EXPERIMENTAL ASSESSMENT BETWEEN BUILDING REGULATIONS AND CLAUSTROPHOBIA

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Abstract. During the past decades there was a noticeable effervescence characterizing the space-psychology related studies. These studies established a connection between the characteristics of the environment and behavior. Therefore, this paper would like to join this field of research. Consequently, the issue raised would be the role played by architecture in the context of the space-perception discussion. In order to provide a practical answer, the paper debates the results obtained through an experiment which analyzed the interaction between certain characteristics of a 12 m2 room, according to architectural building regulations in Romania, and the variations of anxiety, comfort and safety. This experiment tested certain situations in which the natural adaptation process has been short-circuited, triggering phobic reactions. Thus, the paper focuses on questioning whether Romanian building regulations take into account aspects regarding the psychological comfort of the individuals.

Key words: space psychology, space perception, claustrophobia, building regulations.

1. Context

The paper analyzes how particular characteristics of space can influence the level of comfort in individuals who experience a high level of anxiety towards small and closed spaces (Wolpe and Lang, 1964). From a psychologically viewpoint, human experience of safety and security is important on many levels: from an evolutionary perspective, day-to-day living, and in order for a human to be accomplished within their environment (Newman, 1996; Croucher *et al.*, 1991; Crime Prevention Through Environmental Design Committee, 2000; Gifford, 2002; Taylor, 2002). These issues matter to both the ones who are constructing the built environment, as well as to the ones within the field of studying the inhabitants of this environment (Nasar and Jones, 1997; Tuan, 1979).

Thus, an experiment was designed to investigate the existence of a relationship between certain spatial characteristics of a

room – its dimension, proportion, the presence or absence of furniture, and the presence or absence of fenestration – and the state of fear manifested by the participants. The initial assumption was to prove that *building regulations fail to meet standards of psychological comfort*. The case-study is based on the context provided by the state building regulations in Romania.

Three documents were identified as being relevant to this experiment: the Housing Law no. 114/1996 (Parliament of Romania, 1996), the Order Approving the Norms of Hygiene and Recommendations Regarding the Living Environment no. 536/1997 (Parliament of Romania, 1997) and the Regulations Regarding Housing Design (Building Design, Research and Software Institute – IPCT S.A., 2002). From a legal point of view, it was rather difficult to identify whether the minimal area of a room is 10 sqm or 12 sqm. The Housing Law of 1996 stipulates that the area of a bedroom for a one-bedroom apartment is 12 sqm, while, at the same time, it states that, for a two-bedroom apartment the area of the bedrooms should be 22 sqm – namely one of 12 sqm and a second of 10 sqm. However, the Order Approving the Norms of Hygiene and Recommendations Regarding the Living Environment of 1997, stipulates that the area for the first bedroom should be of 12 sqm, and for two bedrooms of 24 sqm, even if the table is preceded by the following explanation: "The sanitary parameters which should be considered when designing and building dwellings are: - the minimal area of a room is 10 sqm". Taking into account all of these aspects, due to the legal ambiguity, it was decided that the area to be used for the experiment should be of 12 sqm – the most frequently cited one.

Consequently, the experiment studies whether this area is or is not psychologically comfortable, especially for occupants who exhibit a high level of anxiety towards narrow and enclosed spaces.

While an *in vivo* study would have been practically almost impossible due to technical constraints, the experiment used a virtual, three-dimensional environment. This choice was motivated by the fact that the virtual environment is nowadays a recurring instrument in psychological treatments and studies (Ibrahim *et al.*, 2007; Coelho *et al.*, 2009; Krijn *et al.*, 2004; Coelho *et al.*, 2008).

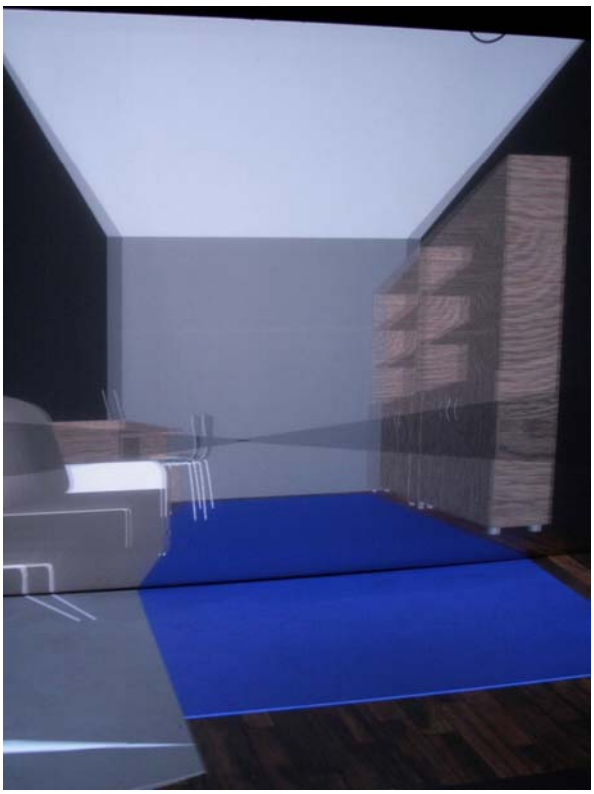

Fig. 1. The virtual reality environment of the Icube

The benefits are obvious: the participants are in a safe, controlled environment; if the level of anxiety should turn into panic, the use of virtual reality offers the possibility of pausing the experiment at any moment; the experimenter has an almost complete control of the studied parameters, which can be easily adjusted and studied (Fig. 1, 2, and 3).

The aim of this experiment was to show that current building regulations are focused only on safety issues, lacking a psychological dimension, thus being oblivious of the occupants' comfort. Furthermore, the experiment tries to establish a general methodology applicable in a wide range of studies regarding built space and the way it is regulated, designed, and perceived.

Fig. 2. The virtual reality environment of the Icube

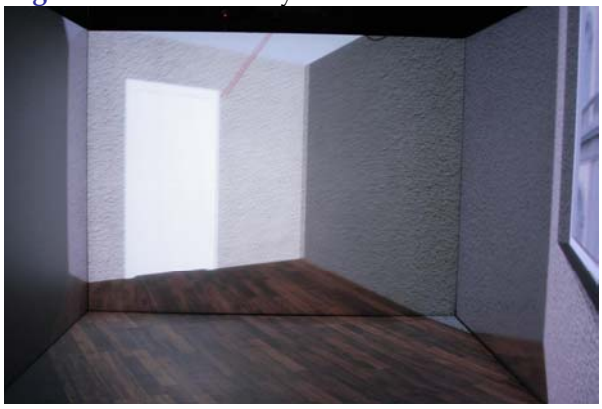

Fig. 3. The virtual reality environment of the Icube

2. Methodology

2.1. Participants

When designing a study, the first part implies identifying the minimum number of participants necessary for the experiment – or *the sample size*. Consequently, *the statistical power* depends on three factors: *the effect size*, *the significance level*, and *the sample size*. Thus, for *a statistical power* of 0.800 – 0.800 being the accepted level in the scientific community – , *a significance level* of 0.050, and a presumed effect size of a medium value – the standard value accepted by the scientific community – *the sample size* has to be of at least 64 participants, a size which ensures the necessary statistical power (Cohen, 1990; David, 2006). The current study is based on *the difference between means*.

Accordingly, as 66 volunteers took part in the experiment (27 men and 39 women, their age ranging between 19 and 70, the average age being 28.29 years), *the sample size* was exceeded. The data analysis revealed that the participants could be split into two groups. The first comprised individuals who manifested a high level of anxiety towards small and closed spaces, while the second – *the control group* – comprised individuals who exhibited a very low level of anxiety. The selection was based on the analysis of the answers collected through the claustrophobia scale ("Claustrophobia Questionnaire"), which is the most frequently used instrument in measuring the level of claustrophobia symptoms. It comprises 26 questions which quantify the level of anxiety. They are structured according to the two components of claustrophobia: *the fear of suffocation* (14 questions), and *the fear of restriction* (12 questions) (Randomsky *et al.*, 2001).

2.2. Study Design

The first step in designing the experiment presupposed that *the independent variables*

(the parameters chosen to be manipulated in the study) and *the dependent variables* (the answers given by the participants) should be stated. The group itself was *the classifying variable* (the interaction between the independent variables and the group was investigated). It had *a moderator* effect in the relationship between *the independent variables* and *the dependent ones* (Baron and Kenny, 1986). The goal was to identify the manner in which *the level of psychological comfort of the participants oscillates in relation to certain features of a 12 sqm room – the independent variables*. Altogether, there were three types of parameters tested: *the ratio between the room's dimensions*, *the presence or absence of fenestration* and *the presence or absence of furniture*. Put differently, the first regarded whether the level of psychological comfort differs not only according to *the area* of the room, but to *its ratio*, as well. The impact of the presence or absence of the fenestration in a room, upon the psychological comfort, was the second – according to the Romanian building regulations, the area of a window is 1/6...1/8 of the area of the room (Building Design, Research and Software Institute – IPCT S.A., 2002). The third parameter tested the presence or absence of the furniture and its impact upon the anxiety level or psychological comfort of the participants. In total, each participant experimented, for approximately one minute, each of the eight designed situational rooms.

The dependent variables were *the level of anxiety or fear, the level of comfort* and *the level of safety* experienced by each participant. The scales used to measure these three variables were based on scientific scales, which register the anxiety towards phobic stimuli. The data was also correlated with the answers previously filled out in "the Claustrophobia Questionnaire". Conclusively, several observations showed how the tested parameters could influence the level of anxiety in such spaces.

2.3. Instruments

Four instruments were used for elaborating this study. The first was "the Claustrophobia Questionnaire" (CLQ), developed by a team led by Adam S. Randomsky, in 2001. The questionnaire is an instrument used for establishing the level of anxiety manifested by the individuals who experience an irrational fear towards small and/or closed spaces (Randomsky *et al*., 2001). The authors identified two major components which characterize claustrophobia: the fear of being trapped and the fear of suffocation. Consequently, they structured the questionnaire into two subgroups of questions, specific to these two fears.

The second instrument was "The Experiment Questionnaire", based on the manner in which the level of anxiety is being measured in the treatment of phobias through exposure (Wolpe and Lang, 1964). It was used to determine the level of anxiety exhibited by the participants in each of the eight rooms they were exposed to. The questionnaire was structures as a group of three questions, each of them measuring the response on a scale comprising values between 0 (not at all anxious) and 10 (extremely anxious):

- On a scale from 0 to 10, how high is the level of anxiety/fear you exhibit in this room?
- On a scale from 0 to 10, how comfortable is this room?
- On a scale from 0 to 10, how safe do you feel in this room?

The third instrument used for this experiment was "The randomization chart". It ensured that each participant

exhibited the rooms in a random order, avoiding the deviations produced by the novelty of the situation or by the effect of adaptation or fatigue.

The last instrument employed for this experiment was "The Eon Icube Immersive Environment" (EON Reality), owned by the International Institute for the Advanced Studies of Psychotherapy and Applied Mental Health, Cluj-Napoca (Romania). It comprises four screens which describe a 3x3x3 m cube – three of them being vertical, while the fourth is horizontal. In order to produce a virtual reality environment, in which the participant can be fully immersed, the image is simultaneously projected and synchronized onto all four screens. Each of them is attached to its own computer and projector, thus ensuring the necessary computational power. The participant perceives the stereoscopic image correctly with the help of a pair of glasses provided with six sensors. These, together with another six sensors that furnish the remote-controller, transmit information regarding the position of the participant to a series of 12 reception devices.

The virtual model used for the experiment (comprising the eight situational rooms) was created using 3D modeling software, such as "Autodesk 3ds Max", the model being then imported into the EON Studio, the Icube's operational software.

3. Procedure

In order to develop a more realistic scenario, the experiment proposed a certain sequence in experiencing the virtual model. Each room had a camera attached to it. The camera was correlated with the height of each participant, due to the sensors positioned on the glasses, and it was placed right in front of the door. Thus, when the participant stepped into the Icube, they actually stepped inside the virtual room, as well. As stated before, all rooms had an area of 12 sqm; however, their features (*the independent variables*) differed. Four of them had a ratio of 3x4 m, while the others were 1.20x10 m. Thus, although identical in surface, they had entirely different proportions. Similar, two were furnished: the 3x4 m rooms as a student accommodation unit, while the others were designed with bookshelves on one side. The last independent variable was the presence or absence of fenestration: half of the rooms had a window, while the others lacked a natural source of light. In conclusion, the experiment reached the total of eight rooms (Table 1).

Table 1. The eight types of rooms

area	ratio	furniture	fenestration	code
12.00 sqm	3x4	unfurnished	unfenestrated	**1**
	1.20x10	unfurnished	unfenestrated	**2**
	3x4	furnished	unfenestrated	**3**
	1.20x10	furnished	unfenestrated	**4**
	3x4	unfurnished	fenestrated	**5**
	1.20x10	unfurnished	fenestrated	**6**
	3x4	furnished	fenestrated	**7**
	1.20x10	furnished	fenestrated	**8**

The first stage of the experiment, presupposed that the participant read and signed the "Informed Consent Form". Then, details regarding the exposure protocol were provided. Consequently, the equipment was presented: the Icube, the stereoscopic glasses, the felted wool slippers and the remote-controller. The protocol also included the possibility that the participant might experience symptoms of virtual reality sickness (a state of discomfort or sickness), case in which they could have requested an immediate discontinuation of the exposure. Likewise, the participant was informed regarding the manner in which the experiment would proceed: the nature of the exposure, the methodology of measuring the level of anxiety or fear, comfort and safety with the

help of the "Experiment Questionnaire", and the duration of the session, as well.

Fig. 4. A participant preparing to enter the virtual reality environment of the Icube

Following the information and preparation phase, came the exposure itself. For this stage, the participant received a pair of the stereoscopic glasses and a pair of felted wool slippers, following which they were invited to step into the Icube. The first moments of the session were reserved for the familiarization of the participant with the virtual environment and for the adjustment of the stereoscopic glasses, as well – so that the projected objects and spaces could be perceived correctly and three-dimensionally. The participant was then invited to explore the environment, however without leaving the central area of the cube. This position ensured a correct perspective, lacking distortions. If, so far, the participant did not experience any virtual reality sickness symptoms, the experiment could proceed further on – each room was allocated approximately one minute (Fig. 4, 5, 6).

Fig. 5. A participant preparing to enter the virtual reality environment of the Icube

Thus, the experimenter projected one of the eight rooms, moving on in the order indicated by the "Randomization Chart". The participant was guided by one of the experimenters with the help of the remote-controller, so that they could estimate the size of the room, observe each of its sides, whether the room was fenestrated or not and whether it was furnished or not. The familiarization phase took about 20-30 seconds, time during which the experimenters did not interact with the participant. Then, one of the experimenters would ask the participant to estimate their level of anxiety or fear, level of comfort and safety, based on the questions and scales provided by the "Experiment Questionnaire". The answers were recorded on the participant's sheet. At the end of this

process, the next room, indicated by the "Randomization Chart", would follow.

Fig. 6. A participant randomly experimenting one of the 8 model

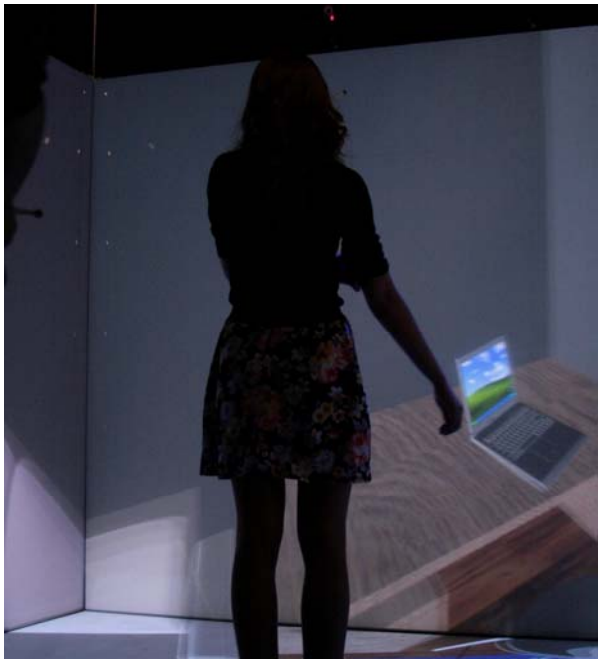

Fig. 7. A participant interacting with the virtual reality environment of the Icube

The evaluation was repeated for each of the eight rooms. The experimenter followed and recorded the levels of anxiety for each room, separately. At the end of the session, one of the experimenters retrieved the stereoscopic glasses and the felted wool slippers (Fig. 7, 8, 9).

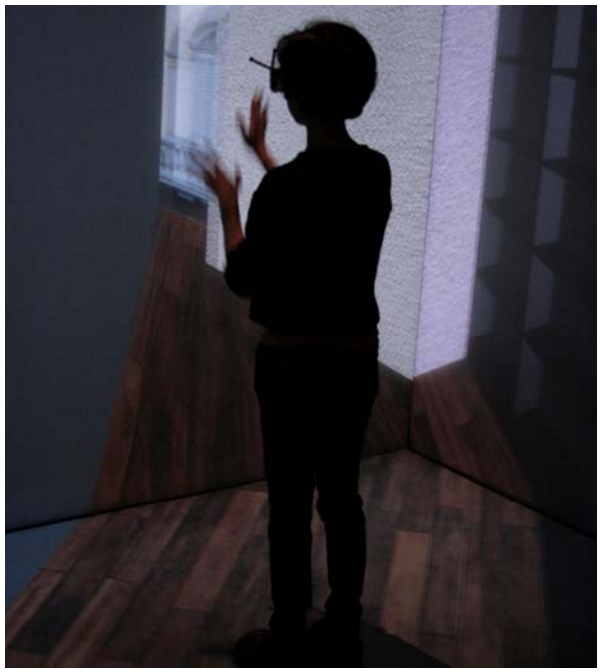

Fig 8. A participant interacting with the virtual reality environment of the Icube

4. Results

The first step in interpreting the results, was to analyze the answers given to the 26 questions of "the Claustrophobia Questionnaire", split into two sections: the suffocation sub-scale and the restriction sub-scale.

Based on the answers, a median level was set, valuing 31.000. The mean which was obtained, 32.450, is similar to the one obtained in the study which validated the scale, namely 28.900 – the value obtained by the non-clinic group, while the one obtained by the group manifesting clinical symptoms was of 51.800. Put differently, the sample used for the present study can be considered as being representative for the general population (Randomsky *et al*., 2001). This divided the 66 participants, into two subgroups: the ones who manifested a high level of anxiety (31 participants) and the ones who manifested a low level of anxiety (35 participants) – *the control group*.

Fig 9. A participant interacting with the virtual reality environment of the Icube

Next, the collected data was analyzed according to the dependent variables and also according to their relationships with the two subgroups.

The statistic test used for analyzing the retrieved data is called *mixed ANOVA* (*analysis of variance*), using the IBM SPSS (Statistical Package for the Social Sciences) Statistics, version 20. This test showed the differences between the answers given by the subjects to the different variables which were manipulated, taking into account the comparison between the two subgroups, as well – *the within-subjects* and *between-subjects effects*. For this experiment, the *within-subjects* factors were *the ratio of the room*, *the presence or the absence of fenestration*, and *the presence or absence of furniture*; while the *between-subjects factor* was *the level of anxiety* exhibited by the subgroup the participant belonged to. *Post-hoc tests* were not necessary, because all factors were of dichotomic nature – there were only two possible values, for example the 3x4 m room versus the 1.20x10 m room.

Thus, in order to formulate conclusive answers when studying the data, the analysis starts with *the statistical test index* (F), *the level of significance* (p), and *the size of the effect* (η^2). The size of the effect, depending on the result, can to be small (for values up to 0.020), medium (for values up to 0.130), and high (for values up to 0.260) (Cohen, 1988). These values are registered for each of *the within-subjects* factors, for *the between-subjects* factor, as well as for the interaction between these, and, finally, for all *the dependent variables* which were analyzed (*anxiety*, *comfort*, and *safety*).

The descriptive values (the mean and standard deviation, for all *three dependent variables*), for all eight rooms are presented in the Table 2.

The detailed results, obtained for each *dependent variable*, are presented, in condensed manner, in Tables 3, 4, and 5.

5. Discussions and Conclusions

The experiment tried to analyze the impact of certain characteristics of a 12 sqm room – the area of a common bedroom – and the manner in which they affect the level of *anxiety*, *comfort*, and *safety*. Accordingly, the effect of *three spatial characteristics – the ratio of the room's dimensions*, *the presence or absence of fenestration* and *the presence or absence of furniture* – upon the dependent variables were studied. The results were analyzed *per se*, for each of these variables, as well as in the case of their interaction with *the level of claustrophobia symptoms*.

Table 2. Results: The descriptive values

Descriptive Results N (number of participants)=66	anxiety		comfort		safety	
	median	*standard deviation*	median	*standard deviation*	median	*standard deviation*
3x4 m room/ furnished / fenestrated	0,730	*1,259*	7,890	*1,857*	8,820	*1,435*
3x4 m room / furnished / unfenestrated	1,710	*2,059*	6,080	*2,458*	7,670	*2,186*
3x4 m room / unfurnished / fenestrated	1,410	*1,718*	6,120	*2,675*	8,020	*1,917*
3x4 m room / unfurnished / unfenestrated	2,550	*2,543*	4,470	*2,851*	6,500	*2,775*
1.20x10 m room / furnished / fenestrated	2,500	*2,488*	4,500	*2,603*	6,740	*2,375*
1.20x10 m room / furnished / unfenestrated	2,890	*2,354*	3,620	*2,528*	5,970	*2,683*
1.20x10 m room/ unfurnished / fenestrated	2,530	*2,143*	4,180	*2,607*	6,290	*2,571*
1.20x10 m room / unfurnished / unfenestrated	3,640	*2,799*	3,290	*2,553*	5,420	*3,039*

Consequently, they were split into two subgroups, based on a median value (31.000) – one of them exhibiting *a high level of claustrophobia symptoms* (comprising 31 participants) and the other a *low level of claustrophobia symptoms* (comprising 35 participants).

Therefore, in order to formulate conclusive answers, three values were analysed: *the statistical test index* (F), *the level of significance* (p), and *the size of the effect* (η^2). The analysis focused on each of *the three spatial characteristics*, on their interaction with the level of symptoms exhibited by the participants, and on the parameters grouped by two, by three and, finally, for all of these combinations and their interaction with the level of symptoms exhibited by the participants. The gathered data confirms most of the initial presumptions, namely the fact that there *is* a difference in the manner in which these eight rooms were perceived.

In the case of *the room ratio*, it was demonstrated that a 3x4 m room is perceived as causing a lower level of anxiety, as being more comfortable and ensuring a higher level of safety, than a 1.20x10 m one. The same results have been confirmed both when it was not taken into account to which group the participants belonged to, as well as in the case when this aspect mattered.

The same results were obtained in the case of *the presence or absence of the furniture*. It was statistically proven that furnished rooms generate a lower level of anxiety and a higher level of comfort and safety – the results being the same, both when it was taken into consideration to which subgroup the participants belonged to, and when it was not.

On the other hand, in the case of *the presence or absence of the fenestration*, there were unexpected results. The experiment proved that the presence of fenestration alters the manner in which the room was perceived, in the case of all three parameters (anxiety, comfort and safety).

Table 3. Detailed results: Anxiety

ANXIETY	F=(1,64) [statistical analysis index]	p [significance level - max. 0.050]	η^2 [size of effect]	result
between-subjects factor: level of claustrophobia symptoms	2.711	105	-	no significant effect
within-subjects factor: room ratio	53.677	<0.001	456	significant effect
within-subjects factor: room ratio + between-subjects factor: level of claustrophobia symptoms	5.772	19	83	significant effect
within-subjects factor: fenestration	16.151	<0.001	202	significant effect
within-subjects factor: fenestration + between-subjects factor: level of claustrophobia symptoms	3.508	66	52	no significant effect
within-subjects factor: furniture	30.306	<0.001	321	significant effect
within-subjects factor: furniture + between-subjects factor: level of claustrophobia symptoms	6.502	13	92	significant effect
within-subjects factors: room ratio and fenestration	2.489	120	37	no significant effect
within-subjects factors: room ratio and fenestration + between-subjects factor: level of claustrophobia symptoms	1.238	270	19	no significant effect
within-subjects factors: room ratio and furniture	1.852	178	28	no significant effect
within-subjects factors: room ratio and furniture + between-subjects factor: level of claustrophobia symptoms	718	400	11	no significant effect
within-subjects factors: fenestration and furniture	2.952	91	44	no significant effect
within-subjects factors: fenestration and furniture + between-subjects factor: level of claustrophobia symptoms	64	801	1	no significant effect
within-subjects factors: room ratio, fenestration and furniture	1.333	253	20	no significant effect

However, this result was obtained only when the parameters were analysed *per se*, and not when the level of claustrophobic symptoms was taken into account. Thus, the manner in which the rooms were perceived does not depend upon the level of anxiety – namely, *the level of claustrophobic symptoms.*

Surprisingly, the most interesting results were obtained when *the three spatial characteristics* were grouped in pairs of two. First, significant effects were obtained *only* in the case of comfort and safety, and *not* in the case of anxiety. Then, there were no significant effects for any of the pairs when *the level of claustrophobic symptoms* was taken into account. This aspect is relevant because it proves that the manipulated parameters seem to have differentiated effects upon the three dependent variables. Then, because the significant results obtained in the case of *comfort* and *safety* were registered *only* when one of the two paired characteristics was *the ratio of the room*.

However, the last result which was obtained, when all *three spatial parameters* where considered (*room ratio*, *the presence or absence of fenestration*, and *the presence or absence of furniture*), combined with their interaction with the *level of claustrophobic symptoms*, were significant only in the case of anxiety.

Table 4. Detailed results: Comfort

COMFORT	F=(1,64) [statistical analysis index]	p [significance level - max. 0.050]	η^2 [size of effect]	result
between-subjects factor: level of claustrophobia symptoms	0.050	0.943	-	no significant effect
within-subjects factor: room ratio	133.564	<0.001	0.676	significant effect
within-subjects factor: room ratio + between-subjects factor: level of claustrophobia symptoms	4.055	0.048	0.060	significant effect
within-subjects factor: fenestration	43.311	<0.001	0.404	significant effect
within-subjects factor: fenestration + between-subjects factor: level of claustrophobia symptoms	0.003	0.958	0.000	no significant effect
within-subjects factor: furniture	75.026	<0.001	0.540	significant effect
within-subjects factor: furniture + between-subjects factor: level of claustrophobia symptoms	0.330	0.567	0.005	no significant effect
within-subjects factors: room ratio and fenestration	23.042	<0.001	0.265	significant effect
within-subjects factors: room ratio and fenestration + between-subjects factor: level of claustrophobia symptoms	2.781	0.104	0.041	no significant effect
within-subjects factors: room ratio and furniture	13.066	<0.001	0.170	significant effect
within-subjects factors: room ratio and furniture + between-subjects factor: level of claustrophobia symptoms	1.514	0.223	0.023	no significant effect
within-subjects factors: fenestration and furniture	0.094	0.760	0.001	no significant effect
within-subjects factors: fenestration and furniture + between-subjects factor: level of claustrophobia symptoms	0.360	0.551	0.006	no significant effect
within-subjects factors: room ratio, fenestration and furniture	0.097	0.757	0.002	no significant effect
within-subjects factors: room ratio, fenestration and furniture + between-subjects factor: level of claustrophobia symptoms	1.627	0.207	0.025	no significant result

Thus, so far, the gathered data offered experimental proof that, although the population sample that was used did *not* exhibit a clinical level of symptomatology (manifesting either a higher or lower level of anxiety) there is a certain variation in the intensity of the *anxiety*, *comfort* or *safety*, exhibited towards the tested parameters. However, further replicating studies are necessary in order to confirm these primary conclusions. Consequently, the present experiment has certain limitations.

Hence, a possible limitation could be the fact that the chosen sample did not manifest symptoms on a clinical level, namely the participants were not screened in order to be *diagnosed* as being or not claustrophobic, they were only *catalogued* as possessing a higher or lower level of anxiety. These aspects might be compensated by replicating the experiment, with different samples of population and by comparing the results.

Table 5. Detailed results: Safety

SAFETY	F=(1,64) [statistical analysis index]	p [significance level - max. 0.050]	η^2 [size of effect]	result
between-subjects factor: level of claustrophobia symptoms	1.066	306	-	no significant effect
within-subjects factor: room ratio	75.876	<0.001	542	significant effect
within-subjects factor: room ratio + between-subjects factor: level of claustrophobia symptoms	4.788	32	70	significant effect
within-subjects factor: fenestration	30.311	<0.001	321	significant effect
within-subjects factor: fenestration + between-subjects factor: level of claustrophobia symptoms	3	958	0	no significant effect
within-subjects factor: furniture	44.317	<0.001	409	significant effect
within-subjects factor: furniture + between-subjects factor: level of claustrophobia symptoms	3.358	72	50	no significant effect
within-subjects factors: room ratio and fenestration	5.114	27	74	significant effect
within-subjects factors: room ratio and fenestration + between-subjects factor: level of claustrophobia symptoms	1.355	249	21	no significant effect
within-subjects factors: room ratio and furniture	7.137	10	100	significant effect
within-subjects factors: room ratio and furniture + between-subjects factor: level of claustrophobia symptoms	1.338	252	20	no significant effect
within-subjects factors: fenestration and furniture	1.316	256	20	no significant effect
within-subjects factors: fenestration and furniture + between-subjects factor: level of claustrophobia symptoms	435	512	7	no significant effect
within-subjects factors: room ratio, fenestration and furniture	669	416	10	no significant effect
within-subjects factors: room ratio, fenestration and furniture + between-subjects factor: level of claustrophobia symptoms	1.842	179	28	no significant effect

A second possible limitation is the fact that, in the case of the room ratio, the chosen values were dichotomic. Probably, it would be worth designing an experiment in which these values vary continuously, thus one could identify the ratio which causes the turning point in the manner in which *anxiety*, *comfort*, and *safety* are perceived.

However, *the most significant aspect* of this experiment remains the fact that *concrete results were registered*, consequently emphasizing *the existence of an interaction* between certain characteristics of a 12 sqm room and the variations of the level of *anxiety*, *comfort*, and *safety*. Conclusively, the first applicability of this experiment would be that the Romanian laws and building regulations should take into account the legitimacy of *the impact of space upon the psychological comfort of the user*, as a parameter in defining certain requirements regarding architectural design. Thus, the present study is linked with a series of earlier and also recent theoretical exercises

which focus on the manner in which psychological aspects can be influenced by varying certain parameters. Accordingly, this experiment joins previous research on topics such as: *the effect of colors* upon the state and preferences (Yildirim *et al*., 2011; Park, 2009), *the impact of lighting* upon the perception of the dimensions of interior spaces (Berfeld and Hecht, 2011), *the psychological effects* of a certain type of furniture (Stone *et al*., 1990; Pizzatoa *et al*., 2012) or, more generically, *the relationship between ambiance and its users* (Graham and Gosling, 2011; Redi *et al*., 2015).

Despite the limitations of this study, the main objective was reached: beside its results, the experiment presented a manner in which the theoretical field of architecture can apply a research methodology specific to social sciences.

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