

Altered Perception and Situations of Disability: A Case Study of the Sensitive Experience of Women in Labor During Birth

Ichraf Aroua, University of Carthage, Tunisia
Faten Hussein, University of Carthage, Tunisia

The Asian Conference on the Social Sciences 2025
Official Conference Proceedings

Abstract

This study examines the impact of the ambiance in birth spaces on the experience of its specific user, the woman in labor, during childbirth. It highlights how her perception of the ambiance can be temporarily altered in this context. Using a combination of qualitative and quantitative in situ approaches, we analyzed the ambiance of two distinct birth space settings, in Tunis and Grenoble. An experimental protocol was developed to identify typical situations of disability in these two environments. This analysis was based on three dimensions of ambiance: spatial, physical, and emotional. This work aims to catalog the situations of disability experienced by women in labor during childbirth. The results, comparing the two study contexts, reveal that certain situations have a significant impact on the well-being and sensory experience of women during labor. These results pave the way for new perspectives on using ambiance as a tool for spatial design in contexts involving situations of disability. These results highlight new ways to use ambiance in spatial design for situations involving disability. These results offer new insights into utilizing ambiance as a tool for spatial design in contexts characterized by situations of disability.

Keywords: childbirth, birth space, altered perception, situations of disability

iafor

The International Academic Forum
www.iafor.org

Introduction

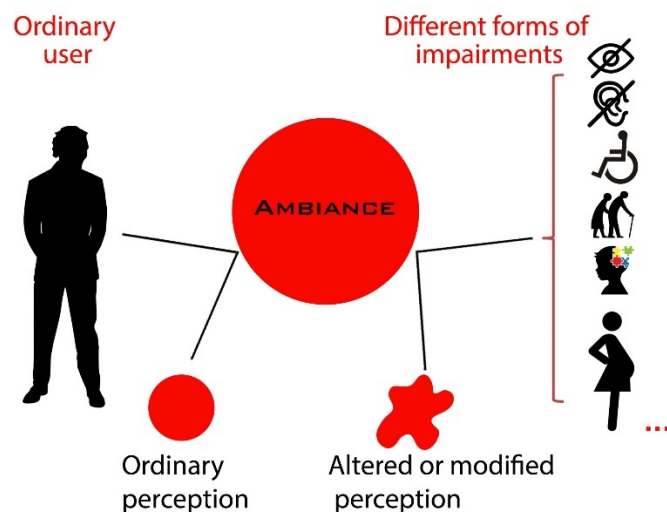
The experience of space varies. It depends on the user involved. This experience encompasses a variety of contexts, relationships and interrelationships. In other words, it situates the human being in relation to an inner world (through his perception, emotional and subjective interpretation of his environment) and an outer world (spatial and socio-cultural). He does not always encounter ordinary situations. In fact, he is often struggling with his environment. Those specific situations are marked by an incompatibility between his environment and his physical and/or mental abilities. It places him in situations of vulnerability, fragility, and difficulty.

Focusing on space's user represents the heart of various reflections on architectural and urban ambiances and their perceptions. Thus, the perception of ambiance is not reduced to the ordinary, to standards and norms. It depends on the specificity of the perceiving subject and the spatio-temporal conditions in which he is immersed. It is then relative to the sensory capacities of the perceiver in a given context. This is why any form of sensory impairment could lead to an imbalance at the perceptual level and could cause an alteration in the perception of ambiances. This alteration does not diminish perception but makes it "different" or "modified". This brings us back to the notion of "altered perception" of ambiance. We describe it as a distortion of our perception of reality under the influence of factors internal or external to our being in the world. We can then affirm that the alteration of the ambiance's perception is the result of an imbalance between the perceiving subject, the physical and sensitive qualities of space and others (Aroua et al., 2020).

Various studies have focused on specific sensory profiles with an altered perception of the space. The sensory parameters relate to the visual (Thomas, 2000), cognitive and behavioural (Layeb, 2020), auditory and age-related (Hussein et al., 2015) abilities. These studies have focused on finding design solutions to overcome situations of disability by creating appropriate devices. They are designed depending on the impairment. They assist with mobility and provide easy access to the space. They are called "architectural prostheses" (Thomas, 2000). Their primary objective is to place the user at the centre of the design process and resilient architectural thinking. This architectural and urban research focused on users who have a different relationship with the world. They are based on space affordances (Gibson, 1979) and how it integrates the various forms of user vulnerabilities. The approach is qualitative and far removed from the health management of disability.

Our research on the woman in labor in birth spaces (Aroua et al., 2020; Aroua & Hussein, 2020; Aroua & Hussein, 2024) is in line with the reflections on the alterations of perception of ambiances (Figure 1). A study of her sensitive experience will focus on the ambiances of the birth space, the singularity of her profile and the particularities of the childbirth event. This study will examine the affordances of the space (Gibson, 1979). It makes birth space a well-being support.

Figure 1
Different Forms of Alteration of Ambiances' Perception



The Woman in Labor: A Specific User

The birth event is announced by pain (Wijma & Wijma, 2017). It characterizes the woman as a human being in a vulnerable situation. It has a significant impact on both psychological and physiological levels. It plunges the woman into a state of disruption or disconnection from her environment. The woman loses control of her body, particularly during labor (England & Horowitz, 1998). As explained in the field of neuropsychology, the peaks of endogenous oxytocin during labor and the progressive release of endorphins in the maternal brain can potentially trigger this modification of consciousness (Olza, et al., 2018). This altered state of consciousness can occur spontaneously in the woman during labor, and increase as it progresses (England & Horowitz, 1998). Obstetric health professionals call this state “birthing consciousness” (Dahan, 2020). It is a temporary and transitory state during which it is extremely difficult to simply act (feel, think, behave) according to normality (Dahan, 2020).

During the labor phase, the change in the woman's consciousness is reflected in an altered perception of time and changes in focus and attention. This altered state can cause alterations in the woman's sensory faculties and perception (England & Horowitz, 1998). Women may be vulnerable at this time. They prefer to be isolated, in their “bubble”: “their own world”. This state is temporary and marks a transitional phase in a woman's life. It changes her perception of space, her interpretation of the spatio-temporal conditions around her and her relationship with other users. We can say that “birth” as an event affects the women in labor. It creates a disruption. This disruption provokes an upheaval that engenders a change in her frame of reference, her interpretation of the event, and her lived experience.

The birth event marks the woman's world and her perception of the surroundings. It disrupts and reconfigures the world in her eyes. It creates a new form of perception that we call a temporarily “altered” or “modified” perception (Aroua et al., 2020).

Methodology

This study provides insight into childbirth as the woman in labor's sensory experience of birth space. It will investigate hospital institutions that provide care for women in labor

during the different phases of childbirth. Using an in-situ approach, we conducted a spatial and ambiantal characterization of two different birth space contexts, Tunis and Grenoble (Figure 2). Having two different study sites will eventually enrich the reference corpus of this research.

In Grenoble, our fieldwork site includes three birth spaces representative of the three birth models (Davis-Floyd, 2001). The maternity ward at the Grenoble University Hospital Center (CHU) is a technocratic model. The birth center “La Maison” reflects the holistic model. The third space is the maternity ward at the Grenoble Mutualist Hospital Group (GHM), which represents the intermediate model between the technocratic and the holistic model.

For Tunis, we chose the Tunis Maternity and Neonatology Center (CMNT). It represents the technocratic model, the only model available in Tunisia. It is the oldest public institution specialized in childbirth in Tunisia. It is also the first in terms of capacity and types of care provided.

Figure 2

Examples of Delivery Rooms From the Study Corpus



We conducted an exploratory study divided into three levels: spatial characterization, ambiantal characterization, and emotional state capture.

The study in Grenoble was qualitative through observations, visits, and qualitative semi-structured interviews. The participants were eight women who have already given birth in one of the above-mentioned birth spaces. They agreed to share their experiences with us through qualitative interviews. This therefore constituted a form of feedback and a voluntary reactivation of the environment. It is thus a reflection based on lived experience and ambiantal reactivation of birth spaces.

In the Tunisian field, we also conducted a quantitative study. It consisted of noise level measurements and emotional state capture through real-time electrodermal activity (EDA) measurements. The analysis of electrodermal activity revealed the woman in labor's emotional state in correlation with the observations and interviews. This involves collecting the immediate bodily and emotional reactivity to environmental stimuli in a given situation (Boucsein, 2012). It is done by measuring the electrodermal activity (EDA) of the woman different phases of childbirth (labor, delivery and postpartum). To achieve this, we used a E4 wearable biophysiological sensor from Empatica® (Figure 3). We observed the childbirth experiences of twenty-two Tunisian women in real time. We measured their emotional states during childbirth in collaboration with the medical team. In the final step, we interviewed them after the birth. In addition to the ambiantal reactivation, the study also includes the real-time capturing of ambiances during the childbirth experience in Tunisia.

Figure 3*E4 Wearable Biophysiological Sensor by Empatica ® (www.empatica.com)*

Results and Discussion

Based on visits, observations and semi-structured interviews, this study resulted in an inventory of specific situations experienced during childbirth. These situations depend on several components: the spatial dimension (the physical characteristics of the space), the psychological dimension (the woman in labor and her perception of the event), the social dimension (sharing), and the temporal dimension (the different phases of birth event).

The analysis of women's narratives and in-situ observations in the four birth spaces contributed to a better understanding of women's feelings, the desired ambiances and those rejected. During this experience, the woman in labor interacts with the space, using the tools and facilities available in the delivery room. She reacts to sensory environmental stimuli. These stimuli vary depending on the type of birth space. Empirical data analysis revealed the redundancy of certain ambiantal situations and their impacts on the perception of space and the event (Aroua et al., 2020; Aroua & Hussein, 2020; Aroua & Hussein, 2024).

In this article, we present typical situations of disability that women may encounter during childbirth, examining how environmental factors contribute to vulnerability and influence their overall experience.

Situation of Disability: "Disorientation"

It is very interesting to consider spatial orientation within a hospital structure. The design must feature guiding elements, including signage, colors, and overall spatial organization. Visual and spatial cues guide the woman in labor in her path and hospital stay for childbirth. A woman in labor feels more comfortable when the space is human-scaled, familiar, and similar in proportion to a home. However, in larger spaces, she may experience disorientation and a loss of spatial awareness (Setola et al., 2019).

At the CHU Grenoble maternity ward, access points present challenges related to orientation, readability, distance, and spatial visibility. At night, access to the maternity ward is via the pediatric ward, more specifically its emergency unit which is located on the lower ground floor. The path involves walking through several corridors. It is then necessary to take a staircase to go up to the ground floor, followed by a lift to access the first floor. Further corridors must be traversed before arriving. Women interviewed perceive this path as long and disorienting, despite the presence of signage. During the day, the woman in labor takes a

shorter and less disorienting path, although it is indirect. The access is via the maternity reception which is located on the ground floor. It is then necessary to take a lift and cross corridor to reach the maternity ward. Noha, a mother who shared her experience, highlighted the importance of spaces that guide rather than disorient.

And then we entered; I didn't realize it was visible... it was a real 'maze'... We went up the stairs. There are lifts, which I didn't see... I was already very tired. We crossed corridors without chairs and doors... There were several doors opening, and I couldn't understand the spatial code. (Noha)

The CMNT case study revealed significant orientation issues based on in-site observations and feedback from both mothers and medical staff. From the main entrance at the lower garden level, we noted the absence of a clearly identifiable reception area and insufficient signage. Spatial disorientation can lead to stress and panic, especially in medical emergencies. Many women describe the maternity ward as maze-like, underscoring the need for improved wayfinding and environmental clarity.

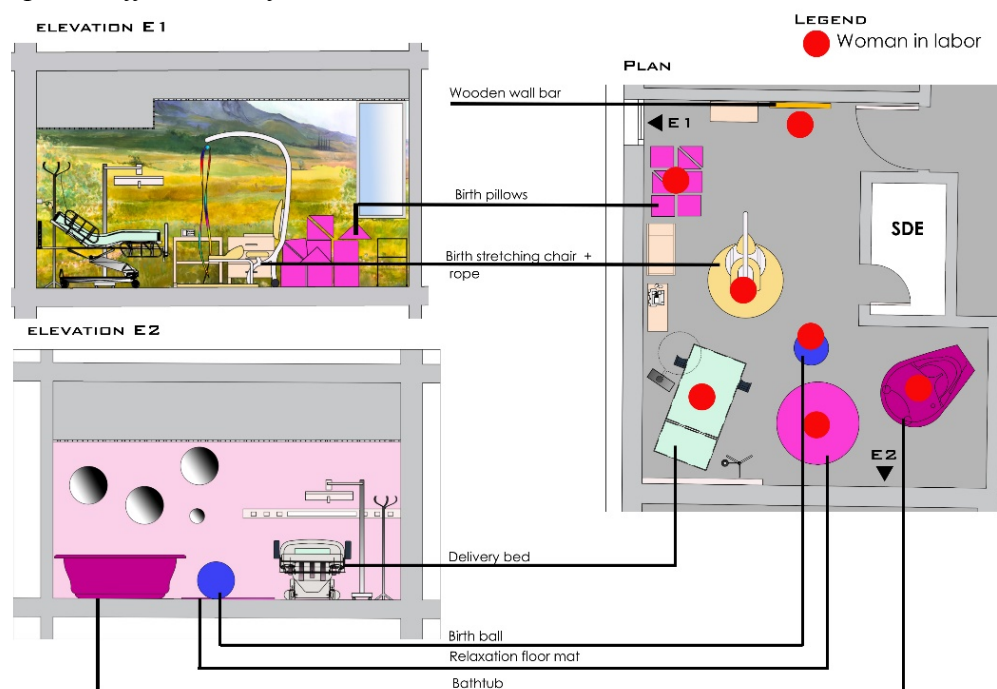
I don't know where to enter or exit; it's like a maze. The architecture is unclear, and the space is disorienting. (Marwa at CMNT)

Situation of Disability: "Immobility"

All the components of the space (morphology, layout, features...) define the woman in labor's way of using it and her birth experience. We have identified typical situations of disability, such as immobility, which can significantly impact this sensitive experience. In Tunis, the woman in labor does not place importance on the kinesthetic ambience. This stems from a technocratic model of care. It is the only approach to childbirth currently adopted in Tunisia. This model relies exclusively on the gynecological birthing position. Consequently, the birth space is static, monotonous and constrained. The design of this space limits women's ability to move and engage during labor.

This rigidity contrasts with the holistic model of birth. This model integrates diverse postures to enhance the labor experience. Posture devices such as pillows, cushions, a birth ball, a carpet, a birth rope, and a bathtub stimulate the haptic dimension (movement and touch) for the woman in labor. This brings us to the concept of spatial affordance (Gibson, 1979). Space is not merely a passive support for actions but rather a stimulator. It shapes the woman in labor's use and behavior through affordances it offers. By integrating diverse postural options, the birth space can shift from a restrictive setting to one that actively supports the physiological and emotional needs of woman in labor.

The figure below illustrated the various posture devices offered by the natural birth room at the maternity ward at GHM Grenoble (Figure 4). This room is designed to be fluid. It has various posture devices such as the birth stretching chair, rope, birth pillows, birth ball, relaxation floor mat, wooden wall bar, bathtub and delivery bed. Several labor and birth postures are available to woman in labor. They stimulate her senses. Her body has more freedom to move. She has the possibility of touching, pushing, leaning on... They help to ease her pain and her state of stress during her birth experience (Robert, 2014).

Figure 4*Spatial Affordances for Childbirth Postures in GHM Natural Birth Room*

The majority of women respondents have mentioned the importance of posture devices to help them ease their pain during the labor phase.

I dreamed about having a natural birth.... I discovered the natural birth room at the GHM Grenoble. According to my experience, it was great. Devices, they were pain-relieving. For me, it's a dream come true to try the bathtub... (Julie at the GHM)

... It was nice to give birth at the birth center. There is birth ball which I didn't have at home... I arrived in the room, I was already having strong contractions, I held onto the edge of the wall, against the window... I was standing. Then, I got down on all fours, leaning on the ball, my knees on the mattress on the floor. (Eva at "La Maison")

Incorporating the kinesthetic ambiance into the birth spaces' design process means reflecting on freedom of movement, bodily autonomy and the fluidity of postures (Lepori, 2008; Setola et al., 2019). In her research, architect Bianca discusses the importance for a woman to be free to move and to be able to control her environment throughout the labor phase (Lepori, 2008).

Situation of Disability: "The Need for a Shared Space"

Childbirth is a social event before it is a spatial one (Davis-Floyd, 2001; Joyce, 2018; Lepori, 2008). It is a joyful event that concerns not only the woman but also her partner and their families. It is shared between all these actors. it generates emotions. This dimension is important for the women during childbirth experience. For this reason, the birth space is considered a social space. It supports social, spatial, and ambiantal sharing between the various users: the woman in labor, medical team, her family, and other women (Setola et al., 2019). The configuration of the space, its layout, its capacity, its arrangement, the isolation

between rooms... these parameters play a key role in determining the relational ambiance and the ways in which space is shared during childbirth.

Women highlight the importance of having a social and communal area. They require an area beyond their maternity rooms where they can eat, interact, and care for their babies. Noha notes the lack of such spaces in the CHU maternity ward. Due to the small size of the maternity rooms, such spaces are essential.

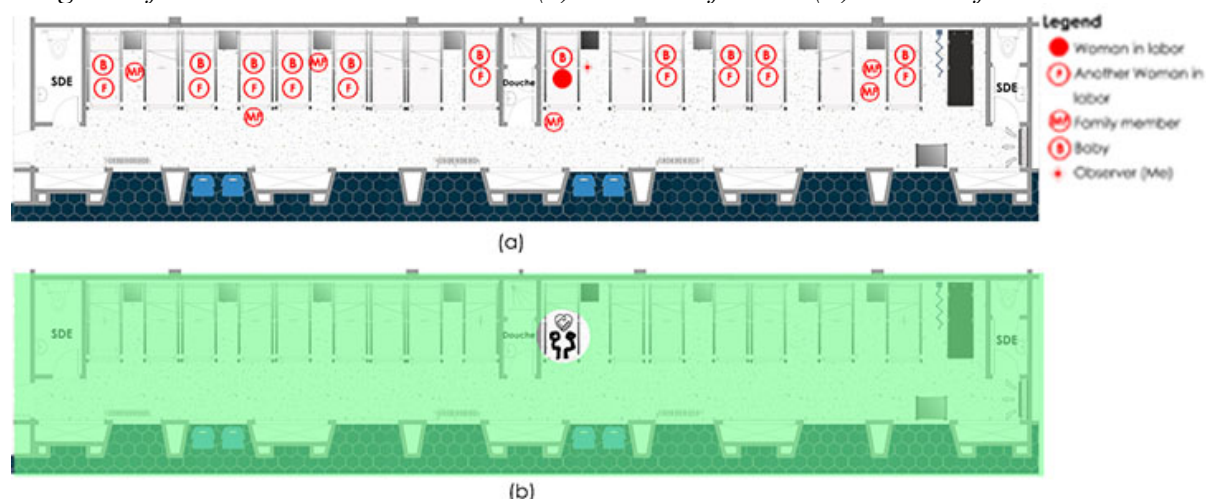
... What I really missed was a collective space. It feels like entering cells, and I feel very alone... It's not easy, I just stay in my room, alone... It might have been a good opportunity, if there was a shared space where we could at least step out... a real place where we can meet, share experiences, sometimes even eat together, walk around with our babies... (Noha at CHU Grenoble)

In the case of Tunis, any presence other than the medical team is prohibited. It is only during the postpartum phase that family visits are allowed, and only for two hours. During the labor phase, the woman in labor wanted to be accompanied to help her cope with the pain and feel reassured. As observers, our presence was passive. Although it was welcomed, it had a positive impact on the women's emotional experience. They were seeking human presence. During the postpartum phase, shared ambiance and emotional support is encouraged.

The maternity room is a shared space with two interconnected parts separated by a shower (Figure 5). It is an open space designed for better visibility and monitoring. This arrangement increases capacity and encourages solidarity among mothers. The room opens onto a corridor that serves as a buffer space, filtering light and sounds from the outside. In this room, mothers help each other and share food. They also explain to first-time mothers how to hold the baby and how to breastfeed. The shared ambiance takes on its full significance in view of the spatial dimension, which is considered poor in terms of quality.

Figure 5

Diagram of Shared Ambiance Situation: (a) Position of Users/(B) Arrival of Husband



From the data collected and analyzed, we identified significant moments by focusing on the already captured EDA. These moments are related to electrodermal reactions (REDs). These are physiological peaks detected at the onset of a sound, light, or other stimuli, and fade once the stimulus stops. The REDs correlating with the observations and interviews allowed us to

detect the ambiantal situations experienced: stressful or significant. To illustrate, we chose a typical situation of shared ambience during family visits (Figure 5 and 6). At the time of RED, the sound level in the room exceeded 75 dB. Our observations indicate that the RED coincided with the arrival of visitors. The maternity room was crowded, and the noise level was well above the standard threshold. The EDA of the woman respondent showed a sudden increase in amplitude (Figure 6). According to both observation and interview, this RED coincided with the arrival of her husband and reflected her joy. Karima held the baby towards him, saying:

Look, your daddy is here!!! This is my husband, Ichraf... (Karima at CMNT)

It was observed that the woman's sense of vulnerability was negatively affected by a crowded sonic ambience but improved by the presence of others (her family) and the festive atmosphere.

Figure 6

Graph of Karima's EDA



In contrast to the hospital space, “La Maison” offers spaces that foster sociability and conviviality. The presence of a shared space, such as a louange or tisanerie, allows women to share moments and move freely, like at home. It also enables them to engage in routine domestic activities, such as cooking and eating together...

...A very pleasant space... I feel like at home... and human presence: It's essential reassuring. It reassures, comforts, and inspires confidence... my husband can go cook in a kitchen at our disposal. This place, like home, is just fantastic... (Perrine at “La Maison”)

A space for sociability, such as a living room, kitchen or dining area, encourages interaction and sharing among women. It is a kind of escape for them. The architectural design of birth centre helps reinforce familiarity and collective experience among its users.

Conclusion

In this study, it was possible to observe that the birth space, through its ambience and affordances, plays a crucial role in mitigating certain disabling situations. These situations, described as temporary, are closely linked to the physical and psychological conditions of the woman in labor during childbirth. They highlight the inherent vulnerability and the alteration of perception during this event. This illustrates the importance of designing spaces that support both physical and emotional needs.

This research situates ambiance at the crossroads of physical and emotional dimensions. It highlights its complexity. This research paves the way for an ambiance's project-based approach. This approach aims to contribute to the architectural design of new hospital structures dedicated to childbirth. It proposes guidelines and corrective tools that must remain flexible and context-sensitive. They are rooted in lived experience rather than in universal application.

Acknowledgements

We dedicate this work to the memory of the late Professor Jean-Pierre Péneau, who led this research and believed in us.

References

- Aroua, I., & Hussein, F. (2020). Color analysis of birth space ambiances. *Cultura E Scienza Del Colore - Color Culture and Science*, 12(01), 40–47.
<https://doi.org/10.23738/ccsj.120105>
- Aroua, I., & Hussein, F. (2024). Ambiance as a key for a better birth experience. *Studies in Health Technology and Informatics*. <https://doi.org/10.3233/shti240944>
- Aroua, I., Hussein, F., Ghozi, R., & Jaidane, M. (2020). Temporary Altered Perception of Birth Space Ambiances. Case of Women in Labor. In D. Masson (Eds.), *Ambiances, Alloaesthesia: Senses, Inventions, Worlds: Proceedings of the 4th International Congress on Ambiances* (Vol. 2, pp. 360–365). Réseau International Ambiances.
<https://hal.science/hal-03220275>
- Boucsein, W. (2012). *Electrodermal activity* (2nd ed.). Springer Science & Business Media.
<https://doi.org/10.1007/978-1-4614-1126-0>
- Dahan, O. (2020). Birthing consciousness: A lacuna in evolutionary psychological science. *New Ideas in Psychology*, 60, 100822.
<https://doi.org/10.1016/j.newideapsych.2020.100822>
- Davis-Floyd, R. (2001). The technocratic, humanistic, and holistic paradigms of childbirth. *International Journal of Gynecology & Obstetrics*, 75(S1).
[https://doi.org/10.1016/s0020-7292\(01\)00510-0](https://doi.org/10.1016/s0020-7292(01)00510-0)
- England, P., & Horowitz, R. (1998). *Birthing from within: An extra-ordinary guide to childbirth preparation*. Partera Press.
- Gibson, J. J. (1979). *The ecological approach to visual perception*. Houghton Mifflin.
- Hussein, F., Ghozi, R., Jaïdane, M., & Péneau, J. (2015). Detecting hazardous situations faced by presbycusic pedestrians in cities: an audio-texture approach. *Ambiances*.
<https://doi.org/10.4000/ambiances.485>
- Joyce, S. (2018). *Towards a new architectural understanding of birth spaces grounded in women's experiences of giving birth*. PhD thesis, University of Sheffield.
<https://etheses.whiterose.ac.uk/21643/>
- Layeb, S. (2020). To Conceive Shared affective atmospheres based on discomfort experiences for autistic. In D. Masson (Eds.), *Ambiances, Alloaesthesia: Senses, Inventions, Worlds: Proceedings of the 4th International Congress on Ambiances* (Vol. 2, pp. 348-352). Réseau International Ambiances. <https://hal.science/hal-03220273/>
- Lepori, B. (2008). The moving, feeling and dreaming body guides architectural design. In K. Fahry, M. Foureur, & C. Hastie (Eds.), *Birth territory and midwifery guardianship—Theory for practice, education and research* (pp. 95–112). Elsevier Health Sciences.

- Olza, I., Leahy-Warren, P., Benyamini, Y., Kazmierczak, M., Karlsdottir, S. I., Spyridou, A., Crespo-Mirasol, E., Takács, L., Hall, P. J., Murphy, M., Jonsdottir, S. S., Downe, S., & Nieuwenhuijze, M. J. (2018). Women's psychological experiences of physiological childbirth: a meta-synthesis. *BMJ Open*, 8(10), e020347. <https://doi.org/10.1136/bmjopen-2017-020347>
- Robert, H. (2014). *L'évolution des positions d'accouchement en France et dans nos cultures occidentales* [The evolution of birthing positions in France and in our Western cultures]. Master's thesis, University of Bordeaux. <https://dumas.ccsd.cnrs.fr/dumas-01076699>
- Setola, N., Naldi, E., Cocina, G. G., Eide, L. B., Iannuzzi, L., & Daly, D. (2019). The impact of the physical environment on intrapartum maternity care: identification of eight crucial building spaces. *HERD Health Environments Research & Design Journal*, 12(4), 67–98. <https://doi.org/10.1177/1937586719826058>
- Thomas, R. (2000). *Ambiances publiques, mobilité, sociabilité : approche interdisciplinaire de l'accessibilité piétonnière des villes* [Public atmospheres, mobility, sociability: interdisciplinary approach to pedestrian accessibility in cities]. PhD thesis, University of Nantes. <https://hal.archives-ouvertes.fr/tel-00514432>
- Wijma, K., & Wijma, B. (2017). A Woman Afraid to deliver: How to manage Childbirth anxiety. In *Springer eBooks* (pp. 3–31). https://doi.org/10.1007/978-3-319-40404-2_1

Contact email: ichraf.aroua@gmail.com