of health literacy, which have been reinterpreted by the Santé Paris Habitat Histoire Residentielle (Paris Housing Health and Residential History; SAPHIR) program, the framework of this research.

SAPHIR is a research program fully funded by the Agence Régionale de Santé Île-de-France (Ile de France Regional Health Agency), involving researchers and students in architecture, sociology, geography, and public health.

The program argues that, in particular social and spatial contexts, health conditions and perceptions thereof enable certain residents to develop the ability to assess the quality of their homes. This research thus seeks to elaborate upon how people act to improve their life quality and, therefore, their physical environments and housing (Fijalkow & Wilson, 2024). Among the various criteria, the notion of "competence" is of great interest, as it underpins other variables, such as the "ability to evaluate" and apply this knowledge to prevent disease (Van den Broucke, 2017) and address the necessary conditions for creating a healthier environment. Health literacy in housing (HLH) is assessed by comparing the differences between objective diagnoses and

subjective perceptions of health in housing. Care, on the other hand, implies that the world may be repaired, including one's body, oneself, and one's environment, all of which are linked through a complex, life-sustaining network (Tronto, 2015). Within the SAPHIR program, spatial dimensions and architectural quality are central to these notions.

The Covid-19 crisis transformed living standards, bringing housing and work closer together. Factors such as the amount of time spent at home per day and the importance of communal spaces have thus influenced housing design (Bick et al., 2023), which is now being further impacted by the energy crisis in Europe (Halkos & Gkampoura, 2021). The government responses in France have led to proposals for the rehabilitation of its housing stock. However, this implies that construction works be carried out to improve insulation and heating systems, which can take time. This means that some must put up with lower heat temperatures to avoid paying unusually high bills. The qualities expected of housing vary according to the socio-economic status of residents and are not limited to the interior of an individual housing unit. At the very least, they are considered at the scale of the building, where numerous discussions take place, as was seen during the pandemic (Grant, 2020). This raises several questions: What skills do residents have to make the connection between health problems and housing, especially those related to temperature (Stojilovska et al., 2021)? What capacity do they have to intervene and improve their habitat? Heating seems to be a particularly appropriate topic, insofar as it concerns the health of individuals and is subject to individual and collective regulation (Crowley, 2001); can people independently fight against the energy difficulties they are confronted with (Liddell & Morris, 2010; Shove, 2003)? Do they consider this an individual or collective struggle? Can housing design and standards (particularly heating) help explain their behavior? What health risks and external variables could influence their decision-making? Is it the cost, the lack of knowledge about public or technical aid, or neighbors' judgment concerning these actions? This article aims to shed light on the link between these elements through a typology of inhabitants and buildings corresponding to different historical periods and standards.

The interaction between health and housing quality can be theorized as shown in Figure 1. This type of relationship was documented by Harrington et al. (2005), noting that, according to socially mediated processes, "poorer health" can lead to a decline in the economic status of individuals. They analyzed how living in an energy-precarious household and having a low socio-economic status directly influences people's mental health. The results of their research allowed them to identify objective conditions that directly impact people's well-being, such as decent heating, air quality, or ventilation (Zúñiga-Bello et al., 2019). For example, a relationship exists between the cooling of one's body and the ability to close a window properly, whether the issue is controllable by the person or stems from a technical problem. This "ability to control" one's domestic environment clearly influences mental and physical health. Similarly, people who cannot control the heat in their homes are more likely to fall ill, as low apartment temperature increases humidity and therefore indoor pollution (leading to mold and dust mites, for example), in addition to more traditional illnesses, such as the flu or asthma (Bluyssen, 2010). Among the subjective variables are personal and emotional control, as well as material conditions, such as lighting or sound quality (Ortiz et al., 2017), which increase the likelihood of "feeling able" to control a healthy space and have a more sustainable quality of life.

These objective and subjective gauges of housing quality require the integration of residential trajectories and, more broadly, the history of apartment occupancy, which is fundamental for the analysis of energy consumption and spatial occupation (Shove, 2017). Stress, anxiety, insecurity, and the accumulation of several unhealthy factors in housing can lead to suicidal thoughts (Colleville & Kermarec, 2021) or generate

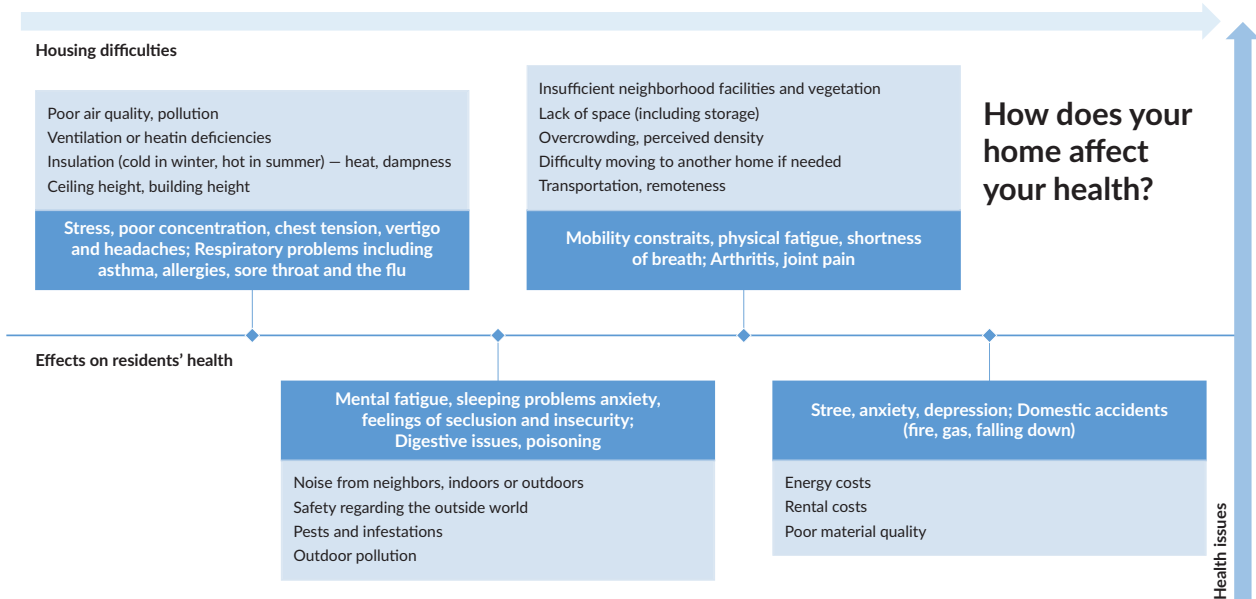


Figure 1. Summary table: The influence of housing on health and associated physical or psychological illnesses.

aggressive impulses or behaviors within the family structure itself or towards neighbors and building managers. In the field of mental health, the notion of “subjectivation” can be considered as a set of social processes that reinforce the subject’s point of view, as opposed to more “objective” elements of a physical or social nature (Benamouzig, 2010), which are also important. From a narrative perspective, combining the history of places with residents’ stories and trajectories helps increase people’s ability to more openly and naturally exchange about their place of residence. According to housing research theory, this would therefore imply the possibility for inhabitants to leave or move, i.e., the principle of mobility (Wacquant & Wilson, 1989); to adapt the dwelling to all ages and life cycles, i.e., the principle of adaptability (Altaş & Özsoy, 1998); to recognize oneself in one’s living space, i.e., the principle of identity (Proshansky, 1978; Proshansky et al., 2014); and to express one’s attachment to a place, i.e., the principle of narrativity (Fijalkow, 2017).

According to Hirschman (1970), all private and public institutions can reduce the quality of goods and services. Faced with these failings, users behave in three ways: They leave the institution, they challenge it, or they are loyal to it (Hirschman, 1970). The first two are warning mechanisms for the institution, which is confronted with the individual expertise of users. While the use of exit is well known, this is not so much the case when users challenge their everyday living spaces, thereby using a corrective force that should be recognized and encouraged. In our case study, this represents the highest level of literacy.

2. SAPHIR: Narrative Research Interventions and Teaching Methodologies

The SAPHIR research program is based on a sample of 12 apartment buildings in the east of Paris and its northeastern suburbs, selected according to the year of construction (and thus compliance with standards, especially thermal and acoustic), spatial density, location in the city, access to amenities, occupancy status (condominiums, social housing), and population type (age and income brackets). Among these are one particularly insalubrious building in the 18th arrondissement of Paris, one poorly insulated condominium in

the inner suburbs of Paris, several *habitat à bon marché* (or the prior French social housing scheme) from the 1920s, and *habitation à loyer modéré* (or social housing) from the 1970s. It also examines social housing complexes built in the heart of Paris in the 1980s, more recent buildings compliant with sustainable development standards from the 2000s, former army barracks “rehabilitated” into housing, and recently built “mixed” social housing/middle-class condominiums. The aim of the methodology is to produce a series of building monographs based on archives and interviews, reconstructing the history and collective memory of these buildings to question the way in which this past does, or does not, play a role in current crises (Covid-19, energy, etc.).

The various components of this methodology make it possible to diagnose and assess housing quality at both the scale of the building and the apartment, allowing us to unpack residents’ literacy by applying the writings of Sørensen (2012) and Tronto (2015) to housing. SAPHIR postulates that residents express and mobilize knowledge and values in response to the problems they face daily. For instance, a parent decides to heat the bathroom before their child bathes to prevent them from getting sick. The drive to safeguard the children’s health despite temperature restrictions draws on both values (staying healthy) and representations (ideal parenthood). It is therefore through what is called “critical situations,” or everyday dilemmas, that the possibility of acting emerges, as can be seen in Figure 2. Some examples include opening the windows to maintain air quality after a shower, minimizing noise from radiator pipes to preserve privacy, protecting indoor air quality from outdoor odors, working at home in a space not especially adapted for this purpose, or turning on the heater to dry laundry and fight humidity.

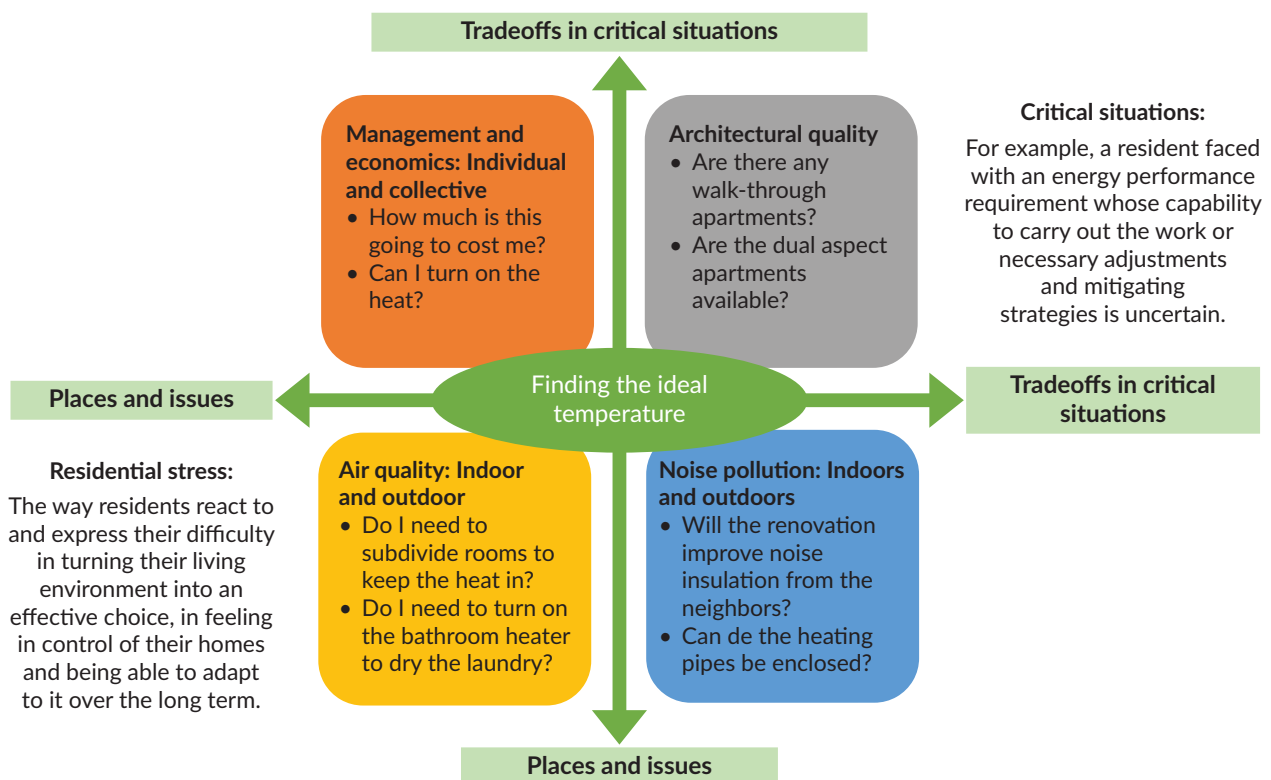


Figure 2. SAPHIR conceptual project.

When residents find themselves at a dead end or faced with a choice—i.e., a critical situation—they must make tradeoffs that require them to change context (e.g., by leaving or rearranging the space). In housing, the quest for energy efficiency is naturally at the heart of these critical situations.

To gather the appropriate data, the following phases were carried out. During the first phase of the study, “educational cafes” were organized by the researchers and presented to the residents. These meetings took place in the lobby, at the foot of the building or in the courtyard and involved willing residents who stopped and took the time to consult a didactic poster on the impact of housing quality on physical and mental health. The goal was to raise residents’ awareness of these issues by involving them as voluntary participants in the survey. Although the residents were not specifically selected for the interviews, access to the landlord’s statistics provided the socio-economic information necessary to ensure various categories from all floors of the building were accounted for (Fijalkow & Wilson, 2024).

The second phase consisted of a series of individual interviews with tenants, enabling them to explain their residential history, hardships, housing and neighborhood practices, and the existing or non-existent connections they make with health. This was accompanied by “inhabited surveys,” that is, the cartography of the layout and location of household objects and furnishings, illustrating occupation density and room multifunctionality. These interviews and surveys were summarized in “places and issues” sheets, which represent high-tension spaces highlighted in the interviews (including windows, elevators, balconies, stairwells, heating, common areas, etc.) and are the subject of stories, rumors, and qualifiers that are often fraught with meaning, at the heart of the critical situations mentioned above.

The third phase involved inviting residents to focus-group workshops (see Figure 3) to confirm the scope of the “places and issues” and “critical situations,” allowing them to express their views, feelings and the influence of their living environment on health in relation to their personal history as well as that of the building. Floor plans of the building, apartments, and their adaptation by residents were therefore used.

Based on fieldwork and research findings, it is argued that while residents’ quest for control over their environment is central to their living system (heat control, safeguarding individual property, etc.), this need is perhaps different from that of technicians and managers, who are primarily concerned with the building’s



Figure 3. Focus group in Paris.

energy performance. In this respect, the study of HLH is a fundamental indicator, enabling an understanding of how residents perceive their homes through physiological experiences (feeling too hot or too cold, dressing warmly, using caulking techniques). A building’s overall performance cannot be solely defined by energy, but involves several associated factors, as this fieldwork has shown. These include noise pollution, poor architectural layout, and management practices along with residents’ daily practices.

3. Three Residential and Health Related Narratives of Buildings Constructed Before the 1970s

Three buildings seem representative of various climate change, norms, and home use trends (Salat, 2009), as well as particular forms of literacy: a 19th-century private rental apartment building, currently in a state of energy insecurity; a 1920s Parisian social housing block; and a 1960s suburban apartment block built to low standards and in need of major thermal renovation (for socio-economic and technical details of all three, see Table 1). Two key common factors of these buildings are their construction prior to 1974 when the first technical building rules came into action, and their targeting by the 2021 Loi Climat et Résilience (French Climate and Resilience Law). This law requires residential building owners to conduct energy renovations within the next few years, with the help of state funds, unless they wish to face the consequence of no longer being able to rent or sell their properties. Although these renovations may be carried out from the interior of dwellings, doing so requires complex logistical arrangements. Exterior renovation work is thus more common but is fraught with financial, technical, social, and administrative obstacles. Compared to previous renovation processes, the energy renovation measures of the 2020s appear less authoritarian than those carried out by Haussmann (1852–1870) through demolition and reconstruction. Also known as “bulldozer renovation,” this is the same method that was applied to older neighborhoods in the 1970s. Today, however, energy renovation is not seen as an urban policy involving spatial planning, but rather as a way of dealing with individual situations, which are thus the focus of this research.

Table 1. The three buildings studied.

| | Letort (Paris 18th Arrondissement) | Tolbiac (Paris 5th Arrondissement) | Diderot (Champigny) |
|----------------------------------|---|---|---|
| Year of construction | 1890 | 1920 | 1960 |
| Number of housing units | 30 | 59 | 150 |
| Population type and social class | Young couples with children and working-class, single-parent families | Elderly, single, and middle-class | Young couples with children; middle-/ lower-middle-class |
| Occupation status | Private rental housing | Social rental housing | Condominium |
| Spatial layout | Closed without any common spaces, seven stories | Closed courtyard, eight stories | Closed courtyard, five stories (communal garden inside the residence) |
| Heating type | Individual electric heating | Individual gas heating | Communal water heating |
| Housing type | Studio to three bedrooms (non-dual aspect) | One to three bedrooms (non-dual aspect) | Studio to three bedrooms (dual aspect) |
| Number of interviewees | Five inhabitants and one neighborhood association | 15 inhabitants and one caretaker | 15 inhabitants |

3.1. Active and Inactive “Expert” HLH Residents in Substandard Housing

In France, rules to combat substandard housing have been strengthened since the first law was passed against it in 1850 (Fijalkow, 1998). Today, however, official reports deplore the multiplicity of procedures (a total of 26 articles in the Public 145 Health Code), with local elected officials finding themselves on the frontline (Fijalkow & Maresca, 2019). The “peril” procedure (Article L.511-1 of the French Building and Housing Code), for example, is the best-known measure, representing the mayor’s power to order work such as reinforcement or demolition when required, who can also act as ex-officio if nothing is done within the short deadline set. In doing so, however, the municipality may incur expenses on behalf of someone else, with no possibility for reimbursement. Residents thus have access to a procedure that allows them to report their dwellings unfit for human habitation, although this procedure does not guarantee their legal occupancy status. Furthermore, landlords can be prosecuted for renting out substandard accommodation at very high prices, thereby directly endangering and taking advantage of their tenants. Nevertheless, fewer than 100 convictions are handed down each year. This represents the context in which almost one million substandard dwellings exist in France today (Fondation Abbé Pierre, 2023), including the one on Rue Letort.

According to archives (Direction générale des finances publiques, 2023; “Service technique de l’assainissement,” 1900), the Rue Letort building (Figure 4) was built in 1887 on a narrow plot of 217 m². With over six floors, totaling 669 m², it comprises 18 rental apartments with an average individual size of 37 m². It is located beside Porte de Clignancourt, in a busy working-class area at the edge of Paris. During the post-war period, tenants were workers (roofers, toolmakers, millers, etc.), living in their two-room apartments as couples with two or three children. Since the building was well equipped for the time (with water, gas, and electricity), applications were regularly received to occupy vacant units. Today, however, there is much proof of the building’s non-compliance with current standards, if not inhabitability. For example, in 2022, the two owners received five rulings against them (Judgment 05.04.2022), condemning the high level of humidity in the dwellings, the degraded state of the common areas, the inadequate heating, the faulty ventilation system causing odors and mold, along with the presence of lead and major cracks. According to the interviews, the tenants compensate for the lack of communal heating with oil-filled space radiators, which are a fire hazard. Most of the tenants cite health issues for themselves and their children, including respiratory and mental health problems, which were confirmed by medical certificates. As stated in the judgment, the owners have defended themselves by denying these facts, referring to work that has, according to interviews, been carried out incorrectly, such as the installation of a mechanical ventilation system.

The tenants interviewed in the building were young working-class families with children, either immigrants or descendants thereof, struggling to find accommodation separate from their families in the center of the urban area where they work and study. One family of five, for example, has been living in a one-bedroom unit for 11 years. Their residential experience has been a bitter one, leaving them feeling “abandoned” with a lack of recourse when it comes to the management agency and sluggish landlords. Furthermore, all residents interviewed stated they had not chosen to live there and felt forced to stay despite a strong desire to move.

Signs of high residential density in the building and in the neighborhood were expressed and confirmed in the interviews. Further, poor air circulation in the apartments on the lowest floors was also highlighted. The neighborhood is not seen as a positive resource, despite its sought-after location in Paris. In terms of



Figure 4. Building facade and view of the courtyard from inside an apartment.

proximity, residents tend to avoid shops and places that have stamped the neighborhood as being ridden with drug dealing.

The main complaint voiced by tenants was dampness. For Nadia, a 30-year-old tenant with one child, this problem surfaces in the form of “black marks” on the walls (mold) and breathing difficulties, causing allergies and infections, which are cited as triggers for asthma attacks and chronic sinusitis. Each winter, Lamia, a 35-year-old single tenant, reports having to throw out clothing, change the furniture and repaint the apartment, carrying the dampness around in the smell of her clothes. This situation is strongly associated with air quality, prompting tenants to air out as soon as the weather permits, outside of the winter months. Some use air fresheners to dissipate the smell of dampness. Moreover, the absence of balconies in most apartments leads tenants to dry their laundry inside, which worsens humidity. Some attribute this problem to the building’s poor rain proofing, others to the ventilation system, which is either outdated or non-existent, while others point out that the floors are not level, which, to them, means the building is probably poorly constructed.

The question of heating, which is both individual and electric, was the second focus of the interviews. Electric radiators of mediocre quality have been provided by the owner. However, the building’s poor insulation causes high energy consumption, which is criticized by residents as being expensive and inefficient. For some inhabitants, like Rania, who only heat for a few hours in the evening, this is harmful to her two children’s health. Moreover, most residents expressed that insulation is also a problem in the summer.

Physical and mental health is also frequently mentioned, often regarding children who are “always sick.” This contributes to a shared collective feeling of not being at home in this hostile environment, especially when it comes to their children, whom they wish to protect. Nevertheless, residents are unable to carry out repairs themselves and are thus forced to accept these constraints, leaving their homes unadaptable to their lifestyles. This feeling of alienation is reinforced by the presence of squatters in the communal areas and the lack of

soundproofing. While several court rulings have directly addressed this issue, the work carried out by the landlords in response has proven itself ineffective.

There is a widespread sense among tenants that they are not living in decent accommodation. Nadia, for instance, remembers the Covid-19 lockdown as having allowed a family of five to share a two room, 40 m² space, exacerbating feelings of immobility and surface area insufficiency, and leading to outcomes such as preventing the children's educational success. Working from home, therefore, does not seem to be a viable option, given the dampness and cramped conditions.

According to the majority of the interviews, the adaptability of the dwellings appears to be low, and the residents' desire to leave has discouraged them from carrying out any work. For tenants, the insecurity of the area reinforces the idea of these homes being temporary places of transition. It should be noted, however, that many of the tenants and their families have painted the flats, as they were rented out in their current state, with significant traces of damp and mold. Despite residents' high health literacy, seen through their awareness and motivation, this example of a substandard building shows the design's limited capacity to evolve. Thus, rather than transforming and adapting their homes to meet their needs, which is not possible for tenants under French law (Civil Code), they prefer to move out (Hirschman, 1970). The places and issues most identified are the walls, windows, and communal areas, while the main critical situation is the residents' struggle against dampness. With this in light, even if they wish to leave the building, they continue carrying out minor work to keep it viable.

3.2. Active and Inactive “Expert and Layperson” HLH Residents in an Outdated Social Housing Building

In France, social housing is highly regulated by the state, which sets rent prices and determines their architectural design. Social housing represents 18% of the housing stock in Paris and is growing steadily, thanks to support from the municipality. Rent prices for this type of housing are below the private market and are scaled from one to four, with one being for the lowest-income levels and four being for average-income families, according to the National Social Housing Organization and the Atelier Parisien d'Urbanisme (APUR, 2018). The first social housing buildings date back to the 1920s and were built to low standards for low-income populations (Dumont, 1991). This is the case for the 118 Rue de Tolbiac building, located near the center of Paris, which ranked one on the social housing scale.

The building's outstanding architecture has been listed as a heritage site, with its red-brick facade (Figure 5a) and a large brick archway leading to a closed courtyard, typical of hygienist architecture (Dumont, 1991). The 60-unit apartment building is therefore “protected” by the City of Paris, as the design is a legacy of the city's social housing policy that served its most disadvantaged residents at the beginning of the 20th century. Most of the apartments contain one to three bedrooms, arranged lengthways around a corridor, often with no openings or windows. The inner courtyard, set away from the street with green spaces, is appreciated by the tenants who seem proud to talk about “their” garden, despite it being the source of irritating noise (voices and the slamming of garbage bin lids). Today, according to our interviewees, this now middle-class building has been rendered precarious by heightened energy prices linked to the current crisis, which can be seen in residents' DIY practices and strategies to avoid financial burdens.



Figure 5. Current building photos (a) and the modification of the larder (b).

Semi-annual revenue surveys conducted by the housing authority among tenants show major income disparities in the building. The overwhelming majority of interview respondents were women, often retired. Some maintain artistic activities (painter, music teacher, etc.), while others are single mothers at the head of single-parent families, the high percentage of which corresponds to the proportion of small homes. Two distinct groups were identified: older tenants (more than 20 years of residence) and new arrivals (less than 10 years), both with different attitudes. Older tenants seem to fall into the “loyalty” category, as developed by Hirschman (1970), falling back on individual strategies to solve their problems. Others, particularly the new tenants, “voice” their concerns. For example, Jeanne-Lise (tenant) has developed an expert position with the landlord, pointing out the shortcomings of her home (foul odors, non-compliant electrical outlets, high utility bills, etc.). Abigaël, another tenant, has taken action against sound pollution by filing a complaint to the public housing authorities. By using the writing skills acquired through her job at the hospital, she attentively read her complaint at the educational cafe session, revealing a high level of literacy due to her involvement in collective action.

The poor quality of these homes is largely due to their age and their non-compliance to today’s standards (built with poor materials, low thermal and sound insulation and small rooms), making them less adapted to the expectations of the current middle-class tenants (Dumont, 1991). The flats are arranged around a long, narrow, windowless corridor that leads from one room to the next, serving as the backbone of each unit. In interviews, inhabitants noted that the lack of windows makes this space unattractive. The rooms are poorly proportioned (living room 20 m², minimum bedroom size 10.5 m², ceiling height 2.5 m) and lack natural light. According to the latest reports on the quality of housing in France, the size of apartments should be: one bedroom 28 m², two bedrooms 45 m², three bedrooms 62 m², four bedrooms 79 m², and five bedrooms 96 m² (Girometti & Leclercq, 2021). This is a source of frustration for most inhabitant respondents: “I find the rooms very small and it’s not easy sometimes. Not only are they tiny, but in terms of light, the rooms are very deep. And storage is almost non-existent” (Hélène, tenant). This type of apartment is also a source of air quality and insulation issues. For instance, each apartment features exterior-facing larders (Figure 5b), which were designed before the invention of the refrigerator (around 1950) and thus let in cold air, according to today’s tenants. Consequently, they waste heat and are often obstructed. Similarly, the very small, windowless

bathroom added in the 1970s is an additional problem, as the existing ventilation is useless, creating dampness that chips the paint on the walls and ceiling which needs to be redone every two years.

Sound insulation is also a major problem. According to the building caretaker, there are quite a few tenants with psychological problems such as stress and anxiety, which are linked to lack of sleep. Furniture movement is one of the major sources of this nuisance. H  l  ne, for example, says that her ex-husband would jump at the slightest sound. Edgar, another tenant, recalls the tension caused by a neighbor with psychiatric problems who used to scream from time to time. Living on his own and having made major investments in his apartment, Edgar is keenly aware of the things that can damage these upgrades. Abiga  l, another neighbor, told us that she is taking legal action against a ground-floor business since the noise from construction work is affecting her peace of mind and her sleep. She has thus used her professional expertise in health matters to write a report to the landlord. In addition, living in a noisy neighborhood, she installed a specific soundproof window in her son's bedroom, which overlooks the street.

In the interviews, the price of gas appeared to be a major concern for most of the tenants and is even referred to as shocking by Abiga  l. The cost of heating makes it difficult for many people to afford the rent, with one tenant stating that "the recommended 19 degrees is not enough." This forced restraint has led residents like Abiga  l to buy electric blankets and wear shawls around the house. Concerning energy costs and thermal comfort, Jeanne-Lise, a single mother who has lived there with her youngest son for the past 10 years, complains of a draft in her home while acknowledging that the social landlord's recent replacement of her front door has made her apartment less energy consuming. Nevertheless, the cold continues to affect the well-being of the tenant, who is recognized as a disabled worker and has a long history of health problems.

Social landlords are required to account for people with serious health problems. This was thus included in the survey sample, as it can show how this type of housing is also used to care for people. Tenants are aware of the difficulty of insulating their homes, whether from the inside or the outside. The modest surface areas and their awkward layout make thermal insulation from the inside unthinkable, whilst the brickwork and the heritage value of the facade make thermal insulation from the outside difficult to foresee. On the other hand, almost all tenants appreciate the thermal comfort provided by the building materials (stone and therefore thick walls) in the summer, i.e., a cool space during high temperatures.

According to most inhabitants, this housing's poor quality is largely due to its age and its unsuitability for a less poor and less family-orientated population. The location and the building's heritage value are important factors for these middle-class tenants. While our survey enabled the development of a shared diagnosis, identifying problems with the noise, ventilation, and heating, remnants of early 20th-century social housing technical standards have hindered the evolution of this building, despite its need for energy renovation. This is understood by both residents and the owner. Renovation from the outside of the building is essential, as it would be costly to carry out the work inside the smaller apartments. However, this would mean confronting the heritage element of the building facade, which is protected by municipal regulations.

In this building, the central problem is the facade and the historic vaults, which block any possibility of thermal and acoustic improvements, especially since the apartments are narrow. The critical situations that arise are expensive individual heating, small room furnishing, and noise generated by the building's density.

Nevertheless, the tenants wish to stay due to its central location in Paris in an attractive building, therefore inciting them to protest the landlord. Another critical situation is the installation of communal garbage disposal in the center of the courtyard, which devalues the building's image and how it is perceived by residents, who are critical of the landlord over this point. In the focus groups, residents denounced this stigmatizing feature.

3.3. Active and Inactive “Resigned” HLH Residents in a Poorly Insulated Building

In France, condominiums are governed by the Law on Condominium Ownership of July 10, 1965 (No. 65557). Under this framework, the ownership of a private space entails the co-ownership of a common space, meaning that maintenance-related aspects are decided by elected bodies. In condominiums, the difficulty of sharing a collective project can be explained by the diversity of residents' backgrounds and interests. However, recent French government-sponsored energy efficiency renovations and the 2021 Climate and Resilience Law are set to restrict the rental and sale of energy-guzzling homes, thus threatening the value of older condominiums built before 1970. This is the case with the Diderot residence in Champigny-sur-Marne.

Located just outside of Paris, the Diderot building in Champigny-sur-Marne evokes the post-Second-World-War reconstruction period. In 1955, the Ministry of Housing launched the Housing Million project, a competition for construction companies to create a three-room housing unit with an average cost (excluding land) of a maximum of one million francs. According to Flamand (1989), this could be considered a very low price at that time, especially when compared to the average price for constructing housing units of the same characteristics. The Société Coopérative d'Habitation à Loyer Modéré de Champigny-sur-Marne, created in 1953 by the mayor of the city, built this building on a flood-prone piece of land, which was therefore probably relatively inexpensive. It is a five-story complex built around a rectangular courtyard with its back to the street. The apartments were built to reduced standards for low-income condominium buyers who qualified for the social housing scheme. Today, the building has recently welcomed lower-middle-class populations (nursery school principals, nurses, nannies, etc.) seeking to acquire property in the Paris region as its “new owners.”

Nowadays, residents consider it an outdated building, with worn, noisy wooden floors, outdated paintwork and classic room layouts. Heating is distributed by cast-iron radiators from a central boiler room that operates poorly, and the building suffers from serious insulation-related heat loss, as interviewees reported (Figure 6b). The building is classified F on the energy performance scale (which goes from A, *excellent*, to G, *very low energy savings*). Nevertheless, the new owners say they are satisfied with their apartments, which they have “redone” (an expression used by inhabitants to discuss adaptations and repairs) each in their own way and according to their financial means. Some have simply repainted the rooms, while others have changed the layout of the bedrooms and the living room and opened up the kitchen. The apartments have thus proven themselves adaptable to today's lifestyles, housing family types that are less common than the nuclear family of the 1960s and therefore in need of particular spatial organizations (single-parent families, divorced people, mixed families, and so on).

These middle-class families (with children under 18) have bought (or rented) private property in an area they describe as privileged, on the banks of the Marne River and “20 minutes from the center of Paris,” far from the working-class neighborhoods of Champigny (which they do not name, except by toponymy: “the top”).

One of the couples interviewed, Sophie and her husband (psychiatric nurses, 35 years old, with two children), describe their search for the perfect apartment when leaving Paris:

It had to be accessible, not necessarily by public transport, but by road. We didn't want to be near a highway, because we didn't want the noise and car pollution. We looked at the air quality, that's it. We had a lot of criteria. We wanted a three-bedroom apartment. We absolutely needed a balcony.

Mobility is emphasized as essential in respondents' choice to buy and settle permanently in the area, to be closer to the commercial utilities, facilities, and social amenities that are key factors in the functioning of the housing complex.

The large garden surrounded by the buildings is a second element of satisfaction, allowing parents to let their children play outside (Figure 6a). They view this element positively with regard to the gardens of individual houses, "where children get bored" (specific remark of an inhabitant during a focus group). The condominium recently sold land to individual houses in order to close the residence and secure the parking lot. This operation has enhanced the value of the condominium. In accordance with the principle of mobility, we note that it is a chosen neighborhood and that few inhabitants consider leaving, except for retirement.

According to most inhabitants, the only defect corresponds to energy-related problems in the buildings, and they admit to being cold in winter, except for those who have insulated their apartments from the inside. As for sound insulation, many refuse to consider this as a problem, insofar as the condominium does not have financing for the work, whether it be at the collective scale of the building or the individual scale of the apartment. Several interviewees mentioned being stressed and worried about the noise coming from the heating pipes and would like to enclose this place and issue to avoid hearing their neighbors. However, aside from this being forbidden, their preference is to keep the heat inside the apartment, leading to feelings of loss of control over their privacy. For example, one housing block has major problems with a neighbor who interviewees called unbearable, unhealthy, insane, and disrespectful. This critical situation has been reported to the police and the process of evicting this family is underway. Some residents expressed irritation and aggression at the situation, explaining that they recently turned off their neighbor's water to show their collective anger.



Figure 6. Current building photos (a) and windows from the interior (b).

The inhabitants have been able to represent themselves in the real estate market and in the city's social hierarchy (at a distance from the working-class neighborhoods and close to the wealthy communities). They have adapted their housing and invested in local sociability, especially since they have little chance of being able to leave it in the current real estate climate. It remains to be seen, however, whether this will lead them to take the fate of the condominium into their hands. The problems linked to the building's compliance with the French Climate Plan are systematically avoided and postponed, and it seems that residents will continue to manage according to their own means. Although this observation is paradoxical, it seems here that non-standard buildings can contribute to the well-being of their inhabitants. This community demonstrates a health literacy that is only slightly developing in the face of more attractive factors (proximity to Paris, reasonably priced property, and the presence of a community center). As a result, thermal and acoustic issues are unfavorable elements in the diagnosis. Housing quality thus depends on possibility (housing as an aid for capability) and inhabitants' ability to manage their environment. While the design of homes can freely evolve according to residents' desires, financial limitations prevent an overall thermal renovation. The main issue in this building is undeniably the heating, which the residents do not seem to be able to control, mainly because of the building's insulation. For most of them, the low level of heating is the price they must pay for access to homeownership close to Paris. They can therefore be seen as in a posture of adaptation that is leading them into an unfavorable critical situation regarding their health, of which they are gradually becoming aware.

4. Conclusions

While a building is built by materials and people, it is also the result of a narrative, from its construction to its daily maintenance (or degradation). The three examples in this article show how historical construction decisions (choice of reduced standard, target population, profitability) have an impact on current occupants and their living strategies. The history of the buildings also makes it possible to understand heating practices in relation to health. Inhabitants thus mobilize this past, either to understand the difficulties, to protest, or to resign themselves and accommodate their living conditions.

The Rue Letort building is characterized by technical faults in terms of noise, pollution, poor air quality, mold, and overcrowding. Inhabitants are able to link these factors to their physical and mental health, i.e., flu, asthma, and stress. According to Sørensen et al. (2012), all the residents have a high level of health literacy surrounding their substandard housing, as they move from observation to action, mobilizing legal tools to assert their rights. For these young working-class people, the building's main quality is its location. With no expectations of improving their heating, there is a strong collective desire to escape this setting, especially if they are able to find social housing. They can thus be referred to as active inhabitants (Figure 7) in terms of their HLH.

Overall, residents who are experts in HLH were quick to signal respiratory problems and stress, while others did not make these connections and can thus be referred to as inactive in HLH (Wilson & Fijalkow, 2023). There were also elderly tenants who sought to appeal to the owner, who can be seen as laypeople in HLH (Wilson & Fijalkow, 2023). These profiles ultimately hamper collective dynamics. As thermal renovation seems to be technically difficult, tenants carry out minor DIY work themselves. According to the results of this research, these small gestures correspond to the first or the second level of HLH.

In Champigny, the possibility of using individual and collective spaces at the convenience of the inhabitants, as well as their capacity to create strong social bonds, reflects a better sense of well-being and a healthier habitat,

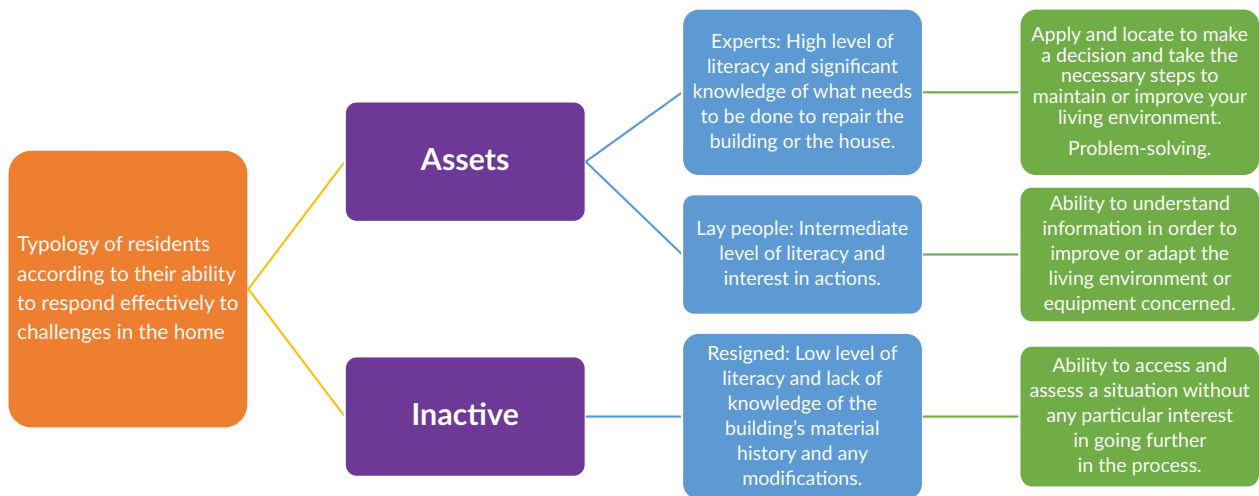


Figure 7. Awareness of health problems related to housing conditions.

demonstrating the importance of architectural forms. However, the community seems to postpone any project and narrative for the future, as shown by the absence of a response to the requirements outlined in energy legislation. In different ways, the three case studies show that outdated equipment of the post-war period is no longer up to thermal comfort standards and that expectations in terms of healthy housing have changed.

The comparison of the three types of buildings reveals different types of HLH. While the residents of Rue Letort understand the health issues at stake in their homes, in the social housing of Rue de Tolbiac, mobilization is more complex, and residents feel the need to develop their technical expertise to mobilize against the social landlord. The Diderot condominium demonstrated that awareness of health issues linked to heating was slow to emerge, despite there being a more widely sought-after notion of collective well-being.

While health in housing struggles to appear on the public agenda, the SAPHIR program proposes a methodology to enable residents to question the quality of their housing through their health concerns. In this context, it is possible to put forth a typology of possible categories of inhabitants to make connections between the symptoms of their health conditions and lifestyles, which can be mapped as a typology of HLH.

The qualitative method of interviewing residents about their residential histories holds different objectives than a quantitative questionnaire survey. Through in-depth interviews with individuals and groups, key issues and critical situations were sought out and identified. To verify this, regular analysis sessions were organized between researchers and interviewers, all of whom attended educational cafes and focus groups.

This hands-on research questions urban planning policy in the field of energy efficiency renovation. Looking at the issues from a health perspective enables residents to address their own experiences, instead of confusing them with the search for energy efficiency as promoted by top-down interests. This enables a distancing from technical promises of home automation through artificial intelligence (Miori & Russo, 2012), allowing for the choice of sobriety to be approached as a societal option in the face of the technicization of the home (Illich et al., 1973). Inhabitants' ability to control their environment can thus be seen as a fundamental element of care.

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Conflict of Interests

The authors declare no conflict of interests.

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