HOW CROWDING INFLUENCES EMOTIONAL, PERCEPTUAL AND BEHAVIOURAL REACTIONS IN STORE

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ABSTRACT

The aim of this research is to test the effect of crowding on emotional, perceptual and behavioural reactions of consumer within a store. A survey was conducted in a cosmetic department using a questionnaire administered face-to-face on a sample of 192 consumers. This allowed us to demonstrate that the two dimensions of crowding (social and spatial) affect differently emotional states, the perception of the global environment of the store, as well as the approach/avoidance behaviour. Our results showed that in-store crowding directly impact the emotions and behaviours, but that the emotional states of pleasure and stimulation mediated the relationship between crowding and the perception of the global environment of the store.

Keywords: crowding, store, emotional states, perception, approach/avoidance behaviour**.**

Jel classification code: M310

INTRODUCTION

Crowding is the only factor in the store atmospherics that belongs to the social category. It is found to be one of the most difficult factors to manipulate. Unlike the other factors (music, colours, lighting…) it is not controllable. In addition, this variable is apprehended by all senses (Daucé and Rieunier, 2002). Considered as an important element of the atmosphere of a point of sale (Baker, 1986; Turley and Milliman, 2000), it has attracted the attention of many researchers as a social factor or human variable within stores (Turley and Milliman, 2000). It has, moreover, been shown that this variable can influence a number of elements such as the satisfaction of consumers (Eroglu et al., 2005; Machleit et al, 2000), the attitude toward the store (Mehta et al, 2013; Pan and Siemens, 2011), and behavioural reactions (Hui and Bateson, 1991; Pan and Siemens 2011).

Before being the subject of investigation in the field of marketing, crowding was first studied in physiology, sociology and environmental psychology (Stokolos, 1972: Déor, 1972). The studies on the effects of the crowd were stimulated by the results of the research on animals and in particular by the work of Calhoun (Dion, 2009). Indeed, the first research on the topic, which dealt with the influences of the density of crowd on animal population; showed that the density causes of malfunctions in the social and physical important among animals (Davis, 1971; Christian, 1970 in Saegert and Langer, 1977; Karray, 2000). The impact exerted by the crowd on the animal population then has motivated the research in psychology and human sociology (Saegrt and Langer, 1977).

The existing literature indicates that the crowd is not only considered both part of the physical environment (Bitner, 1992), and a factor of stress (Lepisto and al, 1991; D'atous and al: 1995; Aylolt

and Mitchell, 1998; Rose and Neidermeyer, 1999), but also an atmospheric variable (Baker et al, 1992; Hoffman and Turley, 2002; Lemoine, 2002; Yalch and Spangenberg, 2000; Rieunier 2000; Bellizzi et al, 1983; Hui and Bateson, 1990). All these studies agree on the importance of human and social dimensions within a store.

More recent studies have been conducted around the concept of crowding, and its effects on the behaviour of individuals and their emotions (Dion, 1999; Machleit and Eroglu, 1990; Machleit, Eroglu and Mantel, 2000; Pan and Siemens, 2011; Mehta et al, 2012).

The results of this research are useful in marketing, especially to understand the effects of the crowd on the behaviour of the consumer in a commercial context. Therefore, the aim of this paper is to test the impact of in-store crowding on the emotional, perceptual and behavioural reactions of consumers within a cosmetic store in Algiers (Algeria), which is a culturally different environment regarding where previous studies were conducted. To reach this objective, we use a positive approach based on the S.O.R (Stimulus - Organism - Response) paradigm (Mehrabian and Russell, 1974). In addition our study, based on a literature review, seek to allow us to justify our interest on crowding factor.

LITERATURE REVIEW

Distinction between density and crowding

As stated by Mehta (2013), crowding can also be termed as Perceived retail crowding or perceived crowding. This concept means a psychological condition created by the fact of being in a space with a number of people considered too high compared to what is expected or desired at this location (Dion, 2009). It also describes the subjective experience of a density situation that generates a stressful condition. In other words, crowding indicates the negative subjective evaluation of a high density. The latter is a subjective estimation of the number of people in one place, available space and organization (Eroglu and Harrell 1986).

Crowding is experienced when the environment is judged dysfunctional in terms of density. These judgments vary with individuals (Machleit, Kellaris and Eroglu, 1994). Therefore, the crowding is a perception that resides within individuals. The recognition of crowding as a personal experience (Stockdale, 1978), means that it cannot be objectively measured in terms of objective density. That is, it cannot be considered in terms of the spatial variable only. Density is more seen as a necessary antecedent for the occurrence of the experience of crowding rather than as a sufficient condition (Stockdale, 1972).

In other words, the distinction between the two constructs can be summarized in this way: the density can be measured objectively, while crowding can only be subjective and depend not only on spatial variables, but also social ones. Indeed, Crowding is not a unidimensional concept, even if it was treated in this manner by some researchers (Eroglu and Machleit, 1990; Hui and Bateson, 1991; Dion, 1999). It is rather a two dimensional concept (Bouchard, 2002; Eroglu and al., 2005).
This two-dimensional approach is induced by the results of the studies in the environmental psychology, where two types of density are identified: spatial density and social density (McGrew, 1970; Mehta, 2013).

In Marketing, few studies have concretely established the distinction between the two dimensions. To our knowledge, only Machleit, Kellaris and Eroglu (1994), Machleit, Eroglu and Mantel (2002), Li and al (2009) and Mehta and al (2012) proposed a conceptualization of crowding that is consistent with what suggested the environmental psychology literature. Indeed, these researchers demonstrated

that crowding provides a reliable representation of these dimensions accordingly to the following definitions:

- Spatial density reflects the number of non-human elements in an environment and the relationship between them. This can be, for example, the quantity of goods, facilities in terms of display and their configuration. They are physical stimuli (Machleit, Eroglu and Mantel, 2000).
- While social (human) density concerns the number of individual as well as the rate and the importance of social interactions among individuals in a given environment. A high level of social density can lead to negative consequences such as lack of privacy or personal space, resulting in an increase in the crowding senses (Machleit, Eroglu and Mantel, 2000).

In this light, one place can be perceived as being small not only because of the physical elements that compose it, but also because of the presence of other individuals and their interactions in it. Furthermore, some studies have shown that it is the social density that generated more effects than the spatial density (Baron and al., 1976; Dion, 1999). While others found that, in general, it is the spatial density that results in more superior effects (Machleit and al., 2000; Eroglu et al., 2005).

These contradictions reveal that it is important to establish a clear distinction between the respective effects of each dimension, to determine whether an individual is affected more by space considerations or social considerations. Also, it is preferable to measure these two types of densities in terms of perception (social perception of crowding and spatial perception of crowding), then in terms of objective density.

Impact of Crowding on Consumer Behaviour

All studies indicate that in-store crowding occur at different levels emotionally, physiologically, in performance and social behaviour (Rieunier and Dancé, 2009). These effects can both increase or diminish depending on the circumstances or individuals. We will summarize the most important findings on the effects of crowding within consumers.

Impact on Emotions

In 1975, Mackintosh, West and Saegaert explained that when respondents were placed under conditions of high population density, they tended to be described as tense and confused (Rieunier and Daucé, 2009). As opposed to those located in low population density that expressed positive emotions like pleasure or relaxation.

More recently, Machleit, Eroglu and Mantel (2000) conducted two studies in which consumers were asked to return their shopping experience afterwards. At a later stage, they performed a laboratory experiment on a sample of respondents. They get results that crowding affects emotions. So when the perceived crowding increases, positive emotions regress (joy and interest) and negative emotions increase (anger, sadness, disgust, shame ...).

- Effects on Pleasure: According to a study by Rodin, Solomon and Metcalf (1978), the densest places (number of people) are considered less pleasant than sparsely populated areas. Moreover, the result of a laboratory study, conducted by Hui and Bateson (1991), proved that perceived density impact directly and negatively the enjoyment of the individual. In addition, two studies of Machleit, Eroglu and Mantel (2000) presented a negative correlation between crowding (both, spatial and human) and the level of pleasure experienced by respondents; the more the crowding is intense, less the fun is important (Karray 2000). Hence, on the basis of these results, we can observe that the relationship between crowding and pleasure is negative.
- Effects on Stimulation: Many researches show that the perception of crowding is a state of stress, since dense environments tend to increase the voltage levels and stimulation of people in it (Stokolos, 1976; Thompson and Aiello and Baum, 1985).Other research supports the fact

that the high blood pressure of subjects placed in situations of high density may be associated with high density in these places (Saegert and Langer, 1977).

The laboratory study of Machleit, Eroglu and Mantel (2000) shows that there is a positive correlation between the level of stimulation felt by the individual and the crowding within stores. The more present is the perception of crowding is (both spatial and social), the more stimulated is the individual. Same results were found by Li and al., (2009).

Impact on Psychological States

Although in-store crowding generates responses for most instant, it can affect the psychological level (Ben Memi, 2005). Indeed, the result of Mackintosh and Saegert (1975) highlights that those customers would remember less shops details in a crowded store than in an empty store. If crowding in the store is badly perceived, customers seem to lack confidence about the value they derive from their purchases (Harrell, Hutt and Anderson, 1980; Granmann and Kruse, 1998). Similarly, the state of irritation can remain long in an individual customer, who experienced crowding, even after his purchases (D'Astous, 2000).

Impact on Behavioural Reactions

Studies in commercial environment have been brought mainly on not only the approach/avoidance behaviour and adaptation strategies but also the purchasing behavior of customers in an exploratory way. Most research has concluded that crowding was mostly negative on behavioural responses within consumers (Harrell, Hutt and Anderson, 1980; Eroglu and Machleit 1994; Dion, 1999). Some consumers react negatively limiting their purchases to leave quickly the store. Others do not hesitate to force the passage and even shoving customers if necessary. Some see the situation as an advantage for them in terms of social density, the crowd means good business opportunities and they will therefore tend to continue to explore the store. While other slash out at themselves (Dion, 2004).

Thus, for Eroglu and Machleit (1990), consumers are less satisfied in a packed store than in an empty one. They are more stressed (Sibéril, 1994) and less comfortable (Saegert and Langer, 1977). The store will be negatively assessed in case of high density (Machleit, Eroglu and Kellaris, 1986). However, Eroglu and al., (2005) found during their last study a positive effect on the perception of space; especially on consumer satisfaction when the mediating effects of purchase values and emotions were considered.

Approach/Avoidance Behaviour

Harrell, Hutt and Anderson (1980) demonstrate that the crowding causes escape's reactions. Indeed, according to their study, consumers tend to change their purchases and to limit their attendance. Hui and Bateson (1991) confirmed the existence of a negative relationship between density and approach behaviour. However, they notice that this relationship is not direct; pleasure plays an important mediating role. The more consumers feel pleasure, less in-store crowding cause's avoidance behaviour. Moreover and according to Eroglu and Harrell (1986), the relationship between crowding and approach/avoidance can also be moderated by the type of consumers. Namely 'utilitarian' consumers reduce the list of their purchases, while 'hedonists' are rather tempted to stay in the store, not to look at products, but more to watch other buyers.

Dion (1999) proposes a typology of avoidance behaviour in context of negative crowding perception: flight, aggression, opportunism and guilt. Some consumers do not dwell on the store, they escape it. Others limit their purchase and leave the place as soon as possible by being very aggressive. And there are those who adopt opportunistic behaviour by staying on the lookout for commercial offers.

We can conclude from these studies that crowding cause's avoidance behavior, since it reduces the time and attendance of customers at the store and can even cause aggression state. However, the crowding effect may be mediated by the level of pleasure felt in the store within hedonistic consumers.

METHODOLOGY

In our study, our analysis will focus on the crowding as defined previously. As it is not everyone who perceives a dense environment as crowded, it appears more appropriate to measure the crowding rather than to consider the density itself.

Our conceptual model of research (Figure 1) proposes to establish the link between the crowding (measured according to the two dimensions: spatial density and social density), the emotional states (Pleasure-Arousal), the perception of the global environment of the store, and the approach/avoidance behaviour. Our research follows the S.O.R. (Stimulus-Organism-Reaction) paradigm. We consider the environmental stimuli are processed by the consumer based on the emotions felt on the point of sale.

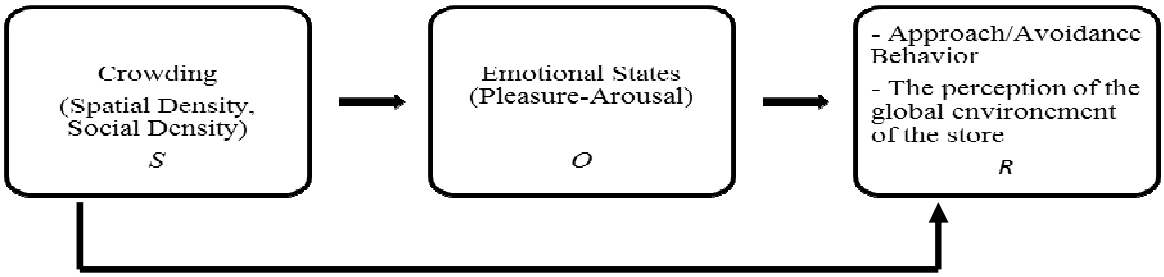

Figure 1. Conceptual Model of Research

We can notice from our model that emotions are both a dependent variable and a mediating variable of the relationship between crowding and the perception of the global environment of the store, in one hand, and the relationship between crowding and the approach/avoidance behaviour, on the other hand. This fact is largely based on the model developed by Mehrabian and Russell (1974).

Hypotheses

Following the results of our literature review and the conceptual model mentioned succinctly above, it is possible for us to formulate six research hypotheses. Four of them express direct relationship, while two stand for indirect relationship.

Direct Relationships

The literature review presented earlier indicates that crowding has, on one hand, a negative effect on the dimension of pleasure (Hui and Bateson, 1991; Machleit, Eroglu and Mantel, 2000), and, on the other hand, it increases the level of individual's stimulation (Machleit, Eroglu and Mantel, 2000). These results lead us to propound the first two following hypotheses:

H1: Crowding decreases the level of pleasure felt by consumers within the store.

H2: Crowding increases the level of stimulation felt by consumers within the store.

Moreover, it has been shown that crowding can alter the perception of the general environment (Eroglu and Harrel, 1993; Dion, 1999). Indeed, according to Eroglu and Harrel (1986) and the overload theory, the consumer would tend, within crowded environments, to minimize his cognitive

activity and would treat the information in a superficial way. Hence, we propose the incoming hypothesis:

H3: Crowding deteriorates the perception of the global environment of the store.

In addition, crowding tends to reduce the time spent on purchases in a store (Langert and Saegert, 1977; Harrel and Eroglu, 1986). It also has the effect of decreasing the desire to explore the place (Whyne, 1991). Therefore, crowding is expected to impact negatively the approach behaviour of consumers (Dion, 1999). This result conducts us to suggest the hypothesis below:

H4: Crowding deteriorates the approach behaviour among consumers within the store.

Indirect Relationships (Emotions as a Mediating Variable)

A mediator is a variable that represents a mechanism by which the variable x influences the variable y: the x variable influences the mediator and the latter in turn influences the variable y (Baron and Kenny, 1986; Brauer, 2000). So the mediating variable is a 'transmitter' by which the influence of *x* on *y* passes. Given this explanation, we want to know if the influence of in-store crowding, in our study, is applied primarily by emotions. That is whether, crowding influences behaviour and perception by a direct effect or an indirect effect, through emotions.

Some studies claim that the emotional states stimulate cognitive activity not only by inference effect or activation of memory but also by acting on the evaluation and memory processes. These studies show partial or complete mediation of emotions on perceptual responses of individuals (Batra and Ray, 1986; Holbrook and Batra, 1987; Homer and Yoon, 1992; Cho and Stout, 1993). Such result pushes us to put the fifth hypothesis, as follows:

H5: The influences of Crowding on perceptions go through the emotions felt in store by consumers.

Finally, we will discuss the proposition of Mehrabian and Russel (1974) according to which emotions play a mediator role in behavioral responses. This discussion is represented by the sixth and final following hypothesis.

H6: The influences of Crowding on behavioural reactions go through the emotions felt in store by consumers.

Method

There are several methods to test the influence of one or multiple factors of the atmosphere of a store on consumer reactions (Schmidt, 2009):

1. data analysis distributors panels
2. laboratory experiments
3. investigations
4. experiments in real field
5. direct observations of actual field behaviour

There is no ideal method, each method has its advantages and disadvantages. The two least questionable methods appear to be those of laboratory experimentation (which maximizes the internal validity of the experiment while having a pretty good external validity) and examination real property (for its external validity) (Rieunier, 2000).

We opt for the actual field investigation and that, for these reasons:

- It is difficult to extract the individual from purchasing position to work in the laboratory (North and Hargreaves, 1997; Rieunier, 2000);
- It is important to test in real stores what was tested in the laboratory on the influence of environmental factors on individual reactions (Sibéril, 1994);

- Using laboratory simulations or videos and slides do not assess the effect of other consumers on individual behaviour, since other people can make a significant impact on the purchasing behaviour (Baker, 1994);
- Last but not least, several authors agree to say that the actual field studies have not known enough research (Turley and Milliman, 2000; Lam, 2001; Lemoine 2003; Kearney, Kennedy and Coughlan, 2007; Bohl, 2012).

The choice of data collection method was dictated by the objective of the research. An empirical quantitative approach has been advocated, which means that we opt for the questionnaire. Indeed, this method allows collecting information from participants about facts, ideas, behaviours, preferences, feelings, expectations and attitudes (Fortin, 1996).
The questionnaire has been administered face-to-face inside the store (Mall Intercept Technique). The investigator is present when administering the questionnaire, allowing for maximum response rate, but he/she is not directly involved in the administration of it, since his/her role is limited to answer to any questions as to how to respond (Bush and Hair, 1982). This method is also well suited to the context of stores and commercial environment, particularly when it comes to applying a non-probability sampling. In addition, buyers still keep in mind fresh information about their purchasing behaviour (Bush and Hair, 1982).

The research was conducted in the cosmetic department of UNO hypermarket in Algiers during one week on May 2015. We choose this department for several reasons:

- It is of the most visited department according to the staff;
- The presence of two shop assistants within the department allows us to concretely measure social interactions on the approach/avoidance behaviour;
- The reduced surface of the department, compared to others, causes a noticeable crowd effect.

Sample

We obtained 192 valid questionnaires. We couldn't get an exhaustive list of customers; a probability sampling method was therefore excluded. In our study, empirical sampling (non-probability) was opted for which individual choice is not random but purposive. The choice of this method is mandatory since the following conditions are present:

- No survey frame or comprehensive listing is available;
- This method is based on an entirely empirical and reasoned choice;
- It meets the objectives of the survey
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It is therefore, a convenience sample that reflects the diversity of the population studied (Evrard, Pras and Roux, 2003). The purpose is to bring together rich, detailed, diverse and quality content (Evrard, Pras and Roux, 2003).

Measures

To measure the impact of crowding on emotional states, the global environment and the approach/ avoidance behavior, we developed a scale measure based on a combination of four different scales. All the scales involved in the questionnaire, were carefully translated in both French and Arabic (the two prominent languages in Algeria), with a forward and backward check. Also, items were measured on a 7-point Likert-type scale (strongly disagree to strongly agree) to increase noticed variance and the precision of the answers. Each scale was subjected to a pre-test to ensure their reliability.

Firstly, emotional states (Pleasure and Arousal) were measured by a scale that we elaborated by using the Churchill Paradigm. Although, this field is dominated by the works of native English speaking researchers, yet the adaptation of these scales has shown its limits for studies that happen in

non-English speaking countries (Drungeon-Lichtlé, 1998; Plichon, 1999), especially in terms of reliability and validity (Lichtlé and Plichon, 2004). This is the case of the Algerian consumers, which are culturally and linguistically different from consumers on which the scale of Mehrabian and Russell (1974) was developed and applied. This leads us to the scale below (α=0.76):

Today in the store, I feel:
Pleasure
- Happy
- Satisfied
- Annoyed
- Anxious

Stimulation
- Relaxed
- Nervous
- Calm

Secondly, the perception of the global environment of the store is measured using a semantic differential scale involving 8 items, developed by Fisher (1974). This scale was subsequently used in studies dealing with the effects of the store atmosphere on consumers. 8 bipolar adjectives appear in response to the question: 'To what extent each of the following adjectives is what you perceived from the environment of this department today?' The environment is described along the following items (α=0.91):
- Tense / Relaxed
- Uncomfortable / Comfortable
- Depressing / Joyful
- Monotone / Colorful
- Boring / Stimulant
- Not animated / Animated
- Dull / Bright
- Interesting / Uninteresting
-

Thirdly, the scale measuring the approach/avoidance behaviour intentions toward the store is the one developed by Donovan and Rossiter (1982). This scale contained originally 8 items assessed under 4 different subjacent dimensions: Time dimension, Affiliation, Affect, Spending. One of the two items indexed in the spending subjacent dimension wasn't quite understandable for the respondents. In order to avoid response bias, the order of the items was mixed and the direction of two of the items in the scale was reversed (α=0.73).
Time dimension:
- I like to spend much time browsing in this store
- I want to avoid looking around or explore this store (reversed)

Affiliation:
- This is a place where I try to avoid other people, and avoid to talk with them (reversed)
- This is a place in which I feel friendly and talkative to store personnel who happens to be near me

Affect:
- I like this store environment
- I enjoy shopping in this store

Spending:

- This is the sort of place where I might end up spending more money than I originally set out to spend.

Finally, to measure the crowding, the scale developed by Machleit, Kellaris and Eroglu (1994) which was again tested by these authors in 2000 (Machleit et al, 2000) was used. In order not only to comply with the time requirements imposed for this study but also not to lengthen the questionnaire more than necessary, we retained only two items for each dimension of the scale (α=0.84).

Human Dimension:

- The store was a little too busy.
- There were a lot of shoppers in the store.

Spatial Dimension:

- The store seemed very spacious.
- I felt cramped shopping in this store.

RESULTS

The statistical analyses performed on our data have been focused on conducting a MANOVA. The level of significance chosen to assert that there is a significant relationship will be $p < 0.05$, since this standard is often adopted in most academic research.

Direct Relationship

The first set of our hypotheses postulated that there is a link between crowding and emotional reactions (pleasure and stimulation) within the customers in the store. The results (see table 1 below) show that the human dimension of crowding decreases the level of pleasure felt by consumers (p=0.01). However, the spatial dimension has no impact on it (p=0.18). But, it can be seen that both human and spatial dimension have a significant influence on the emotional dimension of stimulation.

Table 1: Multivariate analysis of variance (crowding impact emotions)

Independent Variable	Mean Square	F	Sig
Human Dimension/Pleasure	3.62	3.98	0.01 (p<0.05)
Spatial Dimension/Pleasure	2.94	28.02	0.182
Human Dimension/Stimulation	4.02	4.47	0.000 (p<0.05)
Spatial Dimension/Stimulation	20.87	21.20	0.000 (p<0.05)

In line with previous research in this field of investigation, there is a significant impact between crowding and the emotions felt by consumers in terms of pleasure and stimulation. As stated by H2, crowding increases the level of stimulation felt by consumers. But, we can't accept H1, since one of the two dimensions of crowding (spatial dimension) doesn't decrease the level of pleasure felt by consumers.

The results for our third hypotheses confirm those obtained on the previous researches, crowding deteriorates the perceptions of the global environment of the store; it concerns both the human and spatial dimension. Therefore the hypothesis H3 is accepted.

Table 2: Multivariate analysis of variance (crowding impact the perception of the global environment of the store)

Independent Variable	Mean Square	F	Sig
Human Dimension	3.76	4.30	0.000 (p<0.05)
Spatial Dimension	2.93	42.90	0.000 (p<0.05)

The results of our MANOVA for crowding on approach and avoidance behaviour, which reflects the attractiveness to the store, the desire for affiliation, spending time and money in the store, show a significant effect only with the spatial dimension. The human dimension has not a negative impact on the approach behaviour. Hence, the hypothesis H4 is rejected.

Table 3: Multivariate analysis of variance (crowding impact the approach behaviour)

Independent Variable	Mean Square	F	Sig
Human Dimension	4.51	5.74	0.06
Spatial Dimension	2.97	24.42	0.000 (p<0.05)

Indirect Relationship (Emotions as a Mediating Variable)

The method, usually used in marketing works to verify the existence of a full or partial mediating effect, is the regression method (single and multiple) proposed by Baron and Kenny (1986). Although Baron and Kenny advocate looking at the sizes of regression parameters, in practice people tend to seek a change of direction. Thus, mediation would occur if the relationship between the predictor and the dependent variable was significant ($p < 0.05$) on the first equation, but not significant ($p > 0.05$) when the mediator is included on the second equation.

This approach can lead to all sorts of 'nonsense' that 'encourage thinking that the p-values encourage all-or-nothing' (Field, 2013). Indeed, one could have a situation where the b value of the relationship between the predictor and outcome changes very little in models with and without the mediator, but changes the p-value will shift slightly (ex , from $p = .049$ when the mediator is not included in $p = .051$ when it is). While the p values have changed from insignificant to significant, the shift is very small, and the size of the relationship between the predictor and the dependent variable has not changed much. Similarly, we could have a situation where the b of the relationship between the predictor and the variable is reduced greatly when the mediator is included, but remained significant in both cases (Field, 2013).

An alternative is to estimate only the indirect effect (a * b) (see the figure below) and its significance. The indirect effect illustrates the combined effects of the links (a) and (b).
We will calculate confidence intervals for the indirect effect using bootstrap methods. This practice is increasingly common and is preferable to the regressions of Baron and Kenny and Sobel test. Most of the studies apply Baron and Kenny's method, in a way that is intrinsically linked to research the 'significant' correlation. While the estimation of the indirect effect and its confidence interval allow us to simply indicate the degree of mediation observed in the data (Field, 2013).

Since we will test the mediation model of Lambert and al. (2012) by estimating the indirect effect rather than an analysis of the mediation process suggested by Baron and Kenny (1986), then we can use the Hayes PROCESS tool on SPSS (Hayes, 2012).

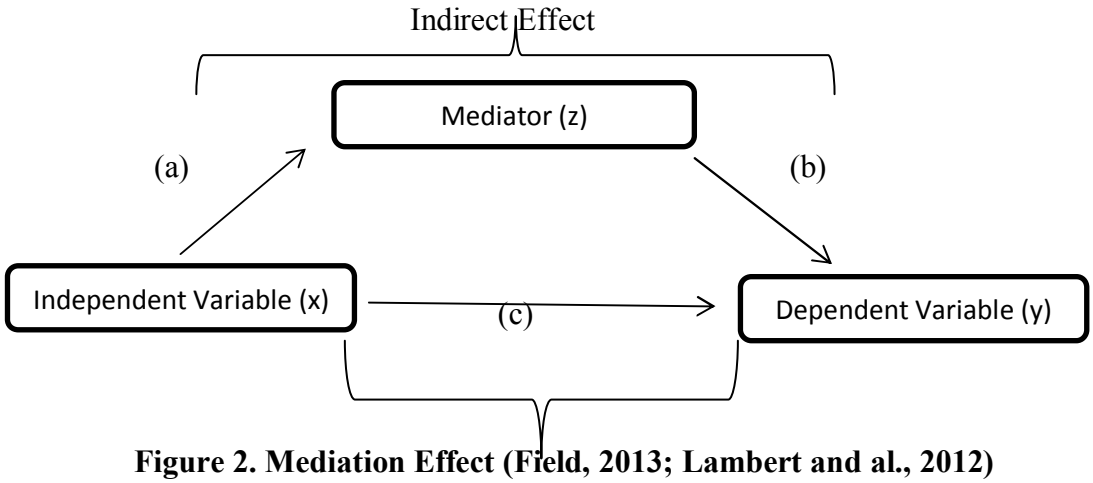


Figure 2. Mediation Effect (Field, 2013; Lambert and al., 2012)

Direct Effect

The hypothesis H5 postulated that emotions mediate the influence of crowding on the perceptions of the global environment of the store. The table below shows the results obtained with our Bootstrap analyses with the mediating variable.

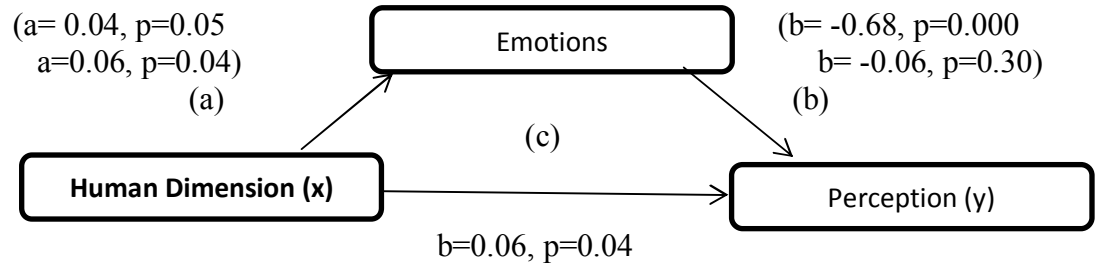
Table 4: Mediating effect of Emotions on the influence of crowding on the perception of the global environment of the store.

Independent Variable	***b*** **(completely standardized indirect effect)**	**LLCI &ULCI (lower and upper levels of confidence intervals)**	**Pm (Percent mediation)**
Human Dimension	0.03	95%BCaCi [0.15, 0.08]	0.59 (59%)
Spatial Dimension	0.19	95%BCaCi [0.06, 0.32]	0.70 (70%)

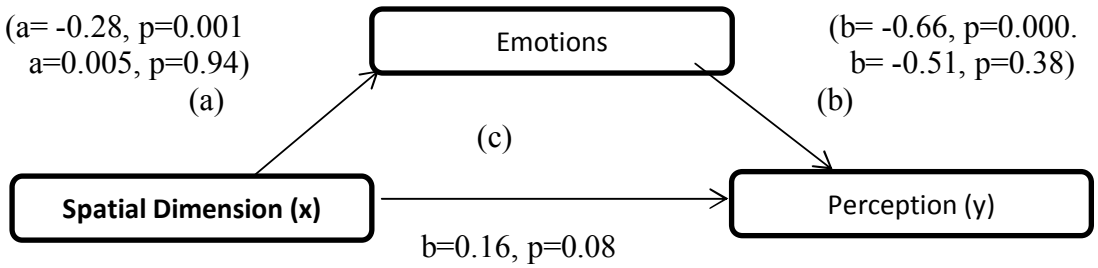
We observe that the confidence interval does not show zero (b=0). This indicates the presence of a mediator effect. In other words, emotions play the role of a mediator variable between crowding and perception. Our mediating variable represents 59% of the total effect of human dimension and 70% of the total effect exerted by the spatial dimension on perception. The relation (a) and (b) (see Figure 2 above) was also verified. We present the results with each independent variable (regression coefficients for the two dimensions of emotional states, pleasure and stimulation), the indirect effect and bootstrap confidence intervals on the following figures below.

These results allow us to accept the hypothesis H5.

The same procedure was followed to test the mediating effect of emotions on the influence of crowding on approach and avoidance behaviour of the consumers. These latter were separately treated.



b=0.06, p=0.04
Indirect Effect: 0.03 95%BCaCi [0.15, 0.08]



b=0.16, p=0.08
Indirect Effect: b= 0.05 95%BCaCi [0.16, 0.05]

The results below (table 5) pinpoint that the emotions felt by the consumer in the store are not mediating the influence of crowding neither on the approach behaviour, nor on the avoidance behaviour. Thereby, we can reject the hypothesis H6.

Table 5: Mediating effect of Emotions on the influence of crowding on the perception of the global environment of the store.

Independent Variable	*b* (completely standardized indirect effect)	LLCI &ULCI (lower and upper levels of confidence intervals)	Pm (Percent mediation)
Human Dimension/Approach Behaviour	0.031	95%BCaCi [-0.49, 0.11]	0.10 (10%)
Spatial Dimansion/Approach Behaviour	0.02	95%BCaCi [-0.09, 0.10]	0.002 (0.2%)
Human Dimension/Avoidance Behaviour	-0.001	95%BCaCi [-0.49, 0.11]	0.008 (0.8%)
Spatial Dimansion/Avoidance Behaviour	0.011	95%BCaCi [-0.032, 0.08]	0.011 (1.1%)

In summary, the findings support the conclusion that crowding influences consumer perception of the environment and increases their level of stimulation. Human dimension influences the level of pleasure felt in store but has no negative influence on their approach behaviour. Regarding the presence of mediating variables, detailed results lead to the conclusion that there is indeed a mediating effect of emotions on perception, but not on behaviour.

DISCUSSION AND FUTURE RESEARCH DIRECTIONS

From this study several conclusions may be drawn. First, our results have shown that only the human dimension of crowding decreases the level of pleasure, spatial dimension has no influence. Although the literature has demonstrated the direct influence of crowding on the emotional states of individuals (Hui and Bateson, 1991; Machleit, Eroglu and Mantel, 2000), it is worth to note that these results come from laboratory experiments. That is, people know they are being studied and may reflect how researchers are expecting them to behave, more than in the case of an experiment in real stores.

Second, the other difference between our results and those mentioned in previous research is that in our case, crowding increases positively the level of stimulation, not negatively. Indeed, a negative effect is interpreted as a stress condition that rises (Stokolos 1976; Machleit, Eroglu and Mantel, 2000). In our study, this positive effect can be interpreted by an invigorating and motivating stimulation.

This difference may be based on cultural differences. Indeed, European as well as North Americans are accustomed to large areas and comply greater interpersonal distances. While crops, called 'contact', tend, in the Arab culture, to appreciate dense situations. Van Rompay, Krooshoop, Pruyn and Verhoeven (2011) showed that crowding effect on the pleasure and stimulation dimensions vary with consumer needs of affiliation: The negative effects are apparent only to buyers with low affiliation needs.

Third, our results show also that crowding deteriorates the perception of the global environment of the store. This does not really contradict the existing literature on this point. Because most studies have shown that the crowding stifles individual's cognitive efficiency by minimizing their attention and deteriorating memorial processes (Eroglu and Harrel, 1986).

Paradoxically, crowding may play favourably in assessing the point of sale, as the latter would seem less monotonous and depressing, and much livelier and interesting, which induces this positive effect on the emotions of consumers. However, although the presence of others makes it more lively environment, too many individuals generate other problems. An environment must not be overloaded by elements, particularly when the latter is narrower than the rest of the store. Since this is likely to discomfort the customer that might feel oppressed.

Fourth, concerning crowding effect on approach behaviour, our results contradict those of previous studies (Eroglu and Harrel, 1986, Eroglu and Machleit 1994; Dion, 1999, 2004). In our study, the effect of crowding does not deteriorate the approach behaviour among consumers. That is, it does not cause avoidance behaviour. This means that individuals do not adopt adaptive strategies to lessen this impact, as we have seen in the literature review. In other words, people do not postpone their purchases on the shelf. This can be explained by the fact that a large concentration of consumers attracts more buyers, since it may communicate positive feelings related to making bargains or discovering interesting products.

Consumer behaviour is therefore insensitive to the social dimension effect even under conditions of limited space. As highlighted by Dion (2004), crowding sought for it by the consumer level to feel comfortable, which is to know that they may have the impression of being neither too lonely nor too rushed, varies considerably across cultures. Since the Algerian culture belongs to 'contact cultures', a dense medium with a somewhat narrow layout is accepted in the cultural attitude of consumers. Indeed, that kind of environment may reflect the traditional commercial spaces. Similarly, the increased presence of individuals in a public place is far from causing harm to cultural

contact of individuals, because the idea of an intrusion in these areas is inconceivable, since 'what is public is actually public' (Hall, 1966). Moreover, each culture has its own way of designing the layout of the space, the boundaries of intimacy, displacement of the body and the conditions of the conversation. Each possesses a proxemics system (Dion and Bonnin, 2004).

In addition, some psychology studies argue that only the social dimension has a significant impact on individuals, if not (or at least,) a superior effect compared to the spatial dimension of crowding (Baron, Mandel, Adams, Grieffen, 1976; Schaeffer, Baum, Paulus and Gaes, 1988). Yet some marketing studies address the crowding construct as multidimensional (Machleit, Kellaris and Eroglu, 1994; Machleit, Eroglu and Mantel, 2000). This, allows us to see that the two dimensions can influence individuals differently. They demonstrate, as was the case in our study, a certain superiority to the spatial dimension. The reason for this difference could be explained by the study subjects and the context of the study. In psychology, the subjects are individuals chosen for the study or individuals who have an emotional commitment. Something that is not really possible in the context of shopping centre where there are more physical elements of the environment that impact, rather than the human elements.

Finally, our results have enabled us to reach the conclusion that the influence of crowding on the perception goes through the emotional states of consumers. This result supports the proposals of Donovan and Rossiter (1982) and Zajonc and Markus (1984) according to which, atmospheric stimuli are influential on the emotion, which in turn influences perceptions.
Indeed, perception is not an encapsulated process. It works in collaboration with many other processes in the brain (Stefanucci, Gagnon, and Lessard, 2011). The process of direct influence of stimuli on emotion can follow 'relatively simple and automatic processes', which come into play before even that cognitive thinking can start (Newman, Michon, Brakus, and Wright, 2010).

In this conceptualization, the environment can positively influence the emotion in a direct way. Indeed, many of our behaviours are irrational, impulsive, led by our emotions: surprise, joy, fear, etc., felt in the presence of a stimulus. Most of the situations that we encounter daily are far too complex and marked too many uncertainties to conduct reason alone to solve them. According to Pham (2004), it becomes possible to consider that the emotions are sources of information, and it can refer to 'logic of feeling' (Pham, 2004). Since, in terms of perception, emotions can inform the judgments of environmental characteristics when, for example, conflicting information is present (known as the hypothesis 'affect as information') (Clore, 2009; Storbeck and Clore, 2008). In addition, S-O-R paradigm of environmental psychology, on which is based our research, argues that emotions are the first response to any environment, regardless of the nature of the latter (Mehrabian and Russell, 1974).

However, our results were not as successful at the level of mediation by emotional states (pleasure and stimulation) between crowding and approach/avoidance behaviour of the consumers, as suggested by the review of literature (Ittelson, 1973, Mehrabian and Russell; Bitner, 1992). We can interpret this fact by the possibility that it is more cognitive processing of the effect of crowding (social and spatial dimensions), which mediates the influence of this factor on the approach/avoidance behaviour of the consumer. Nonetheless, we can assume that future research can prove the mediating influence of emotional states on other behavioural variables, such as for example the intention of coming back or moving within the point of sale.

Our research can be considered as a replication and extension to the work of Eroglu and Machleit (1994), in an Algerian cultural context, unlike the ones in which previous researches were conducted. The contributions of this study are twofold: academic and managerial. Academic, since the literature review and study in a real store help increase knowledge on the subject of the influence

of crowding on the reactions of consumes. Managerial, as our results may lead to the formulation of practical recommendations with regard to distributors and managers of stores. The advantage of our study is that it was held in a real context, allowing the evaluation of the effect of crowding on real customers who makes their purchases. Only, we note a significant limit that is based on our convenience sample.

Our study certainly would have been superior in terms of content validity if questions concerning the density and the dimension 'domination' of the emotional states were taken into account. The literature indicates that the perception of density is a variable that can play a mediating role on the different responses of the consumer. Similarly, towards the purchase involvement, this could also be an explanatory moderating variable of customer behaviour (Bruner, 1990; Chebat Gélinas-Chebat and Vaillant, 1999).
Also, if individuals perceive two dimensions to the crowding, the only dimension that varied during the day on our research was the social dimension. It was impossible for us to vary spatial dimension. Exploiting the manipulation of these two dimensions would be interesting in future research.

Given this constraint, it would be interesting to study the impact of both social and spatial dimensions of crowding in various contexts (since, crowding is a contextual construct). Thus, it would be appropriate to draw a complete picture of the impact of the two dimensions of crowding (Bouchard, 2002). It would also be interesting to see the effects of environmental factors on the employees of the store. Crowding represents a variable that could influence them and affect their mood and work performance.

Moreover, the study of the impact of the other atmospheric variables on the perception of crowding would be advantageous, especially for the managers of the stores. Indeed, instead of seeking to mitigate possible negative effects of crowding, managers should work to attract more customers into their stores.

REFERENCES

Aiello, J. R., Thompson, D. E., & Baum, A. (1985). Children, crowding, and control: Effects of environmental stress on social behavior. *Habitats for children: The impacts of density*, 97-124.

Baker, J. (1986). The role of the environment in marketing services: The consumer perspective. *The services challenge: Integrating for competitive advantage*, *1*(1), 79-84.

Baker, J., Levy, M., & Grewal, D. (1992). An experimental approach to making retail store environmental decisions. *Journal of retailing*, *68*(4), 445.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173.

Baron, R. M., Mandel, D. R., Adams, C. A., & Griffen, L. M. (1976). Effects of social density in university residential environments. *Journal of Personality and Social Psychology*, *34*(3), 434.

Bateson, J. E., & Hui, M. K. (1990). *The effects of perceived control and customer crowding on the service experience*. na.

Batra, R., & Ray, M. L. (1986). Affective responses mediating acceptance of advertising. *Journal of consumer research*, 234-249.

Bellizzi, J. A., & McVey, P. (1983). How valid is the buy-grid model?. *Industrial Marketing Management*, *12*(1), 57-62.

Ben Memi,. (2005). La foule en magasin : conséquences sur le comportement du consommateur. http://thil-memoirevivante.prd.fr/wp-content/uploads/sites/43/2014/11/2005-La-foule-en-magasin.pdf

Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. *The Journal of Marketing*, 57-71.

Bohl, P. (2012). The effects of store atmosphere on shopping behaviour-A literature review. *Corvinus Marketing Tanulmányok*, *2012*(1).

Bouchard, V. (2002). Impact de la perception de foule sur la clientèle d'un centre commercial. (Master Degree dissertation, HEC Montréal).

Bush, A. J., & Hair Jr, J. F. (1985). An assessment of the mall intercept as a data collection method. *Journal of Marketing Research*, 158-167.

Chebat, J. C., Chebat, C. G., & Vaillant, D. (2001). Environmental background music and in-store selling. *Journal of Business Research*, *54*(2), 115-123.

Cho, H., & Stout, P. A. (1993). An Extended Perspective on the Role of Emotion in Advertising Processing. *Advances in Consumer Research*, *20*(1).

d'Astous, A. (2000). Irritating aspects of the shopping environment. *Journal of Business Research*, *49*(2), 149-156.

Daucé, B., & Rieunier, S. (2002). Le marketing sensoriel du point de vente. *Recherche et Applications en Marketing*, *17*(4), 45-65.

Dennis, C., Newman, A., Michon, R., Brakus, J. J., & Wright, L. T. (2010). The mediating effects of perception and emotion: Digital signage in mall atmospherics. *Journal of Retailing and Consumer services*, 17(3), 205-215.

Dion D. (2009), « A la recherche du consommateur : Nouvelles techniques pour mieux comprendre le client », Dunod.

Dion, D. (1999). *La foule dans un contexte commercial: concept, mesure, effets sur les comportements* (Doctoral dissertation, Rennes 1).

Dion, D. (2004). Personal control and coping with retail crowding. *International Journal of Service Industry Management*, *15*(3), 250-263.

Dion, D., & Bonnin, G. (2004). Une étude comparative des systèmes proxémiques français et tunisiens. *Recherche et applications en marketing*,*19*(3), 45-60.

Eroglu, S. A., & Machleit, K. A. (1990). An empirical study of retail crowding: antecedents and consequences. *Journal of retailing*, *66*(2), 201.

Eroglu, S. A., Machleit, K., & Barr, T. F. (2005). Perceived retail crowding and shopping satisfaction: the role of shopping values. *Journal of Business Research*, *58*(8), 1146-1153.

Eroglu, S., & Harrell, G. D. (1986). Retail crowding: Theoretical and strategic implications. *Journal of retailing*.

Evrard, Y. Pras. B. et Roux, E.(2003). *Market: Etudes et recherches en marketing*.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage.

Fisher, J. D. (1974). Situation-specific variables as determinants of perceived environmental aesthetic quality and perceived crowdedness. *Journal of research in personality*, *8*(2), 177-188.

Hall, E. T. (1966). *The hidden dimension*. Anchor Books Editions.

Hargreaves, D. J., & North, A. C. (1997). *The social psychology of music*. Oxford University Press.

Harrell, G. D., Hutt, M. D., & Anderson, J. C. (1980). Path analysis of buyer behavior under conditions of crowding. *Journal of Marketing Research*, 45-51.

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling.

Hoffman, K. D., & Turley, L. W. (2002). Atmospherics, Service Encounters and Consumer Decision Making: An Integrattve Perspective. *Journal of Marketing theory and practice*, *10*(3), 33-47.

Holbrook, M. B., & Batra, R. (1987). Assessing the role of emotions as mediators of consumer responses to advertising. *Journal of consumer research*, 404-420.

Homer, P. M., & Yoon, S. G. (1992). Message framing and the interrelationships among ad-based feelings, affect, and cognition. *Journal of Advertising*, *21*(1), 19-33.

Hui, M. K., & Bateson, J. E. (1991). Perceived control and the effects of crowding and consumer choice on the service experience. *Journal of Consumer Research*, 174-184.

Ittelson, W. H. (1973). Environment and cognition. Seminar Press.

Karray, S. (2000). *Effets de l'odeur ambiante et de la densité de population sur les consommateurs d'un lieu de service* (Master's thesis, Ecoles des hautes etudes commerciales, Montréal).

Kearney, T., Kennedy, A., & Coughlan, J. (2007, September). Servicescapes: a review of contemporary empirical research. In *Conference papers* (p. 4).

Langer, E. J., & Saegert, S. (1977). Crowding and cognitive control. *Journal of Personality and Social Psychology*, *35*(3), 175.

Lemoine, J. F. (2002, September). Perception de l'atmosphère du point de vente et réactions comportementales et émotionnelles du consommateur. In *Actes du 5e Colloque Etienne Thil*. La Rochelle.

Lemoine, J. F. (2003). Vers une approche globale de l'atmosphère du point de vente. *Revue française du marketing*, *194*(4), 83.

Lepisto, L. R., Stuenkel, J. K., & Anglin, L. K. (1991). Stress: An Ignored Situational Influence. *Advances in consumer research*, *18*(1).

Li, J. G. T., Kim, J. O., & Lee, S. Y. (2009). An empirical examination of perceived retail crowding, emotions, and retail outcomes. *The Service Industries Journal*, *29*(5), 635-652.

Lichtlé, M. C., & Plichon, V. (2004). La mesure des émotions ressenties en magasin; une étude exploratoire. *Cahiers de Recherche du Cermat*, *17*.

Machleit, K. A., Eroglu, S. A., & Mantel, S. P. (2000). Perceived retail crowding and shopping satisfaction: what modifies this relationship?. *Journal of Consumer Psychology*, *9*(1), 29-42.

Machleit, K. A., Kellaris, J. J., & Eroglu, S. A. (1994). Human versus spatial dimensions of crowding perceptions in retail environments: a note on their measurement and effect on shopper satisfaction. *Marketing Letters*, *5*(2), 183-194.

Mcgrew, P. L. (1970). Social and spatial density effects on spacing behaviour in preschool children. *Journal of child psychology and psychiatry*, *11*(3), 197-205.

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. the MIT Press.

Mehta, R. (2013). Understanding perceived retail crowding: A critical review and research agenda. *Journal of Retailing and Consumer Services*, *20*(6), 642-649.

Mehta, R., Sharma, N. K., & Swami, S. (2013). The impact of perceived crowding on consumers' store patronage intentions: Role of optimal stimulation level and shopping motivation. *Journal of Marketing Management*, *29*(7-8), 812-835.

Pan, Y., & Siemens, J. C. (2011). The differential effects of retail density: an investigation of goods versus service settings. *Journal of Business Research*,*64*(2), 105-112.

Pham, M. T. (2004). The logic of feeling. *Journal of Consumer Psychology*,*14*(4).

Plichon, V. (1999). Analyse de l'influence des états affectifs sur le processus de satisfaction dans la grande distribution. *Thè se de sciences de gestion, Universit é de Bourgogne, Dijon*.

Rieunier, S, & Daucé, B (2009). Le marketing sensoriel du point de vente: créer et gérer l'ambiance des lieux commerciaux. Dunod.

Rieunier, S. (2000). *L'influence de la musique d'ambiance sur le comportement des consommateurs sur le lieu de vente* (Doctoral dissertation, Paris 9).

Robert, D., & John, R. (1982). Store atmosphere: an environmental psychology approach. *Journal of retailing*, *58*, 34-57.

Rodin, J., Solomon, S. K., & Metcalf, J. (1978). Role of control in mediating perceptions of density. *Journal of Personality and Social Psychology*, *36*(9), 988.

Rose, R. L., & Neidermeyer, M. (1999). From Rudeness to Road Rage: The Antecedents and Consequences of Consumer Aggression. *Advances in consumer research*, *26*(1).

Schaeffer, M. A., Baum, A., Paulus, P. B., & Gaes, G. G. (1988). Architecturally mediated effects of social density in prison. *Environment and Behavior*, *20*(1), 3-20.

Schmitt, J. (2009). *Parcours, déplacements et actions face au rayon: mieux comprendre le comportement physique du consommateur en magasin pour mieux comprendre ses achats* (Doctoral dissertation, HEC PARIS).

Siberil, P. (1994). *Influence de la musique sur les comportements des acheteurs en grandes surfaces de vente* (Doctoral dissertation, Rennes 1).

Stefanucci, J. K., Gagnon, K. T., & Lessard, D. A. (2011). Follow your heart: Emotion adaptively influences perception. *Social and personality psychology compass*, 5(6), 296-308.

Stockdale, J. E. (1978). Crowding: Determinants and effects. *Advances in experimental social psychology*, *11*, 197-247.

Stokols, D. (1972). On the distinction between density and crowding: some implications for future research. *Psychological review*, *79*(3), 275.

Storbeck, J., & Clore, G. L. (2008). The affective regulation of cognitive priming. Emotion, 8(2), 208.

Turley, L. W., & Milliman, R. E. (2000). Atmospheric effects on shopping behavior: a review of the experimental evidence. *Journal of business research*,*49*(2), 193-211.

van Rompay, T. J., Krooshoop, J., Verhoeven, J. W., & Pruyn, A. T. (2012). With or without you: Interactive effects of retail density and need for affiliation on shopping pleasure and spending. *Journal of business research*, *65*(8), 1126-1131.

Yalch, R. F., & Spangenberg, E. R. (2000). The effects of music in a retail setting on real and perceived shopping times. *Journal of business Research*,*49*(2), 139-147.

Zajonc, R. B., & Markus, H. (1985). Must all affect be mediated by cognition?.*Journal of Consumer Research*, *12*(3), 363.