All are (not) equal for the crowd: Social groups moderate the effects of human density on willingness to stay and vice-virtue choices*

Ernesto Cardamone[**], *Gaetano "Nino" Miceli*[***], *Maria Antonietta Raimondo*[****]

Abstract

This research aims to understand the role of social groups in the relationships between human density and willingness to stay in the store and vice *vs*. virtue choices. We suggest that scholars and managers must consider not only how many customers compose the crowd (i.e., human density), but also how they relate with the other customers in the crowd (i.e., social groups). Results of an experimental study demonstrate that higher human density increases willingness to stay when in-group and aspirational group members compose the crowd. Moreover, higher human density leads to choose more vice and virtue products in presence of dissociative and aspirational groups members, respectively. Our research shows that social factors play an important role in the analysis of human density on consumer reactions.

Keyword: Crowding, human density, social groups, willingness to stay, vice-virtue, calories.

First submission: 07/01/2019, accepted: 19/04/2019

* This article is the result of the collaborative work of the three authors. Considering the final version of the article, however, paragraphs 1 and 3 may be attributed to Ernesto Cardamone, paragraphs 2 and 4 may be attributed to Gaetano "Nino" Miceli, and Introduction and Conclusions may be attributed to Maria Antonietta Raimondo.

** Doctoral Candidate in Economic and Business Sciences, University of Calabria, Department of Business Administration and Law. E-mail: ernesto.cardamone@unical.it.

*** Assistant Professor of Marketing, Department of Business Administration and Law. E-mail: gaetano.miceli@unical.it.

**** Associate Professor of Marketing, Department of Business Administration and Law. E-mail: ma.raimondo@unical.it.

Mercati & Competitività (ISSN 1826-7386, eISSN 1972-4861), 2019, 2

Introduction

Crowding perception emerges in presence of a discrepancy between demanded and available spaces, and is a crucial factor in determining consumer behavior in several purchasing contexts (e.g., Eroglu and Machleit, 1990; Hui and Bateson, 1991). Accordingly, a number of marketing researchers have investigated the impact of the perceived crowding on a variety of consumer reactions, but have produced contrasting results (Mehta, 2013). Earlier research underlined a negative relationship between human density, a recognized condition to perceive crowding represented by the number of people in a certain place, and consumer satisfaction (Langer and Saegert, 1977). However, more recent contributions have demonstrated a U-shaped relationship (Pan and Siemens, 2011) or even a positive relationship (Pons, Laroche, and Mourali, 2006) between human density and consumer satisfaction. Despite these contributions, the understanding of the effects of crowding-related perceptions on consumer attitudes and choices is still an open issue that needs further investigation (Mehta, Sharma, and Swami, 2013).

This research aims to reconcile the reported, conflicting evidence by analysing the roles of social factors (e.g., the relations with the other customers in the crowd) in the relationships between human density and consumer reactions. With few exceptions that studied the role of social-identification with the crowd (Schultz-Gambard, 1979; Novelli et al., 2013), previous theorizations have largely neglected the analysis of social factors, thus leaving a relevant research gap in the literature. In fact, ignoring social factors does not allow to completely understand why the same objective level of human density can produce negative or positive effects on consumer reactions.

This research provides evidence on how the nature of other people in the crowd is able to moderate the relationship between human density and consumer attitudes and choices. Results of an experimental study demonstrate that the relationship between human density and willingness to stay in a store is positive only in the presence of in-group and aspirational group members. Moreover, high density of aspirational group members leads to choose more virtue products, whereas an increase in the number of dissociative group members is associated with the selection of more vice alternatives. This research contributes to the crowding literature demonstrating that social factors moderate the relationship between human density and consumer reactions. Our findings also imply managerial implications to set the ideal dimension of stores targeting specific market clusters and to improve customer value by offering virtue products.

1. Literature review

In this section, we first summarize the main contributions on the direct effects of human density on consumer reactions, and underline the current debate in the literature (Langer and Saegert, 1977; Pan and Siemens, 2011; Pons, Laroche, and Mourali, 2006.) We also discuss the impact of personal traits (e.g., tolerance for crowding; Machleit, Eroglu, and Mantel, 2000) and of situational factors (e.g., time pressure; Pan and Siemens, 2011) on crowding perception. Finally, we introduce social factors, focusing on social groups (Escalas and Bettman, 2003). These research streams provide the theoretical background for our conceptualization.

1.1. Effects of human density

Crowding refers to a perception that emerges when demanded and available spaces diverge (Stokols, 1972). Perceived crowding is mainly influenced by two distinct types of density. First, *spatial density* concerns the dimension of the physical space (e.g., in square meters) and the amount of objects present in that space. Second, *human density* is the number of people present in a certain place at a particular time (Harrell, Hutt, and Anderson, 1980) and is a necessary but not sufficient condition for the perception of crowding (Stokols, 1972). Accordingly, studies on the effects of the human density investigated how variations in the people-per-square-meter ratio influence consumer reactions, keeping spatial density constant.

Early contributions on crowding demonstrated a negative effect of human density on consumer experience. When human density is high, consumers tend to make less optimal choices in terms of convenience, and to show lower store evaluation, comfort perception, and capability to find the desired product and to choose between alternatives (Langer and Saegert, 1977). Indeed, higher human density generates feelings of closure, and determines restricted movements and worse overall evaluations of the shopping experience (Harrell, Hutt, and Anderson, 1980). An increase in human density reduces perceived control over the situation and increases perceived risk associated with the purchases, causing lower satisfaction (Hui and Bateson, 1991; Eroglu and Machleit, 1990). Moreover, human density is positively correlated with negative (anger, disgust, contempt, shyness, guilt, sadness, fear) and neutral (surprise) emotions, and negatively correlated with positive (pleasure) emotions. Such emotions partially mediate the relationship between density and satisfaction (Machleit, Eroglu, and Mantel, 2000). The negative influence of

human density on consumer reactions would imply that the preferred scenario would be a store in which a single customer is present.

Assuming that the demand of personal space is not infinite, other scholars stated that the relationship between human density and satisfaction cannot be considered as purely negative but could be described as a reverse U-shaped or even become positive. Considering the reverse U-shaped hypothesis, a first contribution came from the *optimal social stimulation theory* (Altman, 1975), which underlines that individuals perceive discomfort when the number of people around is too limited, because of the emerging sense of isolation. A high level of social stimulation is not considered optimal as well, because the consumer is exposed to a reduction of her/his privacy. Thus, satisfaction is maximized in presence of a moderate number of other customers. More recently, empirical evidence confirmed the intuition of Altman (1975), demonstrating a reverse U-shaped relationship between human density and consumer reactions. Pan and Siemens (2011) proved that consumers are more willing to enter and to explore a retailer store in an average-crowded condition compared to both low- and high-crowded conditions. Uhrich and Luck (2012) showed the existence of a reverse U-shaped relationship between human density and positive emotions, and of a U-shaped relationship between human density and negative emotions. An average level of human density is also associated with the minimization of public self-awareness (Uhrich and Tombs, 2014), that is, a state in which one individual focuses mainly on the impressions s/he makes on others, causing emotional discomfort and inhibition (Buss, 1980). This state emerges in the presence of few other consumers, but also in high-density conditions, which provide anonymity and a sense of de-individuation (Diener, 1980). Specific contextual factors, such as the type of the store, can cause a right or left shift of the optimal point in the U-shaped relationship between human density and consumer reactions (Uhrich, 2011). Overall, these results contributed to explain why the average level of human density is preferable compared to low and high levels.

Suggesting that the relationship between crowding and consumer reactions may be positive, some authors have emphasized the role of other individuals as a core part of the consumption experience. For example, Holt (1995) reported that during sports events the feeling of communion with other attendees is one of the elements generating value for the consumer. In these kinds of situations (e.g., sports events, concerts, dancing at discotheques), the demand for personal space is more limited and, thus, the effect of human density on the evaluation of the experience can be positive. In a laboratory experiment, in which human density was manipulated within a

leisure situation (a disco club), Pons, Laroche, and Mourali (2006) demonstrated that, as expected, participants reported being more satisfied with higher levels of crowding.

Other authors have reported that human density can positively affect consumer evaluations due to heuristics employed to assess quality, or quality/price ratio, of the store. In a grocery store with a limited number of other customers, one may infer that the reduced crowding is due to low store quality. On the contrary, higher levels of human density communicate that other customers have chosen the store, signalling good levels of quality. These considerations are particularly salient for stores for which the quality/price ratio is relevant. Thus, in outlets and discounts, human density can be positively correlated to satisfaction due to the social confirmation of store value (Machleit, Kellaris, and Eroglu, 1994; Machleit, Eroglu, and Mantel, 2000). Similarly, higher levels of human density can act as an informational cue to communicate the social acceptance of "underdog" and "top dog" firms. For example, Shirai (2017) demonstrated that crowded environments increase the acceptance of underdog brands in hedonic domains and of top dog brands in high-risk consumptions. Human density can also have a positive impact on consumer evaluations because crowded environments stimulate consumers to escape from interaction with others. As a result, individuals tend to restore their need for belongingness by showing more attachment to brands (Huang, Huang, and Wyer, 2017).

1.2. Personal and situational factors

Personal and situational factors can influence the relationship between density and consumer reactions. Individuals can have a lower or higher innate tolerance for crowding. Some consumers tend to enjoy and seek crowded stores, while others chronically avoid the crowd (Machleit, Eroglu, and Mantel, 2000). Accordingly, individuals react in different ways to emotional arousal and uncertainty (Krohne, Hock, and Kohlmann, 1992), and show heterogeneous levels of ability to adapt their behavior in high-density situations. Tolerant individuals are less likely to experience the negative feelings associated to perceived crowding. On the opposite, a low level of tolerance causes intransigence toward crowded situations. For low-tolerance consumers, human density is negatively correlated with hedonic and utilitarian shopping value (Eroglu, Machleit, and Barr, 2005).

Similar consequences are observed in individuals with a low vs. high desire for control (Van Rompay et al., 2008). People with a higher desire for control

are more influenced by the presence of others and tend to react with negative emotions to the perceived inability to control events (Burger and Cooper, 1979). For example, people who score high in desire for control tend to demonstrate more discomfort when they have to coordinate their movements with others' (Burger, Oakman, and Bullard, 1983), as in high-density situations (Harrell, Hutt, and Anderson, 1980). Van Rompay et al. (2008) empirically demonstrated that the negative relationship between human density and satisfaction emerges only for individuals with high desire for control. Following this idea, other studies suggested that the optimal social stimulation level (Altman, 1975) is a specific personality trait, which determines the preferred number of other customers (Mehta, Sharma, and Swami, 2013). People differ in arousal-seeking disposition, and a higher optimal social stimulation level leads to higher preference for stimulant and heterogeneous environments (Grossbart et al., 1975). Mehta, Sharma, and Swami (2013) demonstrated reverse U-shaped effects of perceived crowding on pleasure, arousal, store evaluation, and merchandise evaluation for individuals with a high level of optimal social stimulation. On the contrary, these same effects are mostly negative for subjects with lower levels of optimal social stimulation.

Consumer reactions to crowding can vary depending on the chronicle need for affiliation of individuals (Van Rompay et al., 2012), which involves seeking and enjoying human interaction with other people (Hill, 1987). In high-density situations, therefore, individuals with higher need for affiliation are prone to increase their purchases and spending (Van Rompay et al., 2012). Also, consumers who feel to be socially excluded tend to appreciate crowded situations, showing higher intention to browse and willingness to spend (Thomas and Saenger, 2019).

Specific situational factors can also play a relevant role in determining consumer reactions to crowding. Time pressure can determine lower tolerance to higher levels of human density (Eroglu and Machleit, 1990; Pan and Siemens, 2011). Similarly, task-oriented consumers tend to perceive higher crowding feelings than non-task oriented consumers, holding human density constant (Eroglu and Machleit, 1990). Finally, in retail settings, the expectations of a certain level of human density can influence evaluations. Confirmation or positive disconfirmation of expectations (the actual level of human density is lower than expected) has positive effects on satisfaction. Differently, if expectations are negatively disconfirmed (the actual level of human density is higher than expected), one can observe a negative effect on satisfaction (Oliver, 1993; Machleit, Kellaris, and Eroglu, 1994; Machleit, Eroglu, and Mantel, 2000).

1.3. Social factors

The role of social factors must be considered to fully understand the effects of crowding on consumer reactions since the relations with the other people in the crowd can be rewarding or not rewarding (Van Rompay et al., 2012). According to self-categorization theory (Turner et al., 1987; Turner et al., 1994), individuals have a series of social identities, which diverge in salience based on the context. People tend to categorize themselves using a series of variables, such as age, gender, personality, and to create in-group and out-group classification of others (Turner, 1982). The process of social categorization acts as a cognitive instrument to segment the social environment, and allows individuals to evaluate alternative forms of social actions (Tajfel, 1972).

The consumer behavior literature identifies three main types of social groups (Escalas and Bettman, 2003; Escalas and Bettman, 2005; White and Dahl, 2007):

- *in-groups* are social groups to which individuals belong and are members of;
- *aspirational groups* are social groups to which individuals do not belong but desire to be affiliated with;
- *dissociative groups* are social groups to which individuals do not belong and do not desire to be affiliated with.

In-groups and aspirational groups share a positive valence, while dissociative and aspirational groups represent two different forms of out-groups. Social groups can have a strong impact on evaluations and choices since consumers seek affiliation to or dissociation from other group members for accomplishing self-verification and self-enhancement goals (Escalas and Bettman, 2003). For example, the brands used by in-group and aspirational group members influence the strength of the individual self-brand connections, for accomplishing self-verification and self-enhancement goals, respectively (Escalas and Bettman, 2003). Conversely, products associated with a dissociative group have a negative impact on self-brand connections (White and Dahl, 2007). Similarly, the proximity and cooperation with members of positive social groups allow meeting self-verification and self-enhancement needs, determining greater satisfaction (Tsui and O'Reilly, 1989). In fact, individuals desire to be psychologically proximal to in-groups and aspirational groups' members, and desire to be distant from dissociative group's members. When the wish for psychological proximity is coherent with the physical closeness with others, the experience turns out to be enjoyable. On the contrary, if individuals consider their own identities to be distant

from others', physical proximity can lead to adverse outcomes (Novelli et al., 2013). For example, Schultz-Gambard (1979) observed that an increase in the number of in-group members is positively-valenced and do not lead to adverse outcomes, such as anxiety and insecurity, usually observed in crowded conditions. Moreover, Novelli et al. (2013) demonstrated that sharing a common identity with other participants to outdoor events (music concert and marathon) has a negative effect on the crowding perception, leading to a more enjoyable experience. On the opposite, Glick, DeMorest, and Hotze (1988) observed that proximity to a dissociative out-group member generates higher anxiety compared to an in-group member.

2. Conceptual model and hypotheses

In our conceptualization, we apply the concept of social-identification to the study of the relationship between human density and consumer reactions. Specifically, we hypothesize different effects of human density on willingness to stay in the store and vice *vs.* virtue choices depending on the social groups of other customers composing the crowd. In the following sections, we outline the arguments leading to the formulation of our hypotheses.

2.1. Willingness to stay and human density

Willingness to stay is one of the most important variables in retailing since it captures consumer intention and satisfaction (Hedrick, Beverland, and Oppewal, 2005). The desire to stay is considered an approach behavior, while the desire to leave is viewed as an avoidance one (Mehrabian and Russell, 1974). Prior research demonstrated the existence of a reverse U-shaped relationship between human density and willingness to stay in the store (Mehta, Sharma, and Swami, 2013). We elaborate on this relationship considering the roles of social factors. Specifically, we propose that, in presence of in-group and aspirational group members, human density has a positive effect on willingness to stay due to the accomplishment of self-verification and self-enhancement goals, respectively. A higher density of in-group and aspirational group members satisfies the two goals, thus leading to higher willingness to stay in the crowded context. In presence of dissociative group members, human density has a negative effect due to the higher demand for personal space and to the desire to avoid associations with the other customers, which threatens self-verification goals. Individuals who fail to fulfil self-

verification goals face dissatisfaction, discomfort, distress (Burke, 1991), and a reduction of self-esteem (Cast and Burke, 2002). Based on these arguments, we hypothesize that the type of social group in the crowd moderates the relationship between human density and willingness to stay in the store. Formally:

H1: *The effect of human density on willingness to stay is moderated by the type of social group to which other customers in the store belong to. Specifically:*
a) when the crowd is composed of in-group or aspirational group members, the relationship between human density and willingness to stay is positive;
b) when the crowd is composed of dissociative group members, the relationship between human density and willingness to stay is negative.

2.2. Vice vs. Virtue choices and human density

Given the importance of eating habits on consumer health, in the last decade, marketing research has increasingly focused on the factors that can influence food choices (Parker and Lehman, 2014). Wertenbroch (1998) defines products leading to higher short-term benefits (immediate pleasure) as vice products and products allowing to maximize long-term payback (delayed utility) as virtue products. This definition applies to all choices in which a consumer has to compare an unhealthy, tastier option with a healthy, less tasty alternative.

Current research emphasizes that high human density decreases the ability of the consumer to process resources, leading to the consumption of more caloric food (Hock and Bagchi, 2017). A reduction of available cognitive resources jeopardizes self-control, thus leading to more impulse purchases (Vohs and Faber, 2007), higher calories' intake, and preference for more caloric food (Hock and Bagchi, 2017). In other words, human density works as a distractor, and the resulted cognitive overload does not allow pursuing the long-term benefits guaranteed by healthier food. Thus, high human density obstacles the choice of virtue food and facilitate the consumption of vice items.

However, these effects of density may change depending on the social group which composes the crowd. Previous research underlined that the presence of other individuals can encourage or suppress the desire of eating higher quantity of food (Herman, Roth, and Polivy, 2003). In presence of aspirational group members, self-enhancement goals can drive individuals to vary food consumption, because of the desired impression that they want to

convey to others. As human density increases, impression management motives lead to the consumption of virtue products. In presence of dissociative group members, the proximity with other consumers threatens self-verification goals leading to psychological distress and lower self-esteem, which are associated with higher consumption of vice alternatives (Kandiah et al., 2006; Macht, 2008). Previous research demonstrated that stressful conditions are indeed associated with higher cortisol reactivity and consumption of vice food (Epel et al., 2001). Thus, as human density increases, the consumer is less inclined to prefer virtue products. In the case of in-group members, it is not possible to define a clear prediction because impression management motives are less intense than in presence of aspirational group members. At the same time, the potential negative effect of human density may be attenuated by the positive valence of in-group members. The net effect of the two opposite drivers may lead to a null effect. Overall, we predict that the type of social group moderates the effect of human density on vice vs. virtue choices. Formally:

H2: The effect of human density on vice vs. virtue choices is moderated by the type of social group to which other customers in the store belong to. Specifically:
a) when the crowd is composed of aspirational group members, the relationship between human density and choice of virtue products is positive;
b) when the crowd is composed of dissociative group members, the relationship between human density and choice of virtue products is negative.

3. Methodology

Participants and experimental design. Four hundred and ten UK respondents (M_{age} = 36.65, SD_{age} = 9.26, Female = 67.9%) were recruited from Prolific Academic and participated in an online study in exchange of a small compensation. Participants were randomly assigned to one condition of a 3 (human density: low *vs*. medium *vs*. high) x 4 (social group: in-group *vs*. aspirational *vs*. dissociative *vs*. control) between-subjects design. After reading a brief definition of social groups and few examples, participants indicated their personal and most relevant in-group *vs*. aspirational group *vs*. dissociative group and provided a description of that group. For example, participants indicated supporters of their favourite football teams and people with similar hobbies as in-groups; professional actors/musicians and sport professionals as aspirational groups; supporters of rival football teams and

voters of a specific political party as dissociative groups. Participants in the control condition were not involved in this task. Human density was manipulated designing a café by means of the ArchiCAD 19 software, which allowed us to create visual representations of the café that were perfectly equal to each other, but for the number of present customers. The choice of manipulating human density by means of visual stimuli is in line with previous experimental research in the crowding literature (e.g., Eroglu and Machleit, 1990; Pan and Siemens, 2011; Huang, Huang, and Wyer, 2017; Hock and Bagchi, 2017). The low-, medium-, and high-density conditions included 3, 9, and 27 customers, respectively. As an example, figure 1 shows the picture used in the high-density conditions.

Figure 1 – Rendering of the café in the high-density conditions

Participants were exposed for a fixed amount of time (15 seconds) to the image of the café. We specified that the other customers were members of the chosen group. Participants in the control conditions were only asked to see the image of the café, with no specification on the identities of the other customers. Participants were then invited to guess how many customers there were in the café, and to indicate their willingness to stay in the café ("*I would like to enter in and stay for the evening in this café*", 7-point, Likert scale).

Next, participants entered a vice-virtue task, and chose between a tastier, less healthy *vs*. less tasty, healthier alternative for five pairs of products. To arrange the five pairs, we conducted a pre-test study with a different set of participants. Seventy-eight undergraduate students (M_{age} = 19.55, SD_{age} = 1.43, Female = 42.3%) at a Dutch university participated in the pre-test in

exchange of partial course credits. They evaluated 21 products typically offered in a café on tastiness (1 = *not at all tasty*, 7 = *very tasty*), healthiness (1 = *very unhealthy*, 7 = *very healthy*), and association with impulse/deliberate choices (0 = impulsive purchase, 10 = deliberate purchase). The selected products were then coupled in order to present pairs of products that were statistically different (all *ps* < .05) on the three scales, and thus to present a tastier and impulse-related product *vs.* a healthier and deliberate-related product. The five pairs selected for the main study were: hot chocolate *vs*. herb tea, pizza slice *vs*. Greek salad, chocolate cake *vs*. frozen yogurt, beef burger *vs*. turkey sandwich, chocolate bar *vs*. muesli bar. As manipulation checks of the social groups, participants indicated how much they liked the chosen social group (1 = *strongly dislike*, 9 = *strongly like*). Participants in the control condition indicated the extent to which they considered the other customers in the café dissimilar from or similar to them (1 = *very different from me*, 9 = *very similar to me*). Finally, they reported if they have any dietary constraints (e.g., vegetarian, vegan, gluten intolerant) and socio-demographic information.

Manipulation check. A one-way ANOVA confirmed the success of the manipulation of the social groups (M_{in} = 7.67, M_{diss} = 2.88, M_{asp} = 7.46, $F(2,286) = 215.72$, $p < .001$). Participants indicated that they like more the chosen in-group *vs*. the dissociative group ($t(155) = 16.98$, $p < .001$) and the aspirational group *vs*. the dissociative group ($t(159) = 16.05$, $p < .001$). The means of the two positive groups did not differ statistically ($t(189) = 1.00$, $p = .32$). Also, respondents in the control condition did not rated the other customers in the café as neither similar nor dissimilar to them (test value = 5, $t(100) = 0.866$, $p = 0.39$).

4. Results

Willingness to Stay (WtS). Results of a two-way ANOVA indicated significant main effects of human density ($F(2,398) = 6.915$, $p = .001$) and social group ($F(3,398) = 10.01$, $p < .001$). The main effects were qualified by a significant interaction effect ($F(6,398) = 2.725$, $p = .013$). Means and standard deviations are reported in Table 1.

Table 1 – Means and standard deviations of willingness to stay in the experimental conditions

Social group	Human Density		
	Low	**Medium**	**High**
In-group	3.25 (1.34)	3.82 (1.38)	4.63 (1.31)
Dissociative	3.32 (1.22)	3.06 (1.41)	3.06 (1.54)
Aspirational	3.57 (1.38)	4.18 (1.53)	4.58 (1.25)
Control	3.06 (1.24)	3.72 (1.49)	3.43 (1.59)

Planned comparisons revealed that, when the crowd is composed of in-group members ($M_{HighDensity\text{-}LowDensity}$ = 1.379, $F(1,398) = 16.178$, $p < .001$) or members of the aspirational group ($M_{HighDensity\text{-}LowDensity}$ = 1.017, $F(1,398) = 8.613$, $p = .004$), higher human density leads to a higher WtS, thus supporting H1a. In the dissociative group conditions, we observed a slight decrease of WtS as human density increases, but this contrast was not significant ($M_{High\text{-}Density\text{-}LowDensity}$ = -0.261, $F(1,398) = .572$, $p = .45$). This evidence does not provide support for H1b. In the control condition, human density does not affect WtS ($M_{HighDensity\text{-}LowDensity}$ = 0.377, $F(1,398) = 1.320$, $p = .251$).

Vice-Virtue[1]. We summed the choices of virtue products (coded as 1) for each participant (M_{virtue} = 1.46, SD_{virtue} = 1.31). Results of a two-way ANOVA indicated that the main effects of human density ($F(2,376) = 1.39$, $p = .25$) and social group ($F(3,376) = 1.096$, $p = .351$) were not significant. However, the interaction effect was significant ($F(6,376) = 4.459$, $p < .001$). Means and standard deviations are reported in Table 2.

Planned comparisons revealed that, for the aspirational group, an increase in human density leads to choose a higher number of virtue products ($M_{High\text{-}Density\text{-}LowDensity}$ = 1.394, $F(1,376) = 18.479$, $p < .001$), thus supporting H2a. For the dissociative group, higher human density leads to a decrease in the choices of virtue alternatives ($M_{HighDensity\text{-}LowDensity}$ = -0.756, $F(1,376) = 5.090$, $p = .025$), thus confirming H2b. For in-group and control conditions, human density does not affect vice-virtue choice ($ps > .31$). Additionally, we observed that, in the high density condition, participants choose more healthy products in presence of aspirational members than of dissociative ones ($M_{Aspirational\text{-}Dissociative}$ = 1.505, $F(1,376) = 20.722$, $p < .001$) or control condition

[1] Twenty-two participants who indicated to have dietary restrictions were excluded from this analysis. Thus, the final sample for this analysis included 388 participants.

($M_{Aspirational\text{-}Control}$ = .644, $F(1,376) = 4.403$, $p = .037$). Also, the difference between dissociative and control condition is significant ($M_{Dissociative\text{-}Control}$ = -0.861, $F(1,376) = 7.054$, $p = .008$).

Table 2 – Means and standard deviations of virtue choices in the experimental conditions

Social group	Human Density		
	Low	**Medium**	**High**
In-group	1.32 (1.32)	1.59 (1.07)	1.35 (1.48)
Dissociative	1.65 (1.23)	1.36 (1.29)	0.89 (1.12)
Aspirational	1.00 (1.00)	1.50 (1.31)	2.39 (1.78)
Control	1.44 (1.32)	1.08 (0.91)	1.75 (1.18)

Results of the experimental study show that the type of social group is a relevant moderator in the relationship between human density and willingness to stay in the store. In presence of positive social group members (H1a), human density generates positive outcomes. Similarly, the effects of human density on vice *vs*. virtue choices is diametrically opposite depending on the presence of aspirational (H2a) and dissociative group members (H2b).

Overall, the reported evidence demonstrates that the inclusion of social factors in crowding research allows to better understand consumer outcomes and reveals that, varying the nature of the crowd, reactions to human density are different.

Conclusions

This research aims to establish if particular social factors, such as the type of people who compose the crowd, are able to moderate the relationship between human density and consumer willingness to stay and vice *vs*. virtue choices. Considering the state of the art, there is a disagreement in the literature regarding the effect of human density on consumer reactions (Mehta, Sharma, and Swami, 2013). Coherently with the definition of crowding perception (Stokols, 1972), human density can be considered only a necessary but not sufficient condition for the manifestation of the negative effects on consumer reactions. Despite previous research has mostly focused on indi-

viduals' personal factors that are able to moderate the effects of human density (Machleit, Eroglu, and Mantel, 2000; Van Rompay et al., 2008; Van Rompay et al., 2012; Mehta, Sharma, and Swami, 2013), social factors received little or null attention (Novelli et al., 2013). This research contributes to fill this gap in the literature, demonstrating that the study of the effects of human density has also to consider the relations of the consumers with the other people in the crowd. Results of an experimental study show that the impact of human density on willingness to stay is significant and positive only in presence of positive social group members. Moreover, the analysis on the vice *vs.* virtue choices revealed positive and negative effects of human density in presence of aspirational and dissociative group members, respectively. The presented results suggest that is not possible to individuate a universal effect of human density on consumer reactions. Social factors result to be significant moderators of these effects, and help to explain the presence of inconsistent evidence observed in the consumer behavior literature.

Managerial implications

This research offers some managerial implications. In our society, space has economic value (O'Guinn, Tanner, and Maeng, 2015). According to the prior research on crowding (Langer and Saegert, 1977; Harrell, Hutt, and Anderson, 1980; Hui and Bateson, 1991; Eroglu and Machleit, 1990), human density has a negative influence on consumer satisfaction. Thus, to avoid such negative consequence, managers should design stores aiming to obtain a people-per-square-meter ratio as low as possible. The present research demonstrates that, under specific conditions, more elevated levels of human density do not destroy consumer value, but can lead to more positive outcomes. Then, stores that are positioned to serve specific market clusters can create consumer value choosing lower dimensions for the store. Moreover, stores positioned around consumer aspirations (e.g., luxury retailers, high-end café) should offer a wider range of healthy alternatives, since consumer demand will be oriented toward these products. In addition, this research offers insights to managers operating in e-commerce businesses. Previous studies have demonstrated that the effects of human density on consumer behavior are observable also evoking a crowded mindset (Hock and Bagchi, 2017). Considering our results, companies using e-commerce platforms could elicit human density and positively-valenced groups by means of visual stimuli to gather better attitudinal and behavioral responses to products and services.

Limitations and directions for future research

This research suffers from some limitations that may be addressed in future research. First, we considered only one context, a café, typically associated with leisure situations. It is not possible to exclude that, changing the type of store, we would observe a lower tendency to tolerate the crowd. In low leisure situations (e.g., shopping in a supermarket), the positive effects of the in-group and aspirational group members and the adverse reaction to the dissociative group members may be exacerbated. Second, the present research does not provide empirical evidence on the processes explaining why human density affect willingness to stay and vice *vs.* virtue choices in presence of different type of social groups. The three drivers identified in the literature are the overload factor (Hock and Bagchi, 2017), the impression management relevance (Herman, Roth, and Polivy, 2003), and the emotional states hypothesis (Macht, 2008). Future research can replicate this study in a different context, including the measurements of the possible mediators. Third, we employed only visual stimuli to manipulate the levels of human density. Despite this choice is coherent with previous research in crowding literature (e.g., Pan and Siemens, 2011; Hock and Bagchi, 2017), future research may concern a replication of our study in a real shopping context. For example, a field study in a supermarket would allow to measure the levels of human density objectively and to register a series of behavioral outcomes, such as consumer choices and shopping duration. Alternatively, the levels of human density could be manipulated in a new laboratory study by means of alternatives to visual stimuli, such as textual information on the number of other consumers who choose a particular product or service in e-commerce platforms. Finally, future research could explore the moderating role of social groups in the relationship between human density and other outcomes. In a recent contribution, Consiglio, De Angelis, and Costabile (2018) demonstrated that higher levels of human density increase consumer word-of-mouth and social media activities. Future research can test if such effect is influenced by social factors.

In conclusion, human density is a ubiquitous factor in many market contexts, and this study suggests to researchers and practitioners that the analysis of its relationship with consumer outcomes cannot exclude the relevance of social factors.

References

Altman I. (1975). *The Environment and Social Behavior: Privacy, Personal Space, Territory, and Crowding*. Monterey, CA: Brooks/Cole.

Burger J. M. and Cooper H. M. (1979). The desirability of control. *Motivation and Emotion*, 3(4): 381-393. DOI: 10.1007/bf00994052.

Burger J. M., Oakman J. A. and Bullard N. G. (1983). Desire for Control and the Perception of Crowding. *Personality and Social Psychology Bulletin*, 9(3): 475-479. DOI: 10.1177/0146167283093017.

Burke P. J. (1991). Identity Processes and Social Stress. *American Sociological Review*, 56(6): 836. DOI: 10.2307/2096259.

Buss A. H. (1980). *Self-consciousness and Social Anxiety*. Freeman.

Cast A. D. and Burke P. J. (2002). A Theory of Self-Esteem. *Social Forces*, 80(3): 1041-1068. DOI: 10.1353/sof.2002.0003.

Consiglio I., de Angelis M. and Costabile M. (2018). The Effect of Social Density on Word of Mouth. *Journal of Consumer Research*, 45(3): 511-528. DOI: 10.1093/jcr/ucy009.

Diener E. (1979). Deindividuation, self-awareness, and disinhibition. *Journal of Personality and Social Psychology*, 37(7): 1160-1171. DOI: 10.1037/0022-3514.37.7.1160.

Epel E., Lapidus R., McEwen B. and Brownell K. (2001). Stress may add bite to appetite in women: a laboratory study of stress-induced cortisol and eating behavior. *Psychoneuroendocrinology*, 26(1): 37-49. DOI: 10.1016/s0306-4530(00)00035-4.

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

Eroglu S. A., Machleit K. and Barr T. F. (2005). Perceived retail crowding and shopping satisfaction: the role of shopping values. *Journal of Business Research*, 58(8): 1146-1153. DOI: 10.1016/j.jbusres.2004.01.005.

Escalas J. E. and Bettman J. R. (2003). You Are What They Eat: The Influence of Reference Groups on Consumers' Connections to Brands. *Journal of Consumer Psychology*, 13(3): 339-348. DOI: 10.1207/s15327663jcp1303_14.

Escalas J. E. and Bettman J. R. (2005). Self-Construal, Reference Groups, and Brand Meaning. *Journal of Consumer Research*, 32(3): 378-389. DOI: 10.1086/497549.

Glick P., Demorest J. A. and Hotze C. A. (1988). Keeping Your Distance: Group Membership, Personal Space, and Requests for Small Favors1. *Journal of Applied Social Psychology*, 18(4): 315-330. DOI: 10.1111/j.1559-1816.1988.tb00019.x.

Grossbart S. L., Mittelstaedt R. A., Curtis W. W. and Rogers R. D. (1975). Environmental sensitivity and shopping behavior. *Journal of Business Research*, 3(4): 281-294. DOI: 10.1016/0148-2963(75)90010-7.

Harrell G. D., Hutt M. D. and Anderson J. C. (1980). Path Analysis of Buyer Behavior under Conditions of Crowding. *Journal of Marketing Research*, 17(1): 45-51. DOI: 10.1177/002224378001700105.

Hedrick N., Beverland M. and Oppewal H. (2005). The impact of retail salespeople and store atmospherics on patronage intentions. ANZMAC conference.

Herman C. P., Roth D. A. and Polivy J. (2003). Effects of the Presence of Others on Food Intake: A Normative Interpretation. *Psychological Bulletin*, 129(6): 873-886. DOI: 10.1037/0033-2909.129.6.873.

Hill C. A. (1987). Affiliation motivation: People who need people… but in different ways. *Journal of Personality and Social Psychology*, 52(5): 1008-1018. DOI: 10.1037/0022-3514.52.5.1008.

Hock S. J. and Bagchi R. (2017). The Impact of Crowding on Calorie Consumption. *Journal of Consumer Research*, 44(5): 1123-1140. DOI: 10.1093/jcr/ucx088.

Holt D. B. (1995). How Consumers Consume: A Typology of Consumption Practices. *Journal of Consumer Research*, 22(1): 1. DOI: 10.1086/209431.

Huang X. (Irene), Huang Z. (Tak), and Wyer R. S. (2017). The Influence of Social Crowding on Brand Attachment. *Journal of Consumer Research*, 44(5): 1068-1084. DOI: 10.1093/jcr/ucx087.

Hui M. K. and Bateson J. E. G. (1991). Perceived Control and the Effects of Crowding and Consumer Choice on the Service Experience. *Journal of Consumer Research*, 18(2): 174. DOI: 10.1086/209250.

Kandiah J., Yake M., Jones J. and Meyer M. (2006). Stress influences appetite and comfort food preferences in college women. *Nutrition Research*, 26(3): 118-123. DOI: 10.1016/j.nutres.2005.11.010.

Krohne H. W., Hock M. and Kohlmann C. W. (1992). *Coping Dispositions, Uncertainty and Emotional Arousal*. Johannes-Gutenberg-Univ., Abt. Persönlichkeitspsychologie.

Lam S. Y. (2001). The Effect of Store Environment on Shopping Behaviors: a Critical Review. *Advances in Consumer Research*, 28: 190-197.

Langer E. J. and Saegert S. (1977). Crowding and cognitive control. *Journal of Personality and Social Psychology*, 35(3): 175-182. DOI: 10.1037/0022-3514.35.3.175.

Machleit K. A., Kellaris J. J. and 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. DOI: 10.1007/bf00994108.

Machleit K. A., Eroglu S. A. and Powell Mantel S. (2000). Perceived Retail Crowding and Shopping Satisfaction: What Modifies This Relationship? *Journal of Consumer Psychology*, 9(1): 29-42. DOI: 10.1207/15327660051044231.

Macht M. (2008). How emotions affect eating: A five-way model. *Appetite*, 50(1): 1-11. DOI: 10.1016/j.appet.2007.07.002.

Mehrabian A. and 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. DOI: 10.1016/j.jretconser.2013.06.002.

Mehta R., Sharma N. K. and 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. DOI: 10.1080/0267257x.2012.729075.

Novelli D., Drury J., Reicher S. and Stott C. (2013). Crowdedness Mediates the Effect of Social Identification on Positive Emotion in a Crowd: A Survey of Two Crowd Events. *PLoS ONE*, 8(11). DOI: 10.1371/journal.pone.0078983.

O'Guinn T. C., Tanner R. J. and Maeng A. (2015). Turning to Space: Social Density, Social Class, and the Value of Things in Stores. *Journal of Consumer Research*, 42(2): 196-213. DOI: 10.1093/jcr/ucv010.

Oliver R. L. (1993). Cognitive, Affective, and Attribute Bases of the Satisfaction Response. *Journal* of *Consumer Research*, 20(3): 418. DOI: 10.1086/209358.

Pan Y. and 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. DOI: 10.1016/j.jbusres.2010.02.011.

Parker J. R. and Lehmann D. R. (2014). How and When Grouping Low-Calorie Options Reduces the Benefits of Providing Dish-Specific Calorie Information. *Journal of Consumer Research*, 41(1): 213-235. DOI: 10.1086/675738.

Pons F., Laroche M. and Mourali M. (2006). Consumer reactions to crowded retail settings: Cross-cultural differences between North America and the Middle East. *Psychology and Marketing*, 23(7): 555-572. DOI: 10.1002/mar.20146.

Schultz-Gambard J. (1979). Social determinants of crowding. In: Gurkaynak M.E., editor, *Human Consequences of Crowding* (pp. 161-167). Springer US.

Shirai M. (2017). Underdog effects: the role of consumption domain and retail crowding. *Journal of Consumer Marketing*, 34(5): 384-392. DOI: 10.1108/jcm-07-2016-1872.

Stokols D. (1972). On the distinction between density and crowding: Some implications for future research. *Psychological Review*, 79(3): 275-277. DOI: 10.1037/h0032706.

Tajfel H. (Ed.). (1972). *Social Identity and Intergroup Relations*. Cambridge: Cambridge University Press.

Thomas V. L. and Saenger C. (2019). Feeling excluded? Join the crowd: How social exclusion affects approach behavior toward consumer-dense retail environments. *Journal of Business Research (forthcoming)*. DOI: 10.1016/j.jbusres. 2018.12.064.

Tsui A. S. and O'reilly C. A. (1989). Beyond Simple Demographic Effects: The Importance of Relational Demography in Superior-Subordinate Dyads. *Academy of Management Journal*, 32(2): 402-423. DOI: 10.5465/256368.

Turner J. C. (1982). Toward a cognitive redefinition of the social group. In: Tajfel H., editor, *Social identity and intergroup relations* (pp. 15-40). Cambridge: Cambridge University Press.

Turner J. C., Hogg M. A., Oakes P. J., Reicher S. D. and Wetherell M. S. (1987). *Rediscovering the social group: A self-categorization Theory*. Basil Blackwell.

Turner J. C., Oakes P. J., Haslam S. A. and McGarty C. (1994). Self and Collective: Cognition and Social Context. *Personality and Social Psychology Bulletin*, 20(5): 454-463. DOI: 10.1177/0146167294205002.

Uhrich S. (2011). Explaining non-linear customer density effects on shoppers' emotions and behavioral intentions in a retail context: The mediating role of perceived control. *Journal of Retailing and Consumer Services*, 18(5): 405-413. DOI: 10.1016/j.jretconser.2011.06.002.

Uhrich S. and Luck M. (2012). Not too many but also not too few: Exploring the explanatory mechanisms for the negative effects of low customer density in retail settings. *Qualitative Market Research: An International Journal*, 15(3): 290-308. DOI: 10.1108/13522751211231996.

Uhrich S. and Tombs A. (2014). Retail customers' self-awareness: The deindividuation effects of others. *Journal of Business Research*, 67(7): 1439-1446. DOI: 10.1016/j.jbusres.2013.07.023.

Rompay T. J. L. van, Galetzka M., Pruyn A. T. H. and Garcia J. M. (2008). Human and spatial dimensions of retail density: Revisiting the role of perceived control. *Psychology and Marketing*, 25(4): 319-335. DOI: 10.1002/mar.20211.

Van Rompay T. J. L., Krooshoop J., Verhoeven J. W. M. and Pruyn A. T. H. (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. DOI: 10.1016/j.jbusres.2011.08.005.

Vohs K. D. and Faber R. J. (2007). Spent Resources: Self-Regulatory Resource Availability Affects Impulse Buying. *Journal of Consumer Research*, 33(4): 537-547. DOI: 10.1086/510228.

Wertenbroch K. (1998). Consumption Self-Control by Rationing Purchase Quantities of Virtue and Vice. *Marketing Science*, 17(4): 317-337. DOI: 10.1287/mksc.17.4.317.

White K. and Dahl D. W. (2007). Are All Out-Groups Created Equal? Consumer Identity and Dissociative Influence. *Journal of Consumer Research*, 34(4): 525-536. DOI: 10.1086/520077.