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Towards A Post-Traumatic Urban Design That Heals Cities' Inhabitants Suffering From PTSD

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ABSTRACT

Cities are generally in a state of constant modification. Some experience this modification at a more rapid pace due to the technology available in the city; others experience this modification due to the city's time of life, which requires many civilizations to imprint their architectural style and project their social image and identity. In certain cases, these modifications are due to natural disasters, such as earthquakes or tsunamis, or man-made wars, or even both. The study revealed that the relationship found between the ability of "Beirutis" (how Beirut's original inhabitants call themselves) to perceive their identity through the built environment and PTSD, will help urban planners and architects find the procedures based on observation and scientific facts to build with the opportunity to heal disaster-torn cities' inhabitants from PTSD.

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1. Introduction

"With a better understanding of the contributing factors to posttraumatic stress, we can increase our capacity to design in a way that is both sympathetic to this altered state and conducive to healing" (Finn, 2013).

Humans have always tried to imprint their interventions through the visible structure in an attempt to defy natural and man-made disasters. To "control" hurricanes, earthquakes, or floods, people have built the solution. People have even rebuilt their controlling solutions after being defeated or having defeated and occupied others' lands or countries, reflecting through it the state's power and identity by means of a city (Graham, 2008). Therefore, throughout the

centuries, people have found themselves spending their lives inside the man-made environment and even surrounded by it (Kopeck, 2012).

In attempts to correct the natural or man-made urban problems, the growing built environment shaped the adapting inhabitants' interaction in the urban milieu, through the creation of visible (architectural) and invisible (social and psychological) bulwarks (Kopeck, 2012).

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Moreover, throughout these evolving architectural processes, there were professionals from the social, philosophical, medical, and architectural fields who proved the interdependent relationship between the human and the environment, on the one hand, and the natural and built environment, on the other. At the present time, recent findings are leading professionals to support the environmental conservation or upkeep that leads to sustainable solutions healthily balancing the built environment and the inhabitants' well-being (Kopec, 2012). Looking in-depth for the reasons of cities' urban development, observations and scientific results show that people have a cycle of creating needs for themselves and working hard to find suitable solutions (Kopec, 2012). As a result, there are series of emotions that become specific to the inhabitants of a specific city (Roessler, 2012). To examine the relationship between architecture and the mental state of people, the referral to findings related to neuroscience and mental illnesses is incontestable. In effect, according to the Lebanese psychiatrist Dr. Elie Karam, much research was conducted to map out the brain and its specific activities during specific events, and genes and stressors were examined in-depth. Dr. Karam added that "therapy is no longer an art but a solid science, subjected to the scrutiny of an army of researchers" (Karam).

Consequently, the focus of this study will be the scientific findings of mental state and architecture related to man-made disasters, specifically wars. The answers of a community regarding their perception of their city's prewar and postwar built environment in this context help to show the mental process of archiving memories and interpreting events through individual and collective memories of war. In effect, war can be described as a public event that can intrude on private aspects of life and where all the inhabitants of a city are concerned and touched in one way or another. In other words, war can compose a barrier forbidding people to go to the place of the work they would prefer or to see people close to them. It can destroy memories and build other memories or force the building of certain memories through several ways. Furthermore, another consequence of a city's destruction is the overattachment to or complete detachment from the space.

The process for the study, first, will be defining post-traumatic stress disorder (PTSD) and its effect on memory. Subsequently, its symptoms will be linked to the traumas of war. The specific case of Beirut in its architecture, urban development, and traumatic events throughout history will be developed. Then the concept of therapy through architecture supported by neuroscience findings will be expounded. A random sample from Beirutis (how Beirut's original inhabitants call themselves)

will be analyzed; the results will be supported by past literature in the field of psychiatry and architecture, and as a final point will be expanded the ways of healing cities' inhabitants suffering from PTSD through architecture and urban planning.

Thereby, many questions can cover the study in its multiple facets. The judgment of the city's inhabitants as to whether they find their city disfigured or well renovated in its public spaces and private spaces is to be taken into consideration in this case.

2. Post-Traumatic Stress Disorder (PTSD) and Memory

According to the National Institute of Mental Health, PTSD occurs when people do not overcome the fear they have felt during an event they were not prepared to live through (The National Institute of Mental Health Information Resource Center) or that is life threatening (American Museum of Natural History, 2011). These events can be the experience of physical harm or emotional harm caused by nature (e.g., seism) or another person (e.g., war) for one time or on a repetitive basis that cumulates and causes complex trauma (Pavlakakis, 2017; The Center for Treatment of Anxiety and Mood Disorders, 2017). Therefore, people could suffer from remembering the experience, which affects their quality of life and at times the life of their partners and families too. Some people recover, while PTSD can become chronic for others if they are more vulnerable according to their character or their life defying conditions

(The National Institute of Mental Health Information Resource Center). Generally, a longer period of exposure to the traumatic event and its frequency affects the severity of the PTSD (Kessler et al., 2017). Therefore, in war zones, all categories of people who have to stay and watch the attacks or be attacked, or people who have to leave all their belongings and escape, are subject to PTSD if adequate resources are not available to help them heal, such as mental therapy and a suitable urban plan to restore all the destruction.

In the matters of the visual, the shapes that do not refer to configurations easy to discern by the brain, such as half-destroyed houses, require visual efforts, which can lead to a degree of disturbance (Albright, 2012) that affects the memories that people's brains process. Memory can be healthy or traumatized. The healthy memory adapts according to circumstances and contexts (Cyrułnik, 2012) and builds short-term and long-term evolutive memory (Cyrułnik, 2012; Finn, 2013). On the other hand, traumatic memory is a "torn" memory recounting a trauma (an event not expected and not prepared to experience) (Cyrułnik, 2012). When any object or event reminds

the traumatized person of the memory that has occurred, the process of the present situation adaptability leads to a “fight or flight” response or to immobility, whereby the traumatized people observe without reacting because the brain is convincing these people of their vulnerability for survival purposes (Finn, 2013; Wellness & Performance, 2011). Thus, this process becomes a dissociated memory in their brains that is used as implicit memory, linking the present situation to the physical and emotional memories of the traumatic situation (Finn, 2013).

3. The Case of Beirut

3.1 Architecture and the Community's Identity

Beirut has always been a looked-for city by people around the world. Beirut has especially witnessed its turning point when it became a capital during the Ottoman's occupation, when its commune features changed to become urban as it was the case for some European cities' development during the 1880s (YaBeyrouth, 2019). Unfortunately, it was scarred from a massive “civil war” from 1975 to 1990.

No matter the true political story behind this war, the first thing that strikes when discovering the city is that urban discontinuity based on sectarianism and religious enclaves is found today in Beirut. However, the disparities nowadays no longer rise in religious differences that were the “superficial” excuse to fire; rather, on one side, they lie in the preservation of architectural heritage and the possibility of its projection in the new buildings, and, on the other side, in the demolition of old buildings under the presumption of their danger of falling and in the construction of high-rise buildings that reflect economic consumption and do not relate in any architectural element to the history of architecture in Beirut. In fact, what happened regarding the rise of Beirut is a mixture of construction (of the new), reconstruction (which is more a renovation to some traditional Beiruti houses), and, as the Lebanese architect Serge Yazigi, who is a Beiruti living in Beirut, mentioned in a private interview, “deconstruction” because some architectural icons were destroyed after the war and some elements were built in Beirut without having a fluid interconnection within its urban tissue (Yazigi, 2018). Furthermore, during the period of stagnated urban development, the souk of Beirut was fragmented, and business owners moved their stores to the housing area of the city. This is one of the aspects of the adaptive urbanism that was adopted in Beirut, which is also referred to as “Morphogenesis” (Hanna, 2016). Many researchers have defined this concept as a series of small steps in architectural changes in a city based on individual present-day needs and without a solid urban plan linking all parts of the city, which leads in the long term to a major urban

transformation where people will find their city unrecognizable in terms of architecture, economy, and social life (Hanna, 2016). What happened, in reality, is that the armed groups during war marked the battle lines that became the real ones still dividing Beirut's area (De Cauter, 2011; Pascoe, 2012) (Figure 1).

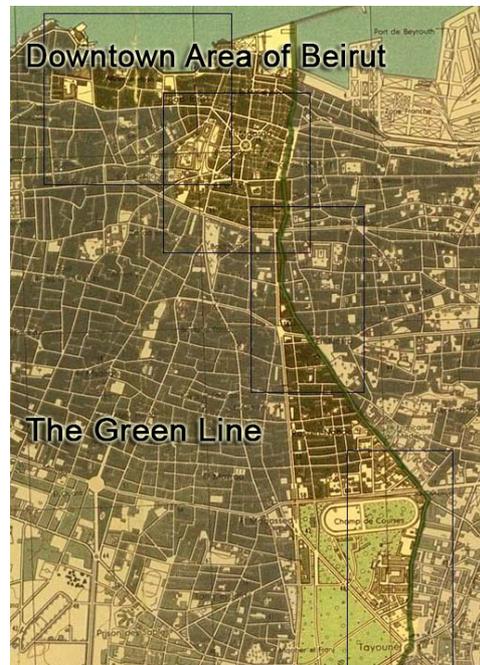


Figure 1. The green line is the separation line that is still virtually dividing Beirut's areas in people's memory. It is green since plants grew when the inhabitants fled due to the severe battles that occurred there. This line passed by the downtown (picture from Habib et al. , annotation from Yazigi (2018)).

Following a survival mode to revive the once vibrant Beirut, the rapid expansion of Beirut after the 1990s was in fact occurring at the same time as other countries worldwide; hence, in normal cases, there would have been nothing to worry about. The only problem in Beirut's case lays in the fact that Beirut was just coming out of a war, and there was a need to reconstruct what was demolished. Many of the inhabitants expected to have the old Beirut rebuilt as it was, but the rapid expansion of the so-called “contemporary city” worldwide made it impossible.

Beirutis tried to adapt and are still using this approach to forget the past. Yet, in reality, the contemporary city is not mitigating this task since it has become the place of this one goal: investment attraction using business redevelopment with a part being from foreign background (Pascoe, 2012), which leads to multiple disparities of the city's image between the historical and the profit-oriented. In fact, according to Beiruti architect Mona Hallak, the decision from the concerned parties was to destroy 800 houses and buildings considered iconic of Beirut's symbolism, leaving only 220 of them (De Cauter, 2011). These houses and buildings ranged between renovated and taken care of and abandoned with scars of

destruction. As a result, the inhabitants of Beirut are not in control of what surrounds them because the decision-makers in the city are the ones who are deciding how the city must look like, and they are not looking in-depth into other aspects that might affect negatively the inhabitants of the constant lively city (Domeier & Sachse, 2015). For example, some Beirutis consider that in postwar Beirut was placed only an emphasis on economic profits (Pascoe, 2012) leading to a neglect of the visual aspects of heritage. On the other hand, the private sector owns more plots in the present time than the municipality, which is increasing individual interventions and an aleatory horizontal and vertical urban expansion without an overall long-term urban planning distributing the functions needed and its amounts in each area.

All of these components affect the one identity of the city that creates a secured sense of a purposeful urban tissue and that leads to a genuine positive attachment linking the physical space with its true emotional and affective fulfilment, and not only a nostalgic attachment (Scannell & Gifford, 2010; Ujang, 2012). As a consequence, Beirutis become vulnerable and try to find healthy resilience (Surjan et al., 2016). Hence, security and motivation are the dynamic agents that should be acting together to preserve a defined and clear identity of trust based on the city's structure (Fawaz & Bou Akar, 2012; Pascoe, 2012).

3.2 PTSD Applied to the Case of Beirut

Even though PTSD affects a limited number of people witnessing a traumatic event (McLaughlin et al., 2015) children and adolescents exposed to war for only three weeks in their natal country can develop PTSD and/or "major depressive disorder (MDD), separation anxiety disorder (SAD), [or] overanxious disorder (OAD)" (Karam et al., 2014). In the case of Lebanon, 15 years of war and exposure to life-threatening attacks were enough for Lebanon to become the third country in the world with the number of people suffering from PTSD (Karam) with an annual average of 11.2% in anxiety disorders (of which PTSD is part) (Karam). In some severe cases, psychiatric comorbidity can occur, (McLaughlin et al., 2015) and traumatized people start predicting dangerous future events based on their memories (Kessler et al., 2017) instead of relying on the reality as it is.

Being hypervigilant during the war is good to avoid injury or death. However, the problem is that this state of hypervigilance and destructive memory does not go away for years, especially for predisposed people (Brainline, 2012; Surjan et al., 2016). As a result, people with PTSD are extremely cautious and focus on any detail, any sound, and action (Cyrulnik, 2012), including the architectural details around them. In general, people

worldwide, including Beirutis, were even taught that PTSD fades away after an average of six months (Brainline, 2012) and consequently, people convince themselves they are perfectly healthy and mask their state, considering it shameful if it persists. However, these people have the underlying feeling of danger around the built environment, especially the one that resembles the scenes of danger they witnessed (Finn, 2013). This feeling of danger includes seeing certain roofs, building entrances, and windows. Traumatized people can even be cautious of the floor and the sky or an opening through which bullets can pass (Finn, 2013). People who were directly involved in war (who participated in battles) are the ones to develop guilt and PTSD more than others and the tendency to commit suicide (Held et al., 2011; Hendin & Haas, 1991) and MDD (Marx et al., 2010). Thus, man-made disasters can lead to a spectrum of disorders and problems—but not necessarily illnesses in the way of thinking, speaking, feeling, and behaving (Roe, 2016). Therefore, cases in Beirut are not limited to illnesses but are as well linked to problems.

4. Neuro-architecture as a Solution for Therapy Through Architecture

4.1 Definition and Role

'Neuro-architecture' is the discipline that came as a solution to study human brain processing of the built environment and human behavior and to analyze urban and architectural designs that improve people's well-being and productivity through brain neuroplasticity (Edelstein, 2006; Vecchiato et al., 2015). Nowadays, reducing mental problems and illnesses is being a part of the urban planning goals (Dougherty, 2014) through observing people's reactions and analyzing their brain imaging in different built environments or using images of real environment landscapes to examine how the human brain processes buildings and spaces. Several technologies are used for that purpose such as neurophysiology, neuroanatomy, and functional brain imaging, and mainly functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) (Albright, 2012; Dance, 2017; Vecchiato et al., 2015). Such technologies help to get objective results rather than relying solely on subjective interviews (Edelstein & Macagno, 2012). These techniques help architects see how urban and architectural shapes affect people psychologically because people perceive configurations and not random shapes (Gombrich, 1994). The brain is highly organized, and through the brain areas that are involved in the built environment information process, measuring natural and built environment is possible (Albright, 2012). Consequently, a built environment stimulates specific emotions that

define people's conscious or unconscious behaviors (Edelstein & Macagno, 2012). when they identify themselves in a particular place according to the "biocultural memories" or the maps that their brain nerves form (Robinson & Pallasmaa, 2015; Zeisel, 2006) to help judge the beauty and security of a place (Coburn et al., 2017) and give it a meaning to get individual and collective memories (Kellou-Djittli, 2013; Taylor-Hochberg, 2014). This human-place interaction is similar to human-human interaction, which leads to a particular attachment of the person to the place. The person, therefore, gives this place identity through the relational and territorial dimensions of the community leading to the sense of fulfillment and social acceptance (Al-Hagla, 2009).

4.2 The Case of Healing PTSD Through Architecture

The purpose of architecture in this case study is to heal from PTSD symptoms to return to a state of safety and security. Therefore, studies are conducted on the human brain and reaction to external stimuli to design the architecture that prevents further mental problem and illness severity by measuring the degrees of arousal triggered in defined parts of the brain, although it is considered as complex as the complexity of modern architecture (Edelstein & Macagno, 2012). In fact, modern architecture and urban expansion concern all cities of the world, but the severity of the cases is where lies the difference. For example, Beirut must deal with traffic, pollution (as well as the "moral pollution" (Graham, 2008) that the civil war has left in Beirut), and (un)planned expansion; but most importantly, it deals with the preservation of its architectural past that is becoming increasingly complicated (Karimi, 2013). Added to that is the complexity of the war that occurred in Beirut between 1975 and 1990 that was no longer limited to the usual weapons, but instead focused on destroying its interconnected urban fabric. By that, destroying a city is an "urbicide" that resembles a genocide (Graham, 2008) where people could be living dead without being killed and act through unhealthy protective reactions (Wellness & Performance, 2011); where people become a figure of "inverse phantoms" whose bodies are still alive but whose souls are just surviving (De Cauter, 2011). They are somehow forced to forget their past and be invaded by new technologies that destroy the urban tissue rich with heritage (Graham, 2008). The spectrum of symptoms and compartments are analogous (Finn, 2013). Moreover, the more the inhabitants of a city are satisfied in their lives, the more they develop social trust and develop the abilities to overcome illnesses and stressful events, which increases productivity and economic profits of a city (Charles, 2014). Thus, the same patterns

adopted for an architectural and urban planning design could serve as a common therapy for most PTSD sufferers (Finn, 2013) and collaborative work would serve as a scientific solid base for architects to create the spaces that adapt to the simplest ways the brain processes them and labels the healthy ones (Albright, 2012).

The space that architects should create must reflect both familiarity (for security) and discovery (for motivation) through people's fluid adaptability of movement and communication, or, as art historian Gombrich said, "easy adjustment and easy arousal" (Gombrich, 1994). In fact, according to the environmental psychologists Pornin and Peeters, the fine line between motivational spaces and spaces of anxiety depend on: the intensity of stimulation of the human senses (e.g., visual), the clarity to "read" the whole architectural frame of a street or a city, the functionality of a space, and the easiness for people to understand why this space has been built (Pornin & Peeters, 2009). This frame offers people a sense of control over the spaces so that they can feel that the spaces follow their freedom of action and their independence and that these are restorative spaces that will calm people and decrease their fatigue and stress (Pornin & Peeters, 2009). The interesting part of this work process is that the areas that are highlighted during brain imaging confirm the mental problem or illness to be worked on even though the concerned people are not conscious of the mental problem they have (Figure 2).

In the case of PTSD, people categorize urban and architectural elements and spaces as safe or dangerous. For example, they consider the doorway and narrow passageways as highly stress stimulating because they link it to what they call "the fatal funnel" which is usually a place where sudden attacks can occur (Finn, 2013).

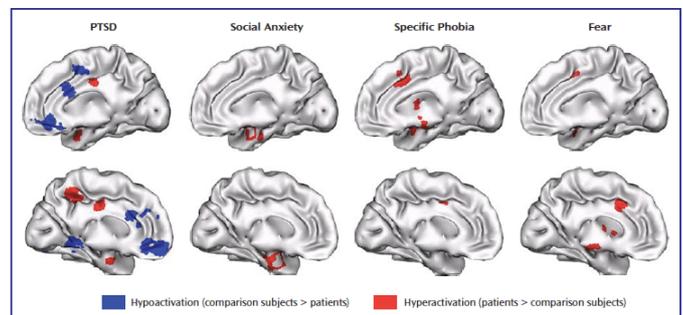


Figure 2. Brain imaging results of hypoactivation and hyperactivation due to PTSD and other mental problems and illnesses (Karam et al., 2008).

These are the brain areas to heal in people, conscious and not conscious of the mental problem they have, through architecture with the collaboration of neuroscientists.

5. Research Methods

The following methods were used in this study to find the correlation between the war in Beirut and the urban factors of Beirut as it is today and the relation with the severity of PTSD among its inhabitants. The participants are a stratified random sampling of 40 Beirutis still living in Beirut: 10 were adults during the war (ages 21 and up), 10 were adolescents than adults (ages 12 and up), 10 were children than adolescents (ages 3 and up) and 10 were born after 1990. The ages are categorized in this way because the war lasted for 15 years and people experienced different life stages (age-wise) during the war.

a. PTSD in Beirut: Past Study Results

For this study, past results of the research are important to take into consideration to link that PTSD, war, and the built environment based on the work of experts in the psychiatry field. The importance of these results lies in the fact they are based on studies that a team of Lebanese psychiatrists has conducted on around 3,000 adults who lived in Lebanon during the war (Karam et al., 2008). In fact, after their investigation based on a "World Health Organization (WHO) interview tool to diagnose mental health disorders" (Public Library of Science, 2008), these psychiatrists collected results based on the interviews in which they asked each participant to recount their traumatic events that occurred during the war (Karam et al., 2008). Among the many results they unfolded, the most important results that support the current study are the following:

a. At least 25% of the participants who had different life conditions during the war (38% refugees, 55% civilians in war zones, and 18% witnesses of death or injuries) carried a mental disorder at a certain point in their lives, mainly due to war (Karam et al., 2008). The percentage of people suffering from mental disorders can be higher; however, due to the taboos or the lack of consciousness of having such illnesses, the participants could have answered that they are perfectly healthy (Karam et al., 2008).

b. Half of the participants who had anxiety disorders (PTSD included) received professional treatment; moreover, they were treated after a delay reaching 28 years (Karam et al., 2008).

c. Psychiatric healthcare in Lebanon is developed and, therefore, the awareness is to be highlighted to decrease taboos and untreated cases of mental illnesses (Karam et al., 2008).

b. Questionnaires

A questionnaire in formal Arabic consisting of the following five questions was distributed to the 40 participants to have a current data sample of PTSD symptoms:

1. Have you experienced or do you still experience nightmares and flashbacks of dangerous scenes? Are you still experiencing them now?
2. Are you feeling disconnected from others? Do you feel that others might harm you at any time?
3. Did you lose your interest in daily activities or things you liked to do? Do you see yourself isolated?
4. Do you feel yourself reacting often with anger? And/or hypervigilance?
5. Do you think that these symptoms are related to the urban change of Beirut?

c. In-depth interviews

Along with the questionnaires highlighting symptoms of PTSD among Beirutis, in-depth interviews in the Lebanese Arabic language were conducted with this sampling. The purpose of the interview is to examine the effects of war on people with different living circumstances and to examine in which conditions PTSD is developed the most. During the interviews, users answered the following five questions:

1. How do you portray Beirut before the Lebanese civil war for a friend who has never visited it during that period and Beirut as it is today?
2. Are you attached to Beirut of the past or Beirut as it is today? Why?
3. Do you feel guilty for an event that happened during the war?
4. Do you feel danger around you in a certain built environment? If yes, in which one?
5. What do you feel is missing to have an agreeable Beirut to stroll in?

d. Visual Study

During the interview, the participants were shown the same five photos of different past and present architectural elements specific to Beirut that usually Beirutis find significant according to the daily conversations with Beirutis and their comments on social medias (Figures 3, 4, 5, 6)



Figure 3. An aerial view of Beirut showing Martyrs' Square (in the middle) surrounded by the urban tissue known as the Beirut downtown in 1958 (photo of a postcard from Nidal Chouman's collection available at Beirut Heritage group, archived in 2017)



Figure 4. Photo of an abandoned traditional two-storey building in Ras el Nabeh region, Beirut (photo available at Beirut Heritage group, archived in 2017)



Figure 5. Photo of a traditional house in Saifi region, Beirut (photo by Ousama Sandid available at Beirut Heritage group, archived in 2017)



Figure 6. Photo in 2017 from the region of Ayn el Mreisseh, Beirut, to the Zeytuna Bay (Photo by Youssef Rached Doughan available at Beirut Heritage group, archived in 2017)

6. Results

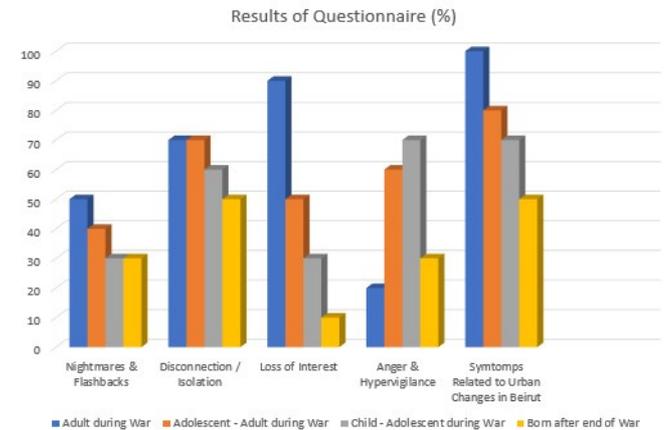


Figure 7. Results of the questionnaire showing degrees of PTSD symptoms among the participants according to their ages

Afterwards, the in-depth interviews conducted with the 40 Beirutis helped to support the analysis of the past literature and questionnaire's answers. Among the Beirutis interviews were ten warriors of war, five people who studied abroad in Europe and the United States of America during the war (for two to five years) and came back during the last five years of war (between 1985 and 1990) or after the war, three people who lost their businesses, five people who were kidnapped for several hours, three people who lost a family member due to random killing, four people who lived in denial of the war, and 10 university students who were born after 1990 and did not experience the war. The unexpected result is that no matter these people's positions and roles during the war, many answers were similar, which shows a solid collective memory in Beirut. With the questions and the pictures, the answers were as follows:

Portraying Beirut: All of the participants agreed that Beirut was more beautiful before 1975. They all also agreed that Beirut today lacks public spaces. Even 20% of the participants answered that "Beirut is a beauty queen that was forced to undergo unsuccessful plastic surgeries" and 10% answered that they "do not recognize the Beirut they have known anymore." They related this beauty to Beirut's houses or buildings with gardens and fountains. They also talked about the souks that had gathered people from all social and economic backgrounds: 75% of the participants said that "before the war, Beirut was for everyone, especially the downtown souk" and 25% referred to the present souk as a "ghost town" available only for rich people and for tourists, mentioning the downtown that witnessed severe battles and is now missing the prewar crowd. Lastly, 80% admitted that they still call the areas of Beirut east and west; these names were given during the war and represented geographic and religious divisions.

Attachment to Beirut: From the responses, 60% of the participants said that "Beirut is Beirut" and that they are attached to it no matter how it is because they "love Beirut", while 20% said they are attached to Beirut of the past. Eight out of ten participants who were warriors during all the period of the war (from 1975 to 1990) or for several years answered that they are "not attached to anything" and that "life moves on."

Guilt: Unexpectedly, all of the participants feel guilty, except for the three businessmen who were bankrupted during the war and said that the present circumstances are not helping them regain their business success. The ten warriors feel guilty for the innocent people who were killed during the war by them or by their fighting groups. The five participants who left during the war to study or work feel guilty for having left their parents and friends because when they returned they had a family member or a friend who died or got severely injured and had to go through recovery without their support. The 10 university students feel guilty because they could not do anything to preserve for their parents and grandparents the old Beirut they talk about with nostalgia. One of these university students said that he feels guilty because "traditional houses pictures remind me of a story that I will never live. These houses even know the stories of my parents more than I do". The five participants who were kidnapped feel guilty for having caused their families "the trauma of having been kidnapped" and for not being cautious enough at the time. The three people who lost a family member said that they feel guilty for not protecting enough the people they loved the most and constantly ask themselves "what if these innocent martyrs were not on the street at that particular time?". Even the four participants who were in denial during the war "feel guilty for not trying to help anyone during [the] war and not even sympathizing with anyone."

Danger Feelings: Of the responses, 80% feel that they belong to certain neighborhoods but feel that they are strangers in different ones, categorizing these spaces between east and west Beirut; 25% of the participants even agreed that they still exhibit anxiety signs such as sweating or shaking when they go to the "other region," especially two of participants who were kidnapped, even after 28 years of peace. Lastly, 20% of the participants say that they do not feel anything negative because Beirut is for everyone.

Missing elements in Beirut: All 40 participants agreed on three elements: public squares, sidewalks, and green spaces for rest or free activities. Of the responses, 80% mentioned the possibility to reach the beach for free because in Beirut, "the private beach resorts are considering the seashore adjacent to their plot limits as their private property". In addition, 50% of the

participants mentioned that the old abandoned houses that were affected during the war should be renovated through the support of the state because "these houses are a constant reminder of the frightening scenes of war".

Other answers: Of the responses, 35% of the participants considered that "this is not a civil war because many other countries were involved" as they explained during the interview that they had many friends from a different religion and they were helping each other during "these difficult times". Furthermore, 30% of the participants said they still live in their memories and "cannot see well the future in Beirut." Regarding the postwar downtown Beirut, 30% supported it whereas 70% were against this new place that "took the memory of our balad." (the Lebanese term for downtown is the term "balad" which means also "country" because the Lebanese considered that everything was found in the Beirut downtown as if the country's power and image relied on it). In fact, these people are in a state of "shock," as they said, "why do the investors not see that the architecture of Beirut in its uniqueness can attract tourists and raise our economy?". Lastly, 15% of the participants added that "international media force us to believe that the situation is unstable, even if it is."

7. Solutions

Based on the results, Beirutis are defining themselves (identity, psychological state) the way they see their urban environment. Several urban solutions could be applied to the case of Beirut to enhance security and motivation:

7.1 Create an inclusive restorative built environment:

Besides spreading awareness and having effective trauma therapy techniques, the creation of dynamic spaces helps the constructive activity of the hippocampus, which is especially beneficial for adults who were children during the war to form new memories. When urban design facilitates mobility and positive functioning for people with visible and invisible disabilities, people achieve a certain interior balance to get motivated and explore the outside world. These dynamic spaces are mentally restorative following people's constant dynamic change.

7.2 Create a long-term healing built environment that defines the meaning of freedom:

Understanding the rights and limitations of freedom in Beirut is important to reflect moderate degrees of security measures in order to avoid dangerous incidents without feeling too surrounded with the safety procedures that could remind the traumatized people of war. One of the urban solutions would be to build an urban strategy where people participate in improving

Beirut without falling into the individual initiatives and promote more for the public *collaboration to gain collective trust*.

7.3 Building on a human scale and promoting green mobility: Designing a pedestrian-friendly city (Albright, 2012; Gehl, 2010) with sidewalks and gardens and human-human and human-nature live contacts helps people become more positive, generous, and friendlier, especially when exposed to green spaces (Charles, 2014; Coburn et al., 2017) in a world where towers could lead. In fact, pedestrianism in places where small shops can open the door to the sidewalk enhances visual contacts between the indoors and outdoors in public places (Albright, 2012). This is where, according to Danish architect and urban design consultant Jan Gehl, people buffering against loneliness and alienation become more positive, walk slower, and initiate social contacts (Charles, 2014; Gehl, 2010). Buildings should have windows oriented to a green landscape and allowing a view of the sea and mountain that is still somehow available in the case of Beirut in small plots. This urban approach is very important for PTSD cases because the pedestrian-friendly city involves the emotions and aesthetics interaction and encourages exploration (Vecchiato et al., 2015) a healthy activity that improves the hippocampus healthy functioning and memory work (space processing and communication) through brain plasticity (Vecchiato et al., 2015). These spaces could be any elements of any scale and their placement in urban spaces motivates people to walk for unexpected and spontaneous interactions such as passive communication (just seeing that there is a form of life around them), active conversations, and events (Albright, 2012). Whether in urban, architectural, or interior designs, capacious spaces with repetitive patterns are the best to apply in this case because they provide rest (Gombrich, 1994).

7.4 Create (or recreate) the urban design that increases the sense of attachment and control: The more people are more attached to a place, the more the identity of that place is better defined (Ujang, 2012). Enhancing familiarity and respecting the meaning of attachment and satisfaction of a community through architecture will make people see it as secure (Kopec, 2012). The most important for people suffering from PTSD is to create for them spaces where they can enhance the feeling of the dominance of space because it was the way they acted to feel secure during the war (Finn, 2013). In the language of urban planning, these concepts can be translated to defined public spaces for mutual protection and trust - for communication and teamwork since feeling alone is highly threatening (Finn, 2013) and

low-rise buildings - for the feeling of the dominance of space.

8. Conclusion

Beirut is a challenged city in term of urban health. In one century, Beirut rose to be one of the most desirable Levantine cities to visit and then fell in a war that imprinted a facet of sectarianism, only to rise again in a different aspect. Nowadays, the city must face the problem of the high-rise building that has nothing to do with its past architecture. Beirutis are in a constant cycle of nostalgia and aim to move on, pulling up by that their sense of judgment on the day by day changes that are occurring in their built environment to find suddenly that the changes are enormous to digest. This state of confusion only increases their loss during their search for emotional stability. The sectarian urban planning still exists and people are still living a cold war. Therefore, PTSD caused by war is still haunting Beirut as people are not able to forget war since they experience the emotions of war on a daily basis. Moreover, guideline plans mixed the urban heritage with the contemporary architectural style, narrowing the opportunities to get a solid root and defined single identity for the whole urban tissue of Beirut. Therefore, if people do not find themselves in the place they thought they knew, but now changed due to war, they will remember the fear of its loss and the thought of losing the places where they have constructed beautiful and meaningful memories, especially with close people who died or are permanently disabled due to war. It is about endeavoring to get a whole interconnected system between architectural and emotional infrastructure, which means, the roads, the forms and functions of the neighboring buildings, the shared public spaces, the facilitation of reaching places Beirutis find primary for their daily life, and many other key factors.

Hence, urban planners have a major role in alleviating mental illnesses through the elements and shapes they propose during the planning of a postwar rising city, enhancing the harmonious relationship between the livable environment and the brain processes. The resulting urban spaces are exciting enough for motivation and quiet enough for rest. By that, Beirut will be able to help its inhabitants get over guilt and mourning through the grief visual therapy they need without having to relocate. As a final point, more research should be done on participants during a walk study (sensewalking) to collect more accurate results about the people's emotions who would be living the space with its visual, auditory, haptic, and emotional environment as they walk in the city.

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Conflict of interests

The author declares that there is no conflict of interest.

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