CROWDING AND MENTAL REPRESENTATION

by

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To my parents Haeng-il Maeng and Yungja Chung
and my husband Ted Grabarczyk
for their unconditional love and support

Chapter 1

INTRODUCTION

Many decisions are made in social environments in the presence of others, oftentimes when socially crowded, such as in retail stores or offices. As store environments vary depending on day of the week and time of day, typically more crowded in the evenings and on weekends and less crowded in the mornings and on weekdays, level of crowdedness could be seen to have consequences on decision making.

Despite the importance of understanding the influence of social cognition on decision-making, our understanding of how consumer decisions are made in these crowded environments is limited, as current decision theories do not take social contexts into account. Therefore, my dissertation works to address this gap, examining the influence of the salient social context of crowding on consumer decision-making, specifically the ways in which crowding changes the mental representation of objects. In this dissertation, I present two ways of examining social crowding - perceptions of crowding and social density – and two ways observing mental representation - levels of construal and representation of valuation.

This dissertation makes two significant theoretical contributions to the field of consumer research. First, it demonstrates the decision consequences of being crowded, a topic thus far not investigated. While previous research has shown the consequences of both spatial confinement in variety seeking (Levav and Zhu, 2009) and consumer density in attenuating consumer intentions of remaining in the store (Hui and Baterson, 1991), the influence of social crowding on consumer behavior potentially goes far beyond these effects. Furthermore, to fully understand the consequences of crowding on consumer decision-making, I examine downstream

consequences of both perception of crowding due to personal space violation and social density of a given space. The concepts of crowding and density are thus far heavily confounded in consumer research; however, evidence shows a clear distinction between the two. While crowding is usually defined as a negative psychological state that may or may not accompany dense spacing, and density is defined as a conscious judgment of space per person (Stokols 1972; Loo 1978; Loo and Kennelly 1979), this dissertation teases apart these constructs and examines influences of both crowding and density in the modulation of mental representation of products. Across two essays, I demonstrate that defensive states under crowding lead people to rely more on concrete representations, thus modulating construal level (Essay 1), and that crowding lowers reference points and therefore modulates willingness to pay (Essay 2).

Essay 1 explores whether the social crowdedness of an environment influences the way individuals mentally construe objects. I propose a novel motivational explanation where fundamental motivational states (approach-avoid) modulate construal level. I demonstrate that individuals in crowded environments tend to rely on concrete low-level construals, while those in less crowded environments utilize more abstract high-level construals. I further evidence the mechanism under this effect as defense system, which evolved to deal with threats to physical survival and is likely to be activated as part of a self-protection mechanism. Over multiple studies, I demonstrate that crowdedness leads individuals to identify actions as lower level construals, use narrow category breadth, and prefer products with feasible features. Theoretically, a novel perspective of construal level theory is provided, demonstrating that an evolutionally significant affective state modulates level of construal.

Essay 2 examines the role social density plays in the ways consumers evaluate both humans and objects in the same space. Multiple studies demonstrate that as the level of social

density increases, consumers display a lower willingness to spend, perceive identical but ambiguous products as being less expensive, and subsequently recall a fixed price product as having been less expensive. It is further shown that judgment of a typical customer in the same context mediate these effects, with increasing social density leading individuals to infer the typical deal –prone customer. This inferred person judgment, in turn, influences inferences made about products presented in the same context. Theoretically, a novel perspective of context effects is given, showing that social context, in addition to externally presented other prices, can serve as reference points and alter willingness to pay.

The first part of my dissertation (Essay 1) focuses on the theories of crowding, defense system, and mental representation in the fields of marketing, social psychology, and cognitive psychology. Chapter 2 reviews research on crowding and personal space violation. Chapter 3 reviews defense states and attentional consequences, and Chapter 4 reviews mental representation-related theories. Following the literature review, Chapter 5 introduces my main proposition and presents specific hypotheses. Next, a series of ten studies are reported, in which the effect of crowding on mental representation was tested across various marketing contexts including action identification (Chapter 6; Experiments 1 and 2), construal of product features (Chapter 7; Experiments 3 to 6), and product categorization (Chapter 8; Experiments 7 to 10).

The second part of my dissertation (Essay 2) focuses on the theories of anchoring effects and the influence of semantic anchoring on willingness to pay. Chapter 10 introduces research on willingness to pay, semantic anchoring and selective accessibility and the contextual influences on social judgments. Following the literature review, Chapter 11 introduces my main proposition and presents specific hypotheses, followed by a series of 5 experiments examining the effect of social density on willingness to pay (Chapter 12; Experiments 13 to 17).

Throughout the first part of this dissertation, I employ diverse methods to assess the influence of crowding on mental representation. Across the experiments, I utilize a variety of manipulations of crowding, including two different priming techniques, actual social crowding in a laboratory setting, and a field experiment. All these manipulations lead to the same core result, namely that participants think more concretely in a crowded environment, whereas participants in a less crowded environment tend to think more abstractly. Specifically, I demonstrate that social crowding leads participants both to prefer products featuring feasibility (as opposed to desirability) orientated attributes, and to generate less inclusive categories when categorizing products. The second part of this dissertation also employs diverse methods to assess the influence of social density on willingness to pay. Across the experiments, I utilize various measurement of willingness to pay from a scale to a behavioral auction. All these measurements lead to the same core result, namely that participants are less willing to pay for a product in a crowded store, whereas participants in a less crowded store tend to be more willing to pay (Essay 2).

ESSAY 1

Does a Crowded Store Lead to a Crowded Mind?

Crowding and Mental Construal of Product Features

Chapter 2

DEFINING SOCIAL CROWDING

2.1 Introduction

The topic of crowding has drawn interest from researchers for many decades. Most research considers crowding as a type of environmental stressor that generates negative consequences. For example, studies in animal populations reveal that high population densities are associated with undesirable phenomena such as ineffective mating behavior, decreased reproduction, heightened mortality, and social withdrawal (Calhoun, 1962; Christian, Flyer, and Davis, 1960; Aureli and de Waal, 1997). The findings from these animal studies were subsequently corroborated by human demographic studies which illustrated that as population density increases, crime rates increase (Schuessler, 1962; Christens and Speer, 2005), and other negative societal parameters, such as rates of mortality, infertility, juvenile delinquency, and admission to psychiatric institutions, have been shown to worsen as well (Galle, Gove, and McPherson, 1972).

However, laboratory studies revealed mixed results. Consistent with the aforementioned animal studies, some research showed that high social density leads to increased hostility (Griffitt and Veitch, 1971; Stokols et al., 1973), asocial behavior (Freedman et al., 1971; Stokols et al., 1973; Ittelson, Proshanskym and Rivlin, 1970; Griffit and Veitch, 1971), withdrawal (Baum and Valins, 1977), and decreased task performance (Glass and Singer, 1972). Other researchers, however, found that high social density did not increase hostility (Stokols et al., 1973; Freedman et al., 1971) and did not influence task performance (Freedman et al., 1971).

Given these mixed results, it was not clear whether the observed negative consequences were due to crowding or spatial confinement.

However, these contradictory results were subsequently explained by the findings delineating necessary components of crowding. As Stokols (1972) has argued, spatial confinement (in his term, nonsocial crowding) and social crowding need to be distinguished. Moreover, a majority of subsequent research on social crowding has argued that that personal space violation by crowding generates negative consequences, while simple density (i.e. spatial restrictions) does not (Freedman, 1975; Worchel and Teddlie, 1976), as arousal significantly contributes to the negative consequences (e.g., Valins and Baum, 1973; Altman, 1975; Evans, 1979). Indeed, as personal space intrusions are often cited as crowding in extant literature, crowding and personal space are often confounded in everyday life because settings judged to be crowded allow less space between adjacent individuals (McClelland and Auslander, 1978).

In my dissertation, I define social crowding as the subjective perception of crowdedness caused by physiological consequences (i.e., defensive reaction) as a result of personal space violation. In this chapter, I explain the key components in my definition of crowding, including 1) social (vs. nonsocial) components, 2) personal space violation (vs. simple density), and 3) motivational outcome of personal space violation.

2.2 Social Crowding versus Nonsocial Crowding

Stokols (1972) argued that nonsocial and social crowding need to be distinguished. Nonsocial crowding refers to perceptions of being confined that are caused by purely physical factors (such as ceiling height or aisle width in a retail setting). On the other hand, social crowding refers to the individual's awareness of spatial restriction in relation to the presence of other people, as well as his/her relationship with them. Social crowding is typically defined as a phenomenon that is related to the number of individuals that are active in a given physical space (Valins and Baum, 1973). While nonsocial crowding only considers the spatial restriction caused by physical variables, social crowding is determined both by the space available and by competition with others for scarce resources, such as space and materials (Stokols, 1972).

Indeed, the difference between nonsocial and social crowding has been shown in psychological research. This important distinction, first highlighted by Stokols (1972), was elegantly exposed by Desor (1972) who asked experimental participants to place as many scale model figures into scaled-down fiberboard rooms as was possible without overcrowding them. Manipulating whether the rooms contained partitions (which had no effect on overall density, but did lower the number of other figures each had line of sight to) suggested that perceptions of crowdedness appeared to be significantly determined by social stimulation, rather than a simple lack of space. These results clearly showed that inter-personal space—rather than the absolute size of space available—determines the level of crowding and that the judgment of crowding is governed by number of people rather than space available per person (Desor, 1972). As such, it appears to be excessive stimulation from a large number of people that increases the feeling of crowding.

Moreover, research has showed that the negative consequences associated with crowding, such as impaired performance, are in fact associated with social crowding but not simple spatial confinement. For example, studies which attempted to manipulate crowding by manipulating the size of the experimental room reported almost no experimental effects on task performance or affective behavior (e.g., Freedman et al., 1971). Stokols (1972) argued that the lack of effects in such studies was because room size manipulations have little effect on social crowding.

Differences in the effect of spatial versus social crowding have also been well reported in marketing contexts. Previous research on retail crowding in consumer research has been concerned with two major effects—antecedence and consequences—of retail crowding. Specifically, antecedents such as time pressure, perceived risk, and shopping motives (i.e., task shopping vs. browsing) have been shown to affect perceived crowding levels (Eroglu and Machleit, 1990). Consequences of retail crowding have been examined in terms of emotions (positive vs. negative), and shopping satisfaction (Machleit et al., 1990; 2000). It was found that while the effect of social crowding on shopping satisfaction is fully mediated by emotion, the effect of spatial crowding perceptions was only partially mediated by emotion, meaning that spatial crowding has a direct effect on satisfaction without mediating emotion (Machleit et al., 2000; Eroglu, Machleit, and Barr, 2005). Furthermore, in crowded stores, customers restrict themselves to superficial forms of interaction with store personnel and other shoppers, engage less in exploratory shopping, delay unnecessary purchases, and reduce shopping time (Harrell, Hutt, & Anderson, 1980).

2.3 Social Crowding, Personal Space, and Defensive State

Much research has found that negative consequences in crowded environments are caused by interaction distance (i.e., personal space violation) rather than pure density (e.g., Worchel and Teddlie, 1976). Research on human use of space flourished following investigations by Hall (1966), and personal space and crowding have been at the center of this exploration of space usage. Personal space was originally defined as "a small protective sphere or bubble that an organism maintains between itself and others" (Hall, 1966, p.112), with Dosey and Meisels (1969) emphasizing "the ownership" of personal space (p. 93). McDowell (1972) defined personal space as "a moveable territory which, when violated, may elicit defensive responses by the victim" (p. 210). The primary function of personal space is as a buffer protecting people from potential threats and overstimulation (Graziano and Cooke, 2006; Delevoye-Turrell et al., 2011). Distinct from territoriality, the concept of personal space refers to the temporary ownership of space in a public area, and this personal space is considered to be moveable territory that may induce defensive responses when violated (Goffman, 1963).

The commonality of these definitions is that individuals feel ownership over their personal spaces and react defensively when these spaces are violated. In animal research, this defensive behavior is represented as a threatened attack (e.g., Devore, 1965); however, the typical human response to these incursions seems to be defensive behaviors, which are usually represented as feelings of anxiety and psychological unease (Hall, 1966; Irwin, 1975). Consequently, empirical literature demonstrates that personal space violations lead to defensive states as measured by diverse behavioral measures, such as a flight response (Felipe & Sommer, 1966; McDowell, 1972), an aversive judgment of invasion (Baum, Riess, and O'Hara, 1974), avoidance and embarrassment and sitting arrangement (e.g., Barefoot, Hoople, and McClay,

1972). As personal space violations commonly occur in crowded environments, crowding research has converged with personal space research at both theoretical and methodological levels and has reported the defensive consequences of crowding.

2.3.1 Social Crowding and Avoidance Response

These defensive consequences have been shown in the research investigating the consequences of personal space intrusion in crowded public settings. Studies demonstrate that, for example, passengers are more likely to experience adverse reactions in a public train during rush hour when they are close to other passengers (Evans and Wener, 2007), office workers show more withdrawal behavior in an office with proximal workstations (Oldham and Fried, 1987), and shoppers do not stay long in crowded retail stores (Hui and Bateson 1991). Research that has examined the consequences of such crowding indicates that crowding can reduce shopper satisfaction and precipitate an earlier departure from the store (Eroglu et al., 2005; Hui and Bateson 1991).

Abundant evidence has shown that mere social crowding does appear sufficient to trigger an avoidance response. For example, being crowded leads to the typical physiological symptoms of an avoidant state, such as increased skin conductance, high arousal, and low experienced pleasure (Aiello et al. 1975; Worchel and Teddlie 1976; Schaeffer and Patterson 1980; Fanselow 1994; LeDoux 1990). Such responses to being crowded are not surprising since violations of personal space are clearly more likely to occur in socially crowded settings. Indeed, research on crowding and personal space has essentially converged at both the theoretical and experimental levels and has demonstrated that the degree of physical proximity to others is a more salient factor for experiencing crowding than raw density per se (see Worchel and Teddlie

1976; Sundstrom 1975). Most studies attribute these aversive consequences of personal space invasion to norm violations (e.g., Felipe & Sommer, 1966); however, we believe that crowding generated avoidance behavior may also have evolutionary significance.

2.3.2 Evolutionary Significance of Personal Space

The study of personal space and spatial perception in social contexts actually originated from observational research of the flight initiation distance maintained by animals. Hediger (1955) investigated social distance in animal populations and discovered that all species have a certain flight initiation distance below which the presence of others is considered an objective threat. He argued that, for any species, escape (i.e., securing personal safety) is biologically an even more urgent survival necessity than reproduction or nutrition. Therefore, all species naturally form boundaries of physical safety below which the presence of others is perceived as a potential threat. In his investigation, flight initiation distances were classified into levels, such as critical distance (attack boundary), personal distance (intra-species distance), and social distance (inter-species distance). Each level of flight distance generates distinct fight-flight responses when invaded, with moderate distance leading to flight response and critical distance to fight response. Furthermore, he observed that the size of this flight initiation distance did not appear to be a simple stimulus-driven reflex, but was determined by animals using their spatial cognition system to construct a boundary of safety around their bodies (Hediger, 1955). For example, one of the vital determinants of the size of social distance is one's own motor capacities, such that, according to optimal escape theory, an animal should begin to escape from a predator when the predator reaches a point at which the risk of it reaching the animal equals the behavioral cost to

escape (Ydenberg and Dill, 2006). This concept of spatial boundaries was later extended to human social behavior and the development of the construct of personal space.

That personal space violations lead to a fight or flight response seems likely to have been evolutionarily adaptive. After all, attacks from other humans have been one of the major threats to our survival (see Neuberg et al., 2011). Throughout history, humans have used surprise attacks to triumph in intra-group conflict and tribal warfare to impose maximum fatalities to others (Boyer and Bergstrom, 2011). As such, it is not surprising that personal space violations activate the defense system, which is believed to have evolved to deal with threats in the environment that threaten physical survival (Lang, Bradley, and Cuthbert, 1997). This defense system is known to have evolved from the flight-fight mechanism, and these defensive responses seem to be controlled specifically by the subcortical circuit involving the amygdala (Ursin, 1965; Blanchard and Blanchard, 1977). Indeed, recent neurological research has shown that personal proximity activates the amygdala (Kennedy et al. 2009). The activation of this defense system manifests as specific emotional states, such as fear and anxiety (Gray and McNaughton, 2000; McNaughton and Corr, 2004).

2.3.3 Emotional Consequences of Personal Space Violation

The key factor distinguishing fear and anxiety is certainty (i.e., immediacy vs. potentiality) of threat. In general, state of fear is supported by a set of behaviors elicited by a predator (urgency), and a state of anxiety sustains a set of risk assessments for uncertain threat (potentiality) (Blanchard and Blanchard, 1988; Gray, 1982; Gray and McNaughton, 1996). As such, intensity of perceived threat maps to different levels of an FFFS (fight-flight-freeze system) with inescapable threat (the smallest defensive distance), resulting in explosive attack, and

potential threats (intermediate defensive distances) resulting in freezing and flight. In humans, the psychological state at inescapable threat would be labeled panic. However, the psychological state at uncertain threat leads to risk assessment behavior which manifests as anxiety (McNaughton and Corr 2004). This emotional state is relevant for personal space violation, as threat is uncertain because the perceiver cannot immediately assess whether the invader is friend or foe. Indeed, abundant evidence has shown that social crowding does appear sufficient to trigger anxiety. For example, being crowded has been shown to lead to typical physiological symptoms of anxiety, such as increased skin conductance, high arousal, and low experienced pleasure (Aiello et al. 1975; Worchel and Teddlie 1976; Schaeffer and Patterson 1980).

2.4 Summary

In summary, I define social crowding as subjective perception of crowdedness that is caused by physiological consequences (i.e., defensive reaction) as a result of personal space violation. The key components in this definition are that personal space violation by intruders is due to crowding accompanied by avoidance motivational consequences. Because personal space is the zone of physical safety which has evolved to support our survival, the violation of this space inevitably entails defensive reactions to physical threats. Therefore, understanding how and when social crowding influences decision-making requires not only cognitive analysis but also emotional analysis. Drawing on the evolutionary perspective of personal space, I propose that personal space violation activates the defense system, which generates the subjective perception of crowding. Having the main construct defined, in the next chapter, I explain cognitive consequences of crowding-evoked defensive state.

Chapter 3

CROWDING, DEFENSE SYSTEM, AND ATTENTIONAL SCOPE

3.1 Introduction

As explained in the previous chapter, research has shown that the internal regulatory system reacts against crowding to avoid negative end states when individuals' personal space is violated in a crowded environment. As a consequence, defense motivation accompanied with negative arousal is likely produced as part of a self-protection mechanism. It is generally believed that programs of this system are designed to help us cope with and function adaptively in situations that recurred in our ancestral environment: identifying opportunities worth pursuing and signaling dangerous threats in which the wrong response would diminish fitness in the environment (Clore et al. 2001; Tooby and Cosmides 1990). Thus, this motivational state is known to have downstream consequences on human cognition through arousal activation.

This notion of crowding-generated arousal has been supported by empirical research, which has posited the existence of a stress or arousal factor associated with it. While little evidence suggests a relationship between simple spatial confinement and arousal, much evidence suggests that personal space violation by other people leads to arousal. Most studies tested task performances as a measure of stress-related arousal (Zajonc, 1965; Worchel and Teddlie, 1976; Evans, 1979; Schaeffer and Patterson, 1980), with some measuring physiological arousal (Aiello et al., 1975; Evans, 1979; Nicosia, 1979; McBride et al., 1965).

Using performance as a measure of arousal stems from drive theory. Drive theory assumes that social stimulation increases general drive (i.e., arousal) and enhances the individual's dominant response tendency more than competing response tendencies (Zajonc,

1965). As a consequence, social stimulus facilitates simple task performance and impairs complex task performance. Cottrell et al. (1968) argue that the social facilitation effect only occurs when an individual is in a position to evaluate his/her performance, suggesting that increased arousal by social stimuli is related to anxiety-related feelings. Blascovich, Mendes, and Salomon (1999) approached social facilitation as challenge and threat, demonstrating that presence of an audience hampered performance and increased cardiac and vascular activities. They attributed these effects to underlying motivational states by social stimulus (e.g., challenge and threat).

As a performance measure on social facilitation effects (Zajonc and Sales, 1966; Matlin and Zajonc, 1968), arousal in crowding studies was measured using primarily cognitive tasks (e.g., word association tasks) and latency of responses. For example, Evans (1979) found that participants in crowded environments show hampered performance in complex tasks, but not in simple tasks. Further, it was found that a crowded environment leads individuals to show poor performance on a group cooperation task, greater behavioral stereotypes, increased defensive postures, more remarks toward the door of the room, and, lastly, less tolerance for frustration. Similarly, Worchel and Teddlie (1976) measured stress induced by crowding using cognitive performance, measured by counting the number of words formed, and social evaluation, measured by rating other group members. The results show that individuals in crowded environments generated fewer words at a lower rate than participants in less-crowded environments. In their study on crowding effects, Schaeffer and Patterson (1980) evaluated arousal measurements and found that participants showed more frequent self-manipulative behaviors (e.g., scratching, grooming, wringing one’s hands, fiddling with keys or rings), poor

performance on a complex cognitive task, and a higher self-report of symptoms of nervous tension.

The other body of research directly measured arousal using physiological measures. For example, crowded environments led to higher skin conductance levels (Aiello, Epstein, and Karlin, 1975), and participants exposed to crowded environments showed significant elevations in blood pressure and pulse rate (Evans, 1979). As such, much evidence from previous research suggests that social crowding leads to higher levels of negative arousal.

Here, then, we have seen being crowded leads individuals to poor performance in general due to defense motivation accompanied with negative arousal, which inform our understanding of cognitive consequences of being crowded. Now we turn to more in-depth understanding of arousal and diverse models explaining arousal activation after which I discuss literature explaining cognitive consequences of it, specifically narrowing attentional scope.

3.2 Psychophysiological Arousal and Response

3.2.1 Theories of Arousal

Arousal has been a popular research topic in social psychology and has evolved over the last couple of decades from unidimensional to multidimensional models, and from chronic and temperament models to situational models. Earlier personality and social psychologists assumed arousal to refer to the degree of general or diffuse (unidimensional) physiological response (e.g., speed of heart rate, skin conductance activity) with synonyms including terms such as activation, excitation, and energization (Neiss, 1988). This concept was theorized by Cannon (1929), who defined arousal as a diffuse, nonspecific sympathetic release that is incorporated with a specific behavioral state—a "fight or flight" reaction. He believed arousal to be a physiological reaction associated with the automatically generated fight-or-flight response, including increased blood pressure and increase in muscular efficiency for quick energy. This view stresses the energy-releasing function of the sympathetic nervous system in automatic regulation.

Although such a unidimensional concept of arousal was initially considered convincing to explain phenomena, weaknesses of the concept came to light many years later (Fowles, 1980; Neiss, 1988). While early personality and social psychologists focused on the effect of arousal on behavioral efficiency, positing that efficiency level increases as arousal increases to some optimal level, it was later found that efficiency decreases as arousal continues to increase after the optimal point. This finding led researchers to explore individual differences of arousability (i.e, temperament). The construct of arousal has been at the center of several theories of temperament (e.g., Eysenck, 1967). For example, Eysenck (1967) has proposed that differences in autonomic arousal determine personality dimensions, such as extraversion-introversion and neuroticism-stability. The level of optimal stimulation for extroverts was posited to be higher

than introverts; therefore, introverts were considered as over-aroused and extraverts as under-aroused (Eysenck, 1967; 1990). This theorization was tested by verbal ability of introverts versus extroverts across different arousal conditions. The results showed that as level of arousal increases (using timing and caffeine intake), introverts decline in efficiency and performance while extroverts improve (Revelle, Amaral, and Turriff, 1976).

Modifying Eysenck's theory, Gray (1987) posited two new dimensions: impulsivity and anxiety. Gray's theory posits that high impulsivity leads to high sensitivity to reward and non-punishment, whereas high anxiety leads to high sensitivity to non-reward and punishment. In terms of neurophysiological-based definitions, impulsivity is equivalent to the behavioral approach system (BAS), whereas anxiety corresponds to the behavioral inhibition system (BIS) (Gray, 1987).

3.2.2 Multi-Dimensional Models of Arousal

While social psychologists were focusing on arousal as a unidimensional/heuristic construct, psychobiologists and neurobiologists were emphasizing specific biological stimuli and mechanisms delineating increasing differentiation and specificity in what originally appeared to be a nonspecific reticular activating system. The multi-dimensional construct of arousal developed when the notion of arousal as a base of temperament was challenged. Revelle et al. (1980) argued that introverts are not chronically more aroused than extroverts; rather, they argued, arousal is mediated by time of day and impulsivity. In line with the notion of situational arousal, Thayer (1978, 1986) and Tucker and Williamson (1984) theorized a multi-dimensional construct of arousal.

Thayer's Multi-dimensional Arousal Model

Thayer (1978, 1986) conceptualized that at least two separate energizing dimensions account for most behavioral variation, roughly characterized as energetic and tense arousal. Unlike extraversion and neuroticism, energetic and tense arousal are states rather than traits. Thayer's two-dimensional model differs from earlier conceptualizations in that these two separate dimensions (i.e., energetic and tense arousal; a.k.a. Dimension A and B) are seen as necessary to fully account for arousal states, and conditions exist under which these two dimensions are positively or negatively correlated.

Dimension A is believed to be a default mode and underlies most behavior, while Dimension B mediates defensive behavior at one extreme, including emergency energy mobilization, and reciprocal quiescent bodily reactions at the other extreme. Dimension B is approximately associated on one pole with subjective tension and, on the other, with placidity and stillness. This dimension is believed to underlie a variety of emotions and stress reactions. For example, it is connected with anxiety and the effects of at least one external stressor.

Activation of dimensions A and B are correlated with each other during most ordinary waking activities. However, during conditions leading to high tension, and also when individuals are experiencing high energy and vigor, dimensions A and B are believed to be negatively correlated. Tension-inducing conditions have their greatest consequence when energy-vigor is low and tiredness is high. On the other hand, tension-inducing conditions have least effect when Dimension A activation is high (Thayer 1986).

Tucker's Attentional Tuning Model

In the same vein, Tucker and Williamson (1984) emphasize the affective qualities of the brain arousal system. Their neuroscience model of arousal formulates a tonic activation system and phasic activation system based on the basic motivational mechanisms. A tonic activation system is suggested to have evolved from fight-flight mechanisms, where the role of attention is maintaining a vigilant posture in the face of threat. Accordingly, the tonic activation system is strongly engaged in facing a subjective experience of anxiety. This system is specifically reflected in the psychometric dimensions of negative affect and tense arousal. On the other hand, the phasic activation system is posited as having evolved from elementary orienting mechanisms and is associated with positive affect and energetic arousal.

Both tonic and phasic activation systems appear to be based on the reticular "arousal" system; however, the tonic activation system is believed to rely on activity within the dopaminergic systems, whereas the phasic activation system is thought to depend on the noradrenergic system (Tucker and Williamson 1984). The projections from the motivational circuitries of the limbic system are believed to control the dopaminergic and noradrenergic responses. Specifically, negatively aroused states such as anxiety would be expected to engage dopaminergic and left hemispheric processing systems, thus promoting attentional biases in favor of local aspects of the environment at the expense of global information. On the other hand, positive aroused states such as elation may recruit noradrenergic and right hemispheric systems (Tucker and Williamson, 1984). These brain arousal mechanisms are believed to be a part of self regulating the allocation of limited cognitive resources. By controlling the integration of perceptual information with working memory, these mechanisms may regulate the structure of instantaneous perception and cognitive strategy.

3.3 Defense System Activation and Attentional Consequences

3.3.1 Arousal and Attentional Focus

The behavioral and cognitive consequences of arousal have been studied in various domains, including behavioral responses more generally (e.g., Zillmann and Bryant, 1974), dominant behavioral responses more specifically (e.g., Zajonc, 1965), and cognitive consequences of physiological arousal, such as attention (e.g., Easterbrook, 1959), attributional reasoning (e.g., Mandler, 1975; Schachter and Singer, 1962), and arousal regulation (e.g., Fazio and Cooper, 1983). Although arousal is viewed as affecting a various domains, the present review concerns only cognitive consequences of arousal, specifically conceptual attention, which is based on Tucker and Williamson's (1984) arousal theory.

In one of the earliest and most influential conceptualizations of how motivation influences cognition, Easterbrook (1959) argued that defensive motivational states constrict the span of perceptual attention, leading to a focus on central (as opposed to peripheral) details in visual space, and for object perception to emphasize local rather than global aspects. Easterbrook argued that aversive motivational states, such as anxiety, are always accompanied by arousal,and that this arousal (e.g., anxiety) modulates perceptual attention. Based on Easterbrook's finding, later research focused on perceptual attention on visual space, and showed that the tension associated with avoidance motivational states narrows the scope of perceptual attention. As a consequence, individuals tend to focus on local detail rather than global structure of visual stimuli when they are aroused (see for e.g., Burke, Heuer, and Reisberg, 1992; Cacioppo, Berntson, and Crites, 1996). This proposition has since been broadly supported by a considerable number of studies, suggesting that psychological stress impairs either the speed or accuracy of response to peripheral visual cues (Bursill, 1958; Reeves and Bergum, 1972; Tyler and Tucker,

1982; Weltman, Smith, and Egstrom, 1971). Put differently, as Weltman et al. (1971) proposed, one way to conceptualize the effect of defensive motivational states is that it narrows the attentional beam via which we process our environment.

This possibility was subsequently addressed by Tucker and his colleagues (Derryberry and Tucker, 1994; Luu, Tucker, and Derryberry, 1998; Tucker and Williamson, 1984), who have integrated Easterbrook's original hypothesis into a broader theory of how motivation influences cognition. Tucker's attentional tuning model makes three core predictions. First, it predicts that aversive motivation not only reduces the scope of perceptual attention, but that it similarly narrows conceptual attention (e.g., remote associations to a given construct are less likely to be activated in memory). For example, when the scope of conceptual attention is narrowed, the activation of mental representation would be restricted to those with the highest accessibility, whereas when conceptual attention is broadened, activation expands. Indeed, Derryberry and Tucker (1994) demonstrated that avoidance-related defensive motivational states narrow the attentional scope, whereas approach-related states broaden the focus of attention at both the perceptual and conceptual level. Much evidence has demonstrated that anxiety narrows down attentional scope, restricting semantic scope. Spence (1958) showed that anxious subjects perform well in remembering words when the words are closely related, but not when the words were remotely related. As such, higher arousal impairs attentional span because fewer resources are available for the peripheral information sources.

Second, while Easterbrook focused on how aversive motivational states lead to a narrowing of attention, the attentional tuning model makes the reciprocal prediction: that approach motivational states (i.e., elated arousal) lead to a broadening of perceptual and conceptual scope. Tucker and Williamson (1984) separated types of arousal—the aforementioned

tonic and phasic activation systems—in the modulation of attentional scope. As the tonic activation system is suggested to have evolved from fight-flight mechanisms where the role of attention is maintaining a vigilant posture in the face of threat, this system is strongly engaged in facing with a subjective experience of anxiety. This system is specifically reflected in negative affect and tense arousal. Negatively aroused states such as anxiety would be expected to promote attentional biases in favor of local aspects of the environment and at the expense of global information. As such, these arousal systems are important in adjusting the overall scope (i.e., narrow vs. broad) of attention (Tucker and Williamson, 1984). However, this theory also predicts that arousal associated with approach motivational states broadens both perceptual and conceptual attentional scope. Specifically, while approach motivational states guide attention to global form by leading individuals to focus on the global information at the expense of the detailed information, avoidance motivational states automatically constrict the scope of attention and block access to remote constructs by leading individuals to focus on the local information at the expense of the global information. Finally, these biases in information processing are argued to be hard-wired, thus suggesting they may influence behavior automatically.

A considerable number of studies support the main predictions of the attentional tuning model. For example, Gasper (Gasper, 2004; Gasper and Clore, 2002) showed that inducing individuals to experience approach motivational states (i.e., happiness) rendered them relatively more likely to categorize complex figures (i.e., avon tasks) based on their global structure rather than on the basis of their local components. Regarding defensive motivation, Mikulincer, Kedem, and Paz (1990) found that both state and trait anxious participants were more likely to exclude possible exemplars from a given category. This latter result is particularly interesting, as the same category exemplar measure has been used in the construal level theory literature to

evidence changes in how individuals mentally construe their environment. Basso, Schefft, Ris, and Dember (1996) also found that individuals with trait happiness tend to rely on global as opposed to local structure in perceiving figures.

3.4 Summary

The literature reviewed above leads to several conclusions. First, social crowding induces tonic arousal (Tucker and Williamson, 1984), also known as Dimension B (Thayer, 1978; 1986), possibly only when the individual is in task-associated and competitive situations (Stokol, 1974). Second, one consequence of such tonic arousal is narrowed attentional scope (Derryberry and Tucker, 1997). Attentional scope here means both perceptual attention and conceptual attention; however, this dissertation focuses more on conceptual attention because it is related to mental representation as will be reviewed in the next chapter. The attentional tuning model (Tucker, 1997) has been tested in many studies and has demonstrated that defensive motivation inhibits access to unrelated conceptual constructs (e.g., Mikulincer, Kedem, and Paz, 1990; Foster et al., 2006). In short, social crowding narrows conceptual attention through increased arousal.

Chapter 4

LITERATURE REVIEW ON MENTAL REPRESENTATION

4.1 Introduction to Mental Representation

When making decisions, individuals rarely use the total information contained in their memory and the choice set; rather, only a subset of accessible knowledge normally enters the judgment and decision-making process. Factors that influence this accessibility essentially determine the type of mental representation used. Theories proposing modulations of construal level (e.g., Vallacher and Wegner, 1987; Liberman and Trope, 1998) and the previously mentioned attentional tuning model (Tucker, 1997) both suggest factors that influence mental representation, namely psychological distance and motivational state, respectively.

Recall that the attentional tuning model (Tucker, 1997) suggests that motivational states direct attention toward global or local details. Similarly, in theories predicting modulation of construal level (Vallacher and Wegner, 1987; Trope and Liberman, 2003), mental representation is normally characterized as high versus low, abstract versus concrete, feasible versus desirable, or visceral versus self-controlled. Specifically, high levels of construal form more abstract representations of entities, whereas low levels of construal shape concrete representations of entities. Accordingly, individuals represent an entity at a concrete level when conceptual attention is narrowed, whereas they form an abstract representation when conceptual attention is broadened (Rosch and Lloyd, 1978; Vallacher and Wegner, 1987).

Different levels of construal change the meaning of entities or events by forming different representations of them. For example, one can classify “a poodle” as “a pet,” which is a low level and concrete representation, or as “a mammal,” which is a high level and abstract

representation (Rosch and Lloyd, 1978). One also can construe a concrete action such as "waving a hand" as a more abstract representation such as "being friendly" (Vallacher and Wegner, 1987).

Moving from one level of representation to the other level of representation changes the meaning of objects by omitting or including detailed information. For example, moving from concrete (e.g., waving a hand) to abstract representation (e.g., being friendly) involves omitting some detailed features (e.g., using one's hands) (Semin and Fiedler, 1988). As such, abstract representations are more prototypical, schematic, and simpler than concrete representations because irrelevant and inconsistent details are omitted from the abstract representations once the method of interpretation is chosen (Fiske and Taylor, 1991; Smith, 1998). One could construct abstract representations at multiple levels, from less inclusive to more inclusive categories of objects, where more inclusive categories (abstract categories) are simpler than concrete categories because they have fewer features (Rosch and Lloyd, 1989).

Similarly, goals could be represented as more abstract, superordinate goals or more concrete, subordinate goals. When a certain action (e.g., studying for an exam) is represented in an abstract, superordinate level, the representation supplies an answer to the question of *why* the action is performed (e.g., to do well on the exam), whereas a concrete, subordinate level gives an answer of *how* the action is performed (e.g., by reading a text book) (Vallacher and Wegner, 1987). Although abstract representations include less unique information, they may also contain more general, high-level information in the larger context. Therefore, abstract representations not only diminish specific information but also give new meaning through the top-down process.

Researchers have suggested various factors modulating mental representation. Specifically, psychological distance—temporal, social, and spatial (Liberman and Trope, 1998;

Trope and Liberman, 2003)—and affective states (Isen and Daubman, 1984; Gasper and Clore, 2002) determine processing style and the way information is represented in the mind. According to these theories, psychologically distant entities or positive affective states lead individuals to construe an environment at a higher (and more abstract) level and with a more heuristic processing style than do proximal entities and negative affective states. I propose crowding as one of the antecedents of the modulation of mental representation. In the next section, I discuss the diverse measurements of construal level and implications of different mental representation in more detail.

4.2 Mental Representation: Levels of Construal

Theories of construal level explain the ways in which information is represented on different levels. Distinct representational effects of high and low levels of construal have been shown. Theories posit that high-level construals involve abstract conceptualization of information and capture the superordinate, central features of an object. On the other hand, low-construal level consists of subordinate, specific features. For example, when high-level construal are activated, individuals were found to use broad categories when asked to group several items, generating fewer, broader, and abstract units, but when low-level construal is activated, these individuals generated more narrow, concrete, and a higher number of units (Liberman, Sagristano, and Trope, 2002, Study 1). This is because high-level representations are more integrative and coherent, whereas low-level representations are more specific and disparate (Liberman et al., 2002; Nussbaum, Trope, and Liberman, 2003).

More important to this dissertation, construal level modulates individuals' judgment and decision-making. The theory posits that temporal distance shifts the overall attractiveness of an option by changing the weights of higher versus lower level attributes. Specifically, when high-level construals are activated, decision makers give more weight to high-level features (i.e., more desirable and abstract) in preference formation and decision-making. Conversely, when low-level construals are activated, more weight is given to low-level features (i.e., more feasible and concrete), and, as a result, preferences and decisions are based on those features.

The features of high versus low level construal have been tested regarding a variety of aspects. For example, different construal level activation leads to different weights on primary versus secondary features (Trope and Liberman, 2000), action identification (Vallancher and Wegner, 1987; Liberman and Trope, 1998, Study 1), category breadth (Liberman et al., 2002,

Study1), principles and values (Eyal et al., 2004), causal attribution of social targets (Nussbaum et al., 2003), behavior consistency (Nussbaum et al., 2003, study2), construal of self (Wakslak et al., 2008), and expectancy versus value in gambles (Sagristano et al., 2002). Among these many measurements, this dissertation adopts three paradigms: action identification, category breadth, and feasibility vs. desirability.

4.2.1 Action Identification

Action identification theory (Vallacher and Wegner, 1987; Wegner and Vallacher 1986) posits that the ways in which actions are cognitively represented are essentially hierarchically structured, meaning any given action can be identified or mentally represented in diverse levels. Further, only one of these possible representations is likely to be activated at a given moment. The level of action identification is a relative notion, and whether the level of identification is high- or low-level depends on the identity of the action with which it is compared. The distinction between high- and low-level representations is that high-level identity can be indicated to be done by performing low-level identity. For example, an individual sees if someone is home by pushing a doorbell, and this individual pushes a doorbell by moving a finger. The theory assumes that these three actions present at different levels in a cognitive hierarchy, despite the fact that all actions pertain to the same action. In this case, “seeing if someone is home” resides in the highest level, “moving a finger” in the lowest, and “pushing a doorbell” somewhere in between.

4.2.2 Category Breadth

Category breadth concerns how broad the categories used by individuals to classify objects are (Liberman et al., 2002). When representing an object more concretely, individuals use narrower categories, whereas abstract representation leads to broader categorization. As a consequence, when individuals represent objects more concretely, they tend to generate a higher number of categories, whereas abstract representation is more likely to generate fewer categories.

Liberman et al. (2002, study 1) tested this prediction under a temporal distance setting. Participants were asked to imagine they were planning an event (e.g., camping trip) in two different time frames (i.e., the upcoming weekend versus a weekend a few months later) and to categorize a given set of 38 items to be used for the event (e.g., matches, camera) into mutually exclusive and exhaustive groups. Through counting the number of groups into which participants sorted the 38 given items, Liberman et al. (2002) concluded that participants used more categories when they imagined the event happening in the near-future, whereas they generated fewer categories when they imagined the event occurring in the distant-future.

This finding supported the assumption of construal level theory that temporally distant events are represented in terms of abstract level, whereas proximal events are represented in terms of concrete, low level construal. This also supports the assertion that objects are classified into fewer categories when they are represented on a high and abstract level, and a higher number of categories when represented on a low and concrete level.

4.2.3 Feasibility and Desirability

Another important difference is that abstract and concrete representations give different weights to the feasibility versus desirability of outcomes, concerning preference formation and

evaluation and decision (Liberman and Trope, 1998). Desirability refers to the values of an action's end state, whereas feasibility refers to the ease or difficulty of reaching these end states. Taking a rebate example, desirability concerns the value of a rebate, whereas feasibility concerns the amount of time and effort one has to invest to get the rebate. Based on this definition, construal level theory predicts that distant-future preferences are more likely to be guided by desirability features, whereas proximal preferences are more likely to be guided by feasible features.

These predictions were tested many times using choice of course assignment (Liberman and Trope, 1998, study 2 and 4), planning (Liberman and Trope, 1998, study 5), feedback seeking (Freitas, Salovey, and Liberman, 2001), preference on promotional options (Todorov et al., 2007), and product preference (Fujita et al., 2008). For example, Liberman and Trope (1998, study 4) tested the prediction using an authentic decision-making situation. Students were asked to choose one out of several course assignments, either easy or difficult (i.e., feasibility consideration) on either an interesting or uninteresting topic (i.e., desirability consideration). The results showed that temporal distance decreased the effect of feasibility consideration (i.e., level of difficulty) and increased the effect of desirability consideration (i.e., interest level of topic). Specifically, the preference for the more difficult but more interesting assignment increased over time, meaning that individuals were willing to sacrifice a feasible aspect (i.e., ease) for the sake of a desirable aspect (i.e., interest), thus committing themselves to a desirable but less feasible task.

4.3 Summary

As reviewed above, various theories of mental representation have identified factors that influence accessibility to the types of mental representation used. Theories proposing modulation of construal level theory (e.g., Vallancher and Wegner, 1987; Liberman and Trope, 1998) and the attentional tuning model (Tucker, 1997) suggest factors influencing mental representation, such as psychological distance and motivational state. Although factors influencing accessibility of knowledge differ among theories, types of mental representation are measured in a similar manner. Specifically, it could be argued that high and low construal levels are conceptually adjacent to the changes in conceptual attention predicted by Tucker's attentional tuning model. For example, the Mikulincer et al. (1990) finding that anxious individuals are more likely to exclude potential exemplars from inclusion in given categories is highly reminiscent of the finding in the temporal construal literature that prospective exemplars are excluded from categories when considered in the present versus the distant future (Liberman, Sagristano, and Trope, 2002). This suggests the possibility that the effects of tense arousal may not be limited to a narrowing of perceptual and conceptual attention, but may also lead to changes in the way consumers mentally represent their immediate environment. If this is the case, then tense arousal being associated with crowding might lead consumers to construe products and services differently depending on the social crowdedness of the environment.

Chapter 5

THEORY AND PROPOSITIONS

5.1 Overview of Research and Hypotheses

This dissertation explores whether the crowdedness of an environment modulates mental representation. My core proposition is that motivational orientations caused by degree of social crowding can systematically change people's mental representation. Specifically, I argue that crowding leads to tense arousal, which leads to a narrowed scope of attention and, therefore, individuals construe entities using low-level construals (concrete mental representations). However, when the environment is less crowded, attentional scope is broadened; consequently, individuals use a higher-level construal (abstract representation). The changed mental representation not only modulates the value of those events and stimuli but also adjusts level of self-control, goal pursuit/persistence, and types of goals adopted.

> **Main proposition**: Social crowding leads to avoidance motivational states, rendering individuals more likely to rely on lower level, concrete mental representations.

While various methods can be used to measure the level of mental representation, I focus on three paradigms: action identification, category breadth, and preference for feasible vs. desirable features. Action identification theory proposes that action in any moment is cognitively represented as either higher level abstract or lower level concrete depending on (Vallacher and Wegner 1987). Therefore, I predict that individuals in a crowded environment will construe actions in a more concrete lower level representation. Category breadth concerns how broad or

narrow the categories used by individuals to classify objects are (Liberman et al., 2002). If individuals represent an object more concretely, they should use narrower categories when classifying objects in a crowded environment versus a less crowded environment, thus generating more categories. Therefore, I predict that individuals create more categories when in crowded conditions compared to less crowded conditions. Another important difference between abstract and concrete representations is that the feasibility versus desirability of outcomes is weighed differently, which affects preference formation, evaluation, and decision-making (Fujita et al., 2008). I propose that concrete representations give more weight to feasible features than abstract representations and, as a consequence, that individuals evaluate products with feasible features more highly in a crowded environment than they would in a less crowded environment.

Hypothesis of Crowding on Mental Representation: Socially crowded (vs. less crowded) individuals are more likely to rely on lower-level construal.

H1. Participants in a crowded environment (vs. less crowded environment) will identify actions with lower-level construal.

H2. Participants in a crowded environment (vs. less crowded environment) will value products with feasible features more highly than those with desirable features.

H3. Participants in a crowded environment (vs. less crowded environment) will categorize products more narrowly, thus generating more categories.

The first three hypotheses propose main effects of being socially crowded. However, given the early work identifying social distance as an input to a broader threat assessment

(Hediger 1955) and the later research linking personal space violations to activation of the avoidance system (Lang, Bradley, and Cuthbert 1997), a reasonable question to ask is whether the composition of a crowd might affect its perceived threat. Certainly an individual's perception of a crowd has been argued to be impacted not only by innate spatial restrictions but also by her relationship (if any) with the members of the crowding group (Stokols 1972). It is thus intuitive to expect that an individual would experience more uncertainty when confronted by a crowd of strangers compared to a crowd of known individuals, which would likely result in an assessment of greater potential threat. In addition to strangers representing a greater threat, prior research is certainly suggestive of individuals' differing perceptions of crowds composed of in-group or out-group members. Therefore, I hypothesize that the crowding-induced effects on level of construal will be strengthened when the crowd is composed of out-group members, and weakened when the crowd is composed of in-group members.

Hypothesis of Moderating Role of Types of Crowds: When the crowd is composed of out-group (vs. in-group) members, the effects of crowding will be strengthened (vs. weakened).

H4. When the crowd is composed of out-group (vs. in-group) members, participants in a crowded environment (vs. less crowded environment) are more likely to rely on lower-level construal; in-group crowding will weaken this effect.

5.2 Overview of Studies

The effect of social crowding on consumers' mental representation was tested in a variety of marketing contexts, including consumers' level of action identification, level of construal of product features (i.e., feasibility vs. desirability), and degree of category breadth. Diverse methods are used to assess the role of social crowding in consumers' level of construal. Chapter 7 employed action identification to assess the role of social crowding in consumers' level of construal (hypothesis 1). In Experiments 1 and 2, both picture priming and real crowd manipulation are used, demonstrating that social crowding leads to lower level action identification.

Chapter 8 extends the obtained effects of social crowding to level of feature abstraction and tests the influence of crowding on consumer preferences for feasibility and desirability (hypothesis 2). In Experiments 3A and B, a subtle Cartesian plane manipulation is used to manipulate perceived social crowdedness, demonstrating that social crowdedness leads to a preference for feasibility-orientated products. This result is replicated in Experiment 4 by priming participants with pictures of either crowded or uncrowded scenes and again in experiment 5 by utilizing an actual manipulation of real social crowdedness. Finally, completing this initial sequence of studies, I demonstrate the ecological validity of the finding in Experiment 6 by showing that consumers in a crowded farmers market prefer a feasibility-orientated product, whereas those in a less-crowded market preferred the desirability-orientated product.

Chapter 9 (experiments 7 to 10) builds upon Experiments 1 to 6 by showing that social crowdedness also affects how participants categorize products (hypothesis 3). Using two types of categorization task, five studies show that crowded individuals tend to be less inclusive in categorization tasks than uncrowded individuals. Experiment 7 utilizes picture manipulation to

manipulate perceived social crowdedness and demonstrates that social crowding leads participants to use narrower category breath, thus creating a greater number of categories; this result is replicated in Experiment 8 using actual physical crowding. In Experiment 9, a category inclusion task is used, demonstrating that crowded participants are less inclusive of atypical exemplars. Experiments 7 and 8B implement mediation analysis to demonstrate that avoidance state does indeed underlie this effect. Finally, in Experiment 10, hypothesis 3 is tested, and it is demonstrated that participants were less inclusive of atypical exemplars when crowds were composed of out-group members, whereas crowds composed of in-group members mitigated this effect. Overall, Experiments 1-10 collectively suggest that consumers are more likely to think concretely in a crowded environment than those in a less crowded environment.

Chapter 6

INFLUENCE OF CROWDING ON BEHAVIORAL IDENTIFICATION

6.1 Experiment 1: Crowding on Behavioral Identification with Real Crowds

Experiment 1 was designed as an initial test of whether individual's construal levels are influenced by the mere social crowdedness of the environment, and took place in a room that was either crowded or uncrowded. Participants completed Vallacher and Wegner's (1987; 1989) Behavioral Identification Form (BIF), which has shown to be a reliable indicator of construal level (Liberman and Trope, 1998).

6.1.1 Methods

Subjects and Design

One hundred sixty-four undergraduate students participated for extra credit. Participants were randomly assigned to either a crowded session or an uncrowded session.

Materials and Procedure

Experiment 1 used naturalistic human crowding manipulation, with all experimental sessions taking place in the same laboratory room, either in a crowded condition (25 participants, the capacity of the room), or an uncrowded condition (4 participants). Participants completed a 19-item Behavioral Identification Form (BIF), in which they chose, for each of the activities listed (e.g., locking the door) one of two identifications: an identification option related to the "why," or abstract aspect of the activity (e.g., securing the house), or one related to the "how," or concrete aspect of the activity (e.g., putting a key in the lock, see Appendix A). Participants

subsequently rated the crowdedness of the room on a scale anchored from 1 (not crowded) to 9 (very crowded). Finally, participants reported current general mood on a 9-point scale anchored at bad (1) to good (9).

6.1.2 Results and Discussion

Manipulation Check

Compared with participants in the uncrowded condition (M = 2.23), those in the crowded condition reported feeling more crowded (M = 7.08; $t(157) = -16.17$, $p < .001$).

BIF Score

The number of lower level ("how") behavioral identifications chosen were counted, comprising participants' BIF scores. Results showed that participants in the crowded rooms identified behaviors at a significantly lower level (M = 8.7) than those in the uncrowded rooms (M = 7.37, t (157) = -2.62, $p < .01$). This result thus provides initial support for the hypothesis that a higher level of social crowding leads individuals to think more in terms of low-level concrete representations. This effect cannot be attributed to general mood, as reported mood from participants in the uncrowded room (M = 6.7) and the crowded room were almost identical (M = 6.4, t (157) = 1.6, $p > .1$). Experiment 1 successfully illustrates the effect of crowding on mental representation using behavioral identification form.

6.2 Experiment 2: Crowding on Behavioral Identification with Picture Manipulation

Experiment 2 has two purposes. First, as socially crowded environments are also visually cluttered, it is important to rule out an alternative explanation that visual clutter might lead to this effect. Therefore, in Experiment 2, object clutter manipulation is used; if object clutter does not generate the effect obtained from the first experiment, it can be concluded that social crowding rather than physical distance generate this effect. The second purpose was to generalize the effect using another manipulation and rule out the potential of social influence in the crowded room manipulation in Experiment 1. To this end, picture priming was used.

6.2.1 Methods

Subjects and Design

One hundred thirty-seven undergraduate students participated for extra credit, and they were randomly assigned to one of three experimental conditions.

Materials and Procedure

In Experiment 2 (which was presented as a picture perception study), participants were first presented with one of three pictures (highly crowded vs. uncrowded vs. cluttered, see Appendix B), and were asked to imagine and describe how they would feel if they were in the pictured scene. After the manipulation task, in an ostensibly unrelated study, participants filled out the BIF form, as in Experiment 1.

6.2.2 Results and Discussion

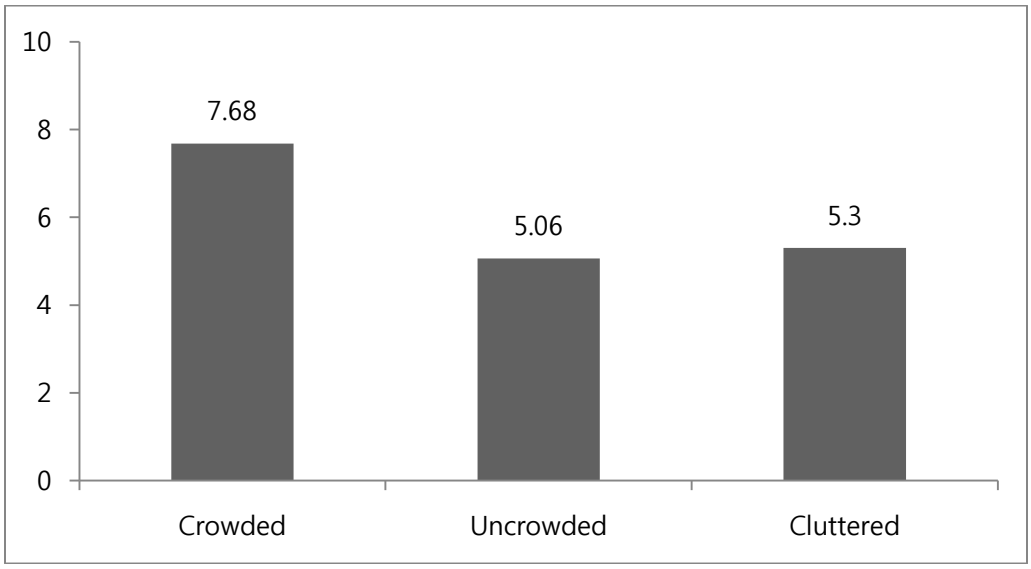
Manipulation Check

Participants in the crowded condition reported a higher number of anxiety-related words (M = 1.9) than those in the uncrowded (M = .0) and cluttered conditions (M = .7; F(2, 135) = 99.3, p <.001).

BIF Score

Results showed that participants in the highly crowded condition identified behaviors at a significantly lower level (M = 7.67) than those in the uncrowded (M = 5.06) and cluttered conditions (M = 5.30, F (2, 135) = 7.84, p <.001). Further, planned contrast revealed significant difference between crowding and clutter (t (135) = 3.25, p <.001).

Figure 6.1 BIF Score by Conditions: Crowded vs. Uncrowded vs. Cluttered (Experiment 2)



Chapter 7

INFLUENCE OF CROWDING ON FEASIBILITY VERSUS DESIRABILITY

7.1 Experiment 3A: Cartesian coordinate Plane Priming on Construal Level

Experiments 1 and 2 successfully demonstrated a potential relationship between social crowding and mental construal using action identification. Therefore, studies in this chapter generalize the obtained effect to general construal level by using another measurement of construal level, namely feasibility and desirability. For the studies reported in this chapter, both actual crowding and picture manipulation are utilized to replicate the effects obtained in the previous studies. If both manipulation techniques evoke a sense of social crowding and further lower the level of construal, participants will show distinct product preference depending on the level of crowdedness.

Experiment 3A was designed as a first test of the potential relationship between the crowdedness of the environment and how the environment is construed. To manipulate crowdedness, a modified version of the Cartesian coordinate task used by Williams and Bargh (2008) was used to prime distance. Specifically, participants viewed a Cartesian plane on which eight (vs. two) points were plotted in the crowded (vs. uncrowded) conditions. Next, in a supposedly unrelated task, participants were asked to rate a DVD player regarding seven key attributes, one of which was varied to be either feasibility- or desirability-oriented. It was hypothesized that participants primed with crowdedness would prefer the DVD player with the more feasible feature, whereas participants primed with uncrowdedness would prefer the DVD player with the more desirable feature.

7.1.1 Methods

Subjects and Design

Two hundred fifteen undergraduate students (102 female) at a Midwest university participated in this study. The study was designed as a 2 (presentation: feasibility vs. desirability) x 2 (priming: crowded vs. uncrowded) between subject design. Participants were randomly assigned to each condition. There was no effect of gender.

Materials and Procedure

The purpose of the initial study was presented as: "We are developing a new type of cognitive and attitude measure. This is a pilot study to assess the validity of the measure." Participants were first directed to plot points on a Cartesian coordinate plane (see Appendix C). In the crowded condition, participants plotted the following eight points on the plane: (1, 1), (-2, -2), (2, -1), (-1, 2), (1, 3), (-2, 1), (1, -2), and (-1, -1). In the uncrowded condition, they plotted two points: (12, 10) and (-11, -8). In both conditions, to facilitate the likelihood that the plane would serve as a prime of the level of crowdedness, a small stick figure was located at the origin of the Cartesian plane.

After plotting the appropriate coordinates, participants were asked, in a supposedly unrelated task, to evaluate a DVD player. Each DVD player had seven described features, six of which were common in each condition (i.e., high-quality digital sound system, two-year warranty, special student discount, two free DVDs, user-friendly and easy to operate, DVDs can be viewed directly through a television without distortion). However, in the feasibility condition, one of the attributes of the DVD player was varied to be feasibility-oriented (i.e., manual is easy to use)' while in the desirability condition it was varied to be desirability-oriented (i.e., player is made of

environmentally friendly materials). This critical feature was presented first on the list of features presented to the participants. After reading the feature list, participants indicated their evaluation of the product on a seven-point Likert scale, anchored at -3 (bad product) and +3 (good product). Both the DVD feature set and the rating task, were adopted from Fujita et al. (2008) (see Appendix E), who used them to demonstrate that temporal construal influences how individuals construe product attributes.

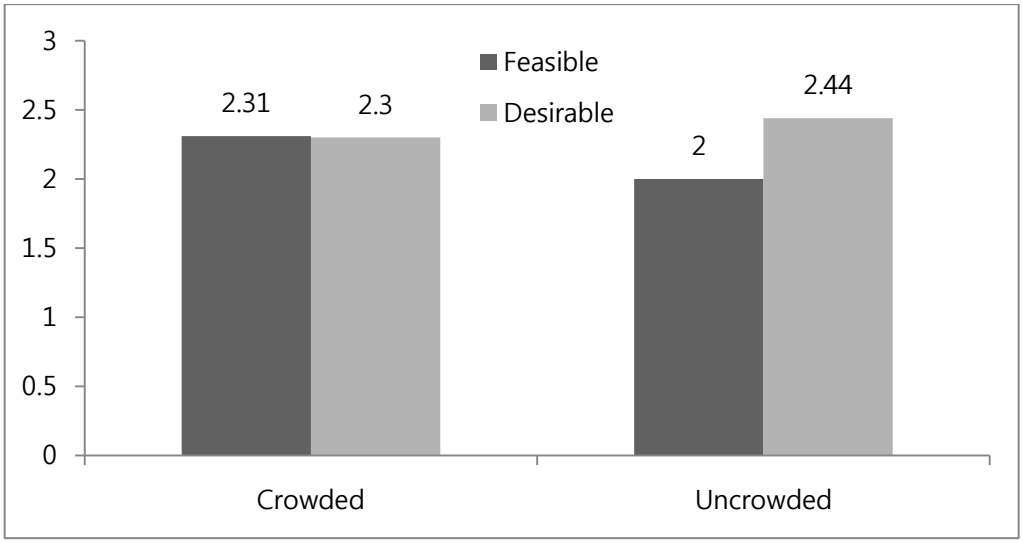
7.1.2 Results and Discussion

A 2 (level of crowdedness) x 2 (product feature type) ANOVA revealed an interaction between the two ($F(1, 211) = 4.183$, $p < .042$). As shown in Figure 7.1, simple effect analyses revealed that this interaction was primarily driven by participants in the uncrowded condition rating the DVD player with the desirably feature higher ($M_{desirable} = 2.44$) then the player with the feasibility feature ($M_{feasible} = 2.00$, $F(1, 212) = 4.183$, $p < .042$). In the crowded condition, however, the two DVD players were essentially rated equivalently ($M_{desirable} = 2.30$; $M_{feasible} = 2.31$, $F<1$).

Study 3 successfully illustrates a potential relationship between crowding and level of construal. However, two possible confounds may have influenced the results. First, it is quite possible that the Cartesian plane manipulation did not prime crowdedness, but in fact primed simple spatial distance since the eight points that participants plotted in the crowded condition were located near the origin/stick figure, whereas the two points plotted in the uncrowded condition were located further apart and further from the origin. Secondly, it is possible that the difference in effort to plot eight versus two points might prime constructs other than crowding. For example, it is possible that plotting eight points (regardless of their location) might prime a

detail orientation whereas plotting two points might not. Therefore, Experiment 3B was designed to build on Experiment 3A by ruling out these potential confounding factors.

Figure 7.1 Mean Ratings of DVD Player by Construal Level and Priming Type (Experiment 3A)



7.2 Experiment 3B: Cartesian coordinate Plane Priming on Construal Level

Experiment 3B was designed to remove the potential confounding effect of simple spatial distance by ensuring the dots in the uncrowded condition were not more distant from the origin than those in the crowded condition. Moreover, to rule out the potential confounding effect of different levels of effort, the study was carried out on computers, and participants were presented with a Cartesian coordinate plane with points already plotted and were tasked with writing down the locations of two points instead of plotting points on a blank grid. After the coordinate task, participants were presented with the same DVD rating task used in the first study.

If the effects from the first study were not driven by distance between points or different levels of effort required from the tasks, the current study should show similar patterns of construal level. Specifically, the participants who were primed with crowdedness (i.e., eight points grid) would prefer the DVD player with the more feasible feature; whereas the participants who were primed the sparse cue (i.e., two points) would prefer the DVD player with the desirable feature.

7.2.1 Methods

Subjects and Design

Two hundred eighty-three participants from a general online panel participated in this study for payment. The study was designed as a 2 (priming: crowded vs. uncrowded) X 2 (presentation: feasibility vs. desirability) between subject design. Participants were randomly assigned to each condition.

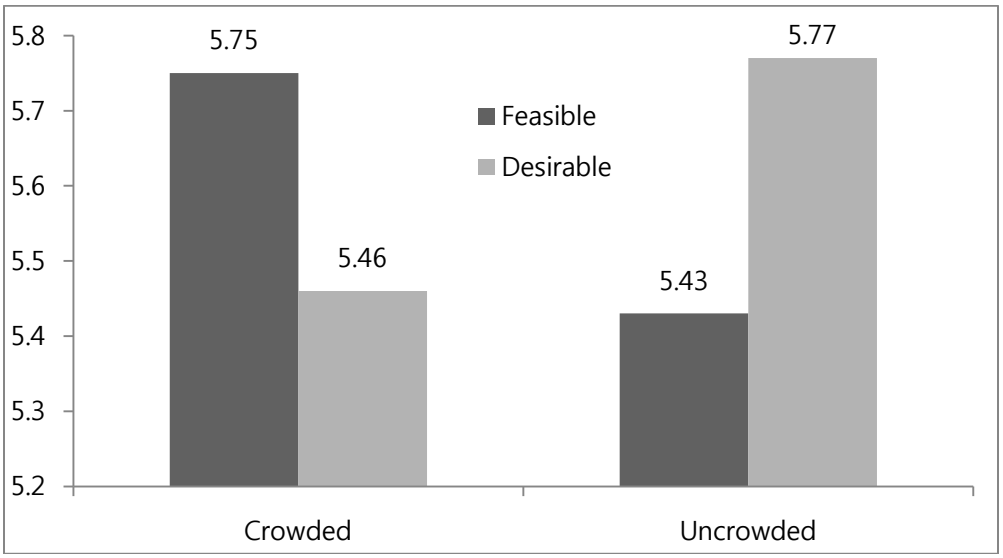
Materials and Procedure

Participants were first shown the Cartesian coordinate plane pictured in Appendix D. In the crowded condition, the following eight points were plotted on the plane: (1, 1), (-2, -2), (2, -1), (-1, 2), (1, 3), (-2, 1), (1, -2), and (-1, -1). In the uncrowded condition, only two points were plotted at (1, 1) and (-1, -1). As in Experiment 3A, to facilitate the likelihood that the plane would serve as a prime for level of crowdedness, a small stick figure was located at the origin of the Cartesian plane. Also of note, to avoid confounding crowdedness with distance (from the origin), the two points constituting the uncrowded condition were the two closest points plotted in the crowded condition. To ensure sufficient attention was paid to the prime, participants in both conditions were asked to enter two of the plotted points into the computer: those in the crowded condition were asked to enter "any two," while those in the uncrowded condition were asked to enter "the two" plotted points. After entering the coordinates, as in the Experiment 3A, participants indicated their evaluation of the product on a seven-point Likert scale, anchored at 1 (bad product) and 7 (good product) (see Appendix E).

7.2.2 Results and Discussion

A 2 (level of crowdedness: crowded vs. uncrowded) x 2 (product feature: feasible vs. desirable) ANOVA revealed no main effects but an interaction between the two ($F(1, 280) = 5.02$, $p < .03$). Participants in the uncrowded condition rated the DVD player with the desirably feature higher (M = 5.77) than the player with the feasibility feature (M = 5.43). In the crowded condition, however, the player with the feasible feature was rated higher (M = 5.75) than the one with desirable feature (M = 5.46, see Figure 7.2). However, none of the simple effects were statistically significant (both *p*s>.05).

Figure 7.2 Mean Ratings of DVD Player by Construal Level and Priming Type (Experiment 3B)



7.3 Experiment 4: Crowding on Feasibility vs. Desirability

While Experiment 3B successfully removed the potential confounding effects of distance and level of effort, there are two plausible alternative explanations to the above findings. One is that the points on the Cartesian plane might prime physical confinement and not social crowding. Therefore, to generalize the obtained effects, Experiment 4 adopts a more direct picture priming technique to prime social crowdedness. The second potential alternative explanation is that the effects in Experiments 3 were somehow caused by mood generated by the priming tasks. While it seems unlikely that the Cartesian plane manipulation would affect mood, previous research has certainly demonstrated that positive moods can lead individuals to use broader categorization and heuristic processing style than negative mood (e.g., Isen and Daubman, 1984). Therefore, Experiment 4 was designed to control effects of mood.

7.3.1 Methods

Subjects and Design

This study was conducted using an online panel. Two hundred and thirty-two survey panels from Qualtrics® participated in this study. The study was designed as a 2 (picture priming: crowding vs. uncrowding) x 2 (presentation: feasibility vs. desirability) between subject design. Each condition was randomized, meaning participants were randomly assigned to each condition.

Materials and Procedure

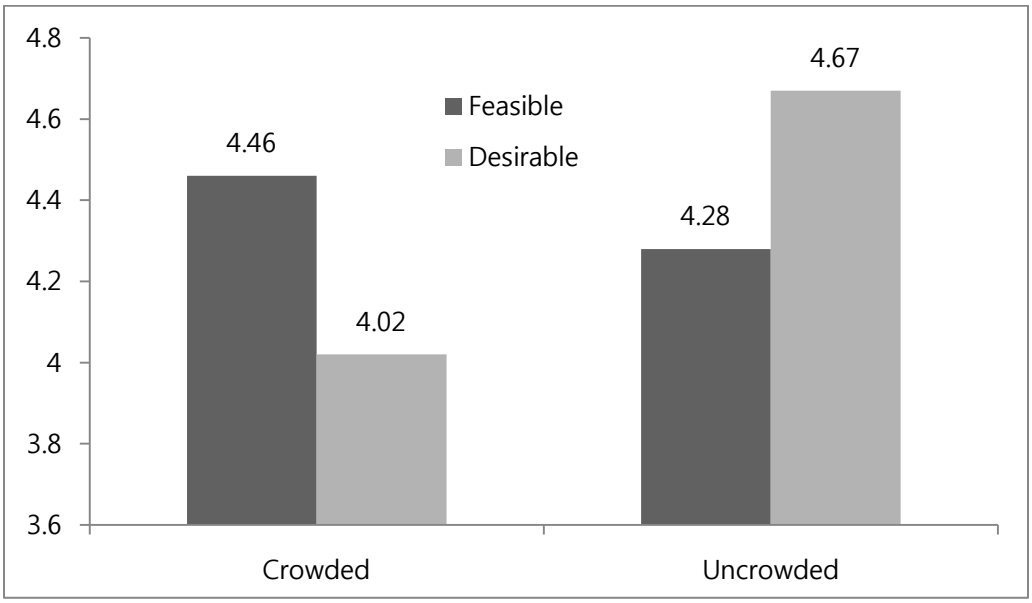
Two pictures of real spaces containing different numbers of people were developed by modifying stock photos using Photoshop (see Appendix B). Specifically, the picture to prime crowding consisted of a large crowd gathered in a field, whereas the picture to prime uncrowded

consisted of only three people located in the middle of a field. The study was presented as a "picture perception study," and participants were presented with one of the two pictures (crowded vs. uncrowded). Participants were asked to spend a few moments looking at the image and considering how they would feel if they were in the scene, and were then asked to briefly describe these feelings. After the picture perception task, participants were then asked, in a supposedly unrelated task, to evaluate a DVD player, the task used in Experiment 3 (Appendix E). Finally, after completing the DVD player evaluation, participants indicated their general mood on the affect grid scale (Russell et al., 1989).

7.3.2 Results and Discussion

A 2 (picture priming) x 2 (product feature type) ANOVA revealed no main effect, but did reveal an interaction between the two ($F(1, 128) = 7.626$, $p < .007$). Simple effect analyses revealed that the interaction was primarily driven by participants in the crowded condition evaluating the DVD player with the more feasibility-oriented feature (low construal DVD player) more favorably ($M_{feasible} = 4.46$) than the DVD player with the more desirability-oriented feature (high construal DVD player) ($M_{desirable} = 4.02$, $F(1, 129) = 5.27$, $p < .02$). However, those primed with the picture of the uncrowded environment rated the high construal DVD player more favorably ($M_{desirable} = 4.67$) than the low construal DVD player ($M_{feasible} = 4.28$, $p > .09$, see Figure 7.3). These results provide additional support for our conceptualization that feasibility (low level) vs. desirability (high level) features are valued differently when those features are evaluated within different levels of crowdedness.

Figure 7.3 Mean Rating of the DVD Player by Level of Construal and Picture Prime Condition (Experiment 4).



Finally, participant responses to the affect grid measure (Russell et al., 1989) were examined. First, general positive and negative mood scales were constructed to examine the role of general mood. Results indicated no differences between the crowded and uncrowded conditions regarding mood ($M_{crowded}$=6.01; M_{empty}=5.82, F <1). Moreover, adjusting for general mood as covariates did not change the pattern of results reported above, suggesting that they do not mediate the effect of crowding on construal. These results are thus consistent with the assumption that crowding leads to representation of entities in terms of more specific, low level construal. Experiment 4 successfully illustrated the effect of crowding on mental representation using a different measurement of construal level. While this experiment used picture manipulation, the next study uses actual crowding to replicate the core result.

7.4 Experiment 5: Crowding on Feasibility vs. Desirability Using Real Crowds

In this experiment, the DVD rating task from Experiments 3 and 4 is replicated with direct manipulation of crowding. It was hypothesized that participants in the uncrowded condition would have broader conceptual attentional scope (i.e., evaluate the DVD player with the desirable feature as better), whereas those in the crowded room would have narrower attentional scope (i.e., evaluate the DVD player with the feasible feature as better)

7.4.1 Methods

Participants

One hundred ninety-one undergraduate students participated for extra credit. Participants were randomly assigned to either a crowded session (23 participants invited) or an uncrowded session (3 participants invited). Due to normal attendance issues, the actual number of subjects in the crowded conditions ranged from 16 to 23.

Materials and procedures

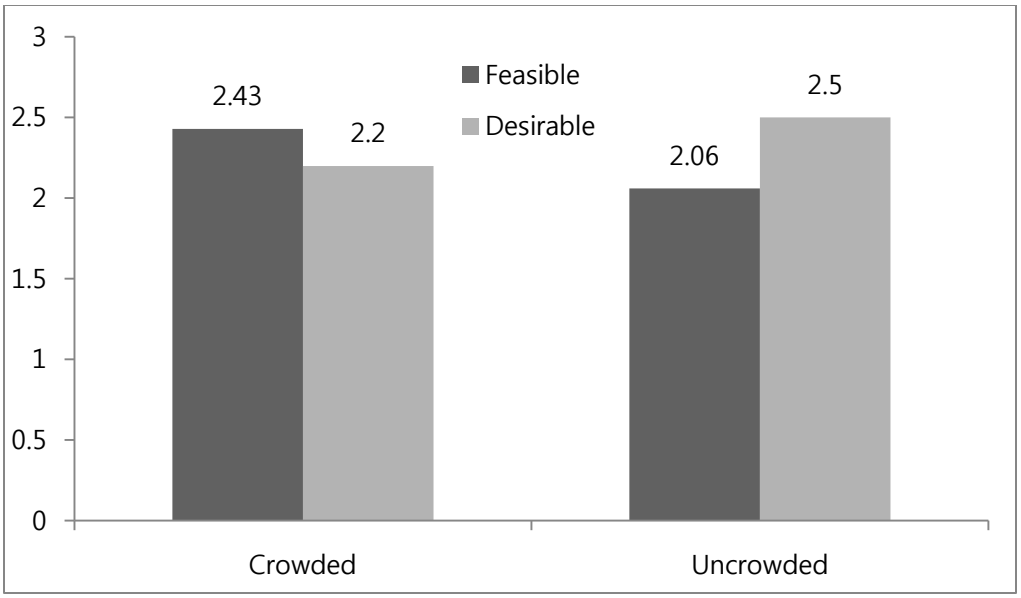
Participants were given a packet of questionnaires, including the DVD rating task from the prior studies (see Appendix E). After completing the evaluation tasks, participants completed a 9-point general mood scale (1=very bad, 9=very good) and a set of arousal-related measures (happy, tense, relaxed, worried, disappointed, calm, content, and discouraged) on 9-point scales (1=not at all, 9=extremely).

7.4.2 Results and Discussion

A 2 (level of crowdedness: crowded vs. uncrowded) x 2 (product feature: feasible vs. desirable) ANOVA revealed an interaction effect ($F(1,187) = 7.318$, $p < .007$). As seen previously, simple effect analyses revealed that participants in the crowded condition evaluated the DVD player with the feasibility feature (low construal DVD player) higher ($M_{feasible} = 2.43$) than the DVD player with the desirable feature (high construal DVD player) ($M_{desirable} = 2.2$, $F(1,188) = 1.43$, $p=.23$). However, those in the uncrowded condition rated the construal DVD player ($M_{desirable} = 2.5$) higher than the low construal DVD player ($M_{feasible} = 2.06$, $F(1,188) = 8.34$, $p=.004$, see Figure 7.4). These results provide support for the claim that feasibility (low level) vs. desirability (high level) features are valued differently when those features are evaluated in conditions with different levels of crowdedness. These results support the findings of the priming studies.

No effects of mood between the two conditions were found ($M_{crowded} = 6.35$; $M_{uncrowded} = 6.38$) and happiness were almost identical in each condition ($M_{crowded} = 5.96$; $M_{uncrowded} = 5.99$). However, a difference in the scales associated with arousal was present. Specifically, participants in the crowded room reported higher tension than those in the uncrowded room ($M_{crowded} = 4.76$, $M_{uncrowded} = 4.12$), while participants in the uncrowded room reported higher levels of relaxation than those in the crowded room ($M_{crowded} = 5.14$, $M_{uncrowded} = 5.60$). An ANOVA on the difference score (relax – tense; $M_{crowded} = 0.37$, $M_{uncrowded} = 1.49$) revealed that the difference of arousal was significant ($F(1,189)=4.042$, $p=.046$).

Figure 7.4 Mean Rating of the DVD Player by Room Type (crowdedness vs. less crowded) and the Level of Construal (Experiment 5).



7.5 Experiment 6: Real Market Crowding on Construal Level

Experiment 6 is designed to replicate this effect using an ecologically valid manipulation. The study was conducted at two farmers markets that varied in their level of crowdedness: a Saturday farmers market that was extremely crowded with hundreds of shoppers tightly constrained within a single street, and a Tuesday evening market which was much less crowded.

7.5.1 Method

Subjects and Design

One-hundred twenty-two shoppers (71 female) at two local Midwestern farmers markets participated voluntarily in this study. The study was a 2 (presentation: feasibility vs. desirability) x 2 (market: crowded vs. less crowded) between subject design. Participants were randomly assigned to each condition, the age distribution was similar across conditions, and there was no effect of gender. The study was conducted over four weeks. Shoppers were randomly approached and asked to complete a brief survey concerning product preferences.

Material and Procedure

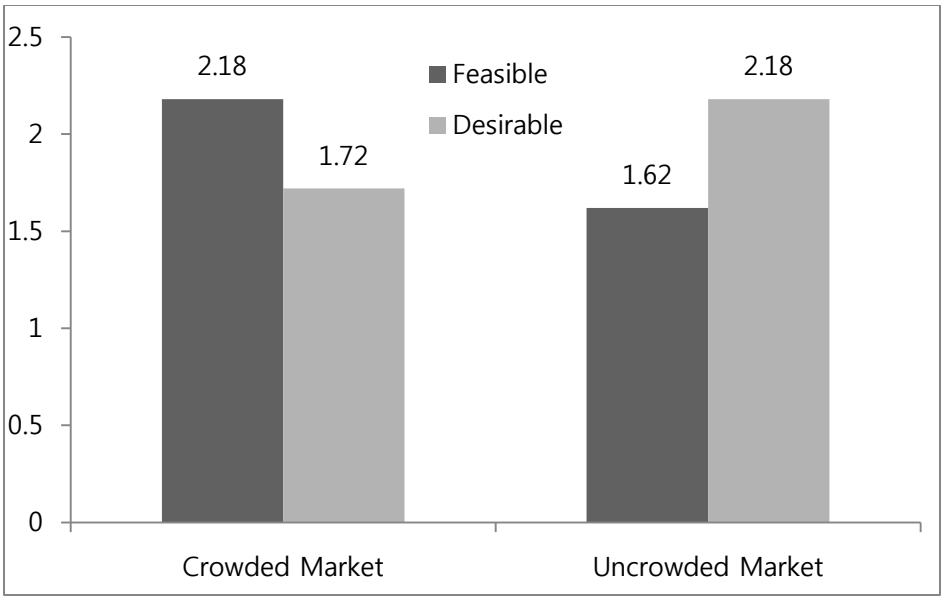
To maximize the external validity of the crowding manipulation, real shoppers were recruited at the two farmers markets. The DVD player preference materials were the same as the ones used in the previous studies; each DVD player was presented as having seven key features, six of which were same in each condition and one of which varied across conditions. Half of the participants at each market (crowded vs. less crowded) evaluated the DVD player with a feasibility-orientated feature (i.e., manual is easy to use), while the other half evaluated the DVD player with the desirability-orientated feature (i.e., DVD player is made of environmentally

friendly material) (Fujita et al., 2008). After reading the list of features, participants indicated their evaluation of the product on a seven-point Likert scale (See Appendix E).

7.5.2 Results and Discussion

There was a significant interaction effect between type of market and feature abstraction ($F(1, 118) = 8.89$, $p < .003$). Simple effect analyses revealed that participants in the crowded market preferred the DVD player with the feasibility feature ($M_{feasible} = 2.18$) compared with the one with the desirability feature ($M_{desirable} = 1.72$, $F(1, 119) = 5.33$, $p < .03$). However, in the uncrowded market condition, this pattern of preference was reversed ($M_{feasible} = 1.62$; $M_{desirable} = 2.18$, $F(1, 119) = 3.74$, $p = .055$), all p's $< .05$ (see Figure 7.5). Thus, the results of this field study strongly support the laboratory study results. The crowdedness of the market environment appeared to influence consumers' construal of product features. Specifically, consumers in the crowded market thought more concretely, preferring the product with the feasibility feature, whereas consumers in the uncrowded market thought more abstractly, preferring a product with the desirability feature.

Figure 7.5 Mean Rating of Level of Construal of DVD Player by Market Type (Experiment 6).



Chapter 8

INFLUENCE OF CROWDING ON CATEGORY BREADTH

8.1 Experiment 7: Crowding on Category Breadth

Experiment 7 was designed to generalize the results from Experiments 1 to 6 by using a different measure of construal level. To manipulate perceptions of crowdedness, the picture priming technique used in previous studies was utilized. To assess participants' construal levels, Liberman, Sagristano and Trope's (2002) category inclusiveness task was used, which requires participants to sort 38 camping equipment items into mutually exclusive groups of like items. Consistent with the CLT prediction that distant future events are represented in terms of higher-level abstract categories, Liberman et al. showed that participants did indeed use broader categories when thinking about a distant future trip vs. a near future trip, which led to the generation of fewer total categories. Here it is hypothesized that individuals will use fewer, broader categories to classify objects when primed with a picture of the uncrowded scene then when primed with the crowded picture.

8.1.1 Methods

Subjects and Design

One hundred thirty-one undergraduate students (61 female) participated in this study for extra credit. Participants were randomly assigned to either crowded or uncrowded condition. Participants were randomly assigned to one of two crowded conditions, either crowded or uncrowded picture manipulation.

Materials and Procedure

In a supposed picture perception study, participants were first presented with one of the two pictures (highly crowded vs. uncrowded) used in previous studies (see Appendix B). Participants were asked to imagine how they would feel if they were in the scene presented and to briefly describe their thoughts. Next, in an ostensibly unrelated study, participants were told to imagine they were going camping and that they would be taking the 38 items of equipment listed on the page (i.e., brush, tent, matches, camera, soap, gloves, bathing suit, shovel, fishing pole, hat, marshmallows, socks, blanket, flashlight, pants, sunglasses, rifle, shoes, cigarettes, rope, hotdogs, canteen, toothbrush, underwear, beer, sleeping bag, pillow insect repellant, potato chips, and an axe, see Appendix F). Participants were instructed to place the equipment into groups by writing the names of items that belong together next to each other, and then circling each group.

8.1.2 Results and Discussion

The number of groups that each participant used to categorize the camping equipment was counted. Indeed, consistent with this prediction, participants generated more discrete categories after being primed with the picture of the crowded scene (M = 6.0) than did participants primed with the picture of the uncrowded scene (M = 5.35; $t(129) = -2.49$, $p < .02$). This finding is thus consistent with the contention that crowded individuals construe their environment relatively more in terms of concrete lower-level construals, with more abstract high level construals being used in uncrowded environments.

8.2 Experiment 8: Crowding on Category Breadth

Experiment 8 was designed to replicate the results of Experiment 7 using naturalistic crowd manipulation, and to explore whether the effects are regulated by an increased avoidance motivation. The level of crowdedness was manipulated via the actual crowdedness of the experimental environment. On completion of the categorization task, participants then undertook an anagram task designed to assess their accessibility to avoidance-related constructs (Forster, Liberman, and Higgins, 2005).

8.2.1 Methods

Subjects and Design

One hundred sixty-four students participated for extra credit. Participants were randomly assigned to either a crowded or uncrowded condition.

Materials and Procedure

Participants were randomly assigned to one of two conditions: an uncrowded session (with 3 participants) or a crowded session (with 25 participants). Participants completed the Liberman, Sagristano, and Trope (2002) category inclusiveness task, described in the previous study (see Appendix F), and then completed an anagram task which required them to solve 12 anagrams within a minute, six representing control words (e.g., drink, computer), and six representing avoidance motivation (e.g., guard, protection) (see Appendix H).

8.2.2 Results and Discussion

Manipulation Check

Participants in the crowded rooms reported that they felt more crowded (M = 6.89) than those in the uncrowded rooms (M = 2.57; $t(162) = -14.39$, $p < .001$).

Category Breath

Since generating a greater number of categories is consistent with utilizing concrete low-level construals, the number of categories generated by each participant was counted. Participants in the crowded condition generated more discrete categories than did those in the uncrowded condition ($M_{crowded} = 6.0$, $SD = 1.94$, $M_{uncrowded} = 5.3$, $SD = 1.72$; $t(162) = -2.43$, $p < .02$).

Mediation Analysis

The number of solved anagrams was counted, and the difference between the solved avoidance and control anagrams was calculated, thus providing a net measure of the accessibility of avoidance constructs. This analysis revealed that avoidance-related words were solved more often in the crowded condition (M = .31) than in the uncrowded condition (M = -.25, $t(162) = -3.2$, $p < .001$). Next, the indirect effect of crowding on category breadth through the accessibility of avoidance-related constructs was examined (Preacher & Hayes, 2004). Using 5,000 bootstrap samples, this analysis revealed a significant indirect effect of crowdedness on participants' categorization score through accessibility of avoidance words (95% confidence interval: 0.011 and 0.393). Thus, the strength of avoidance motivation appeared to mediate the effect on construal level.

These results generalized the results of Experiment 7 by revealing that, whether primed or actually manipulated, increased social crowdedness leads individuals to be less inclusive in a product categorization task. Moreover, consistent with our theorizing, this narrowing in inclusivity was mediated by an increased avoidant motivation.

Table 8.1 The Mediating Role of Avoidance Motivation on Construal Level (Experiment 8)

	B	*T*	*P value*
Crowding predicting Category Breadth	5.37	$t(162) = 27.3$	$p<.001$
Crowding Predicting Avoidance Anagram	-.25	$t(162) = -2.13$	$p<.04$
Avoidance Anagram and	.30	$t(161) = 2.37$	$p<.02$
Crowding predicting Category Breadth	.52	$t(161) = 1.79$	$p>.08$*

Note. – * indicates a partial mediation.

8.3 Experiment 9: Crowding on Inclusiveness of Categorization

In Experiment 9, I attempt to generalize the results from Experiment 7 and 8 using another type of category inclusion task. One possible alternative explanation for Experiment 7 and 8 is that the crowded picture served as a prime of large numbers. This prime may have then led participants to be motivated to create a greater number of categories in the crowded prime condition. While unlikely, one goal of Experiment 9 was to rule this possibility out by using a categorization task that does not rely on creating a certain number of categories.

It is expected that participants in the uncrowded room will be broader and more inclusive in their categorization, whereas those in the more crowded room will use less broad and less inclusive categorization. Therefore, it is hypothesized that participants in the crowded condition will be less likely than those in the uncrowded condition to include the atypical exemplars in the given categories. However, inclusion of typical members of categories should not be influenced by abstract or concrete styles of thinking; therefore, it is hypothesized that typical exemplars will not be rated differently depending on the level of crowding.

8.3.1 Methods

Participants

One hundred and seventy-one students (Female=75) participated in this study for extra credit.

Materials and procedures

Participants were assigned to either the crowded condition (16-23 participants per room) or the uncrowded condition (3 participants per room). Participants were given four exemplars (e.g., chair, shirt, peas) for three categories (i.e., furniture, clothing, and vegetables), and were asked to rate these categories in terms of the degree to which they belonged to a given category (Wakslak et al. 2006). Two of the exemplars were categorized as typical, and the remaining two were categorized as atypical based on Rosch's (1975) norms. For the furniture category, typical exemplars were chair and sofa; atypical exemplars were radio and clock (see Appendix G). For the clothing category, typical exemplars were shirt and pants; atypical exemplars were purse and ring. For the vegetable category, typical exemplars were pea and carrot; atypical exemplars were pumpkin and seaweed. Participants were asked to evaluate each exemplar in terms of the extent to which it belongs to the given category on a 10-point scale anchored from 1 (the item definitely does not belong to the category) to 10 (the item definitely does belong to the category).

8.3.2 Results and Discussion

A mixed-design ANOVA was performed on the ratings of category inclusion, with average ratings of the typical and atypical exemplars as a repeated measures factor and crowding as a between-subject factor. Table 8.2 presents the ratings of the typical and atypical exemplars. A main effect of exemplar type confirmed that participants rated the typical exemplars to be considerably better category members than the atypical exemplars, $F(1,170)=2333.87$, $p=.000$. Further, a main effect of crowding indicates that participants in the uncrowded room tended to be more inclusive in their categorization than those in the crowded room, $F(1,170)=11.18$, $p=.001$ ($M_{crowded} = 6.72$, $M_{uncrowded} = 7.09$). However, this was qualified by the predicted interaction, $F(1,170)=3.229$, $p=.07$. As expected, participants who were in the crowded room were less

inclusive in their categorization of atypical exemplars (M=3.72) than those in the uncrowded room (M=4.33), $t(170)=-2.989$, $p=0.003$. In contrast, the level of crowding had no impact on typical exemplar ratings ($p>0.1$). The mean rating of the category inclusion by conditions are displayed in Table 8.3 below.

Further results suggest that these findings are not due to effects of mood. General mood was not different across conditions ($M_{crowded}=6.39$, $M_{uncrowded}=6.39$, $p>0.9$) and neither was happiness ($M_{crowded}=6.07$, $M_{uncrowded}=6.00$, $p>0.6$). However, arousal-related measures such as tension ($M_{crowded}=4.78$, $M_{uncrowded}=4.17$, $p=0.14$) and relaxation ($M_{crowded}=5.17$, $M_{unrowded}=5.59$, $p=.14$) illustrated that participants experienced more arousal in the crowded room (see Table 8.4). Experiment 9 thus provides further evidence that items evaluated in a crowded environment are represented in a more concrete and less inclusive manner than items in an uncrowded environment.

Table 8.2 Exemplar ratings as a function of the level of crowdedness of the room (Experiment 9)

Dependent variable	Level of crowdedness			
	Uncrowded (N=114)		Crowded (N=58)	
	M	SD	M	SD
Atypical exemplar rating	4.329 [a] ($\alpha = .897$)	1.216	3.72 [a] ($\alpha = .529$)	1.35
Typical exemplar rating	9.859 [b] ($\alpha = .714$)	0.526	9.698 [b] ($\alpha = .630$)	0.825

Note. – [a] indicates significant differences and [b] indicates no significant differences (CI: 95%)

Table 8.3 Category Inclusion by Room Type (crowdedness vs. less crowded) (Experiment 9)

		Crowded Room (N=58)		Uncrowded Room (N=114)	
		Typical exemplars	Atypical exemplars	Typical exemplars	Atypical exemplars
Categories	Furniture	9.85 [b] (.82)	2.89 [a] (1.72)	9.83 [b] (.45)	2.91 [a] (1.42)
	Clothing	9.63 [b] (1.46)	2.87 [a] (1.83)	9.95 [b] (.47)	3.40 [a] (1.87)
	Vegetables	9.61 [b] (1.22)	5.44 [a] (2.57)	9.80 [b] (.84)	6.68 [a] (2.10)
	Average	9.69 [b] (.82)	3.74 [a] (1.40)	9.86 [b] (.52)	4.33 [a] (1.21)

Note. – [a] indicates significant differences and [b] indicates no significant differences (CI: 95%)

Table 8.4 Mean Rating of Mood Measures by Room Type (crowdedness vs. less crowded) (Experiment 9)

	Crowded (N=58)		Uncrowded (N=114)	
	M	SD	M	SD
General mood	6.39	1.53	6.39	1.32
Worried	4.61	2.27	4.82	2.19
Disappointed	3.31	1.87	3.41	2.02
Calm	5.77	1.88	6.30	2.02
Happy	6.07	1.62	6.00	1.48
Content	5.76	1.90	5.92	1.75
Tense	4.78	2.16	4.17	2.65
Discouraged	3.50	1.98	3.50	2.04
Relax	5.17	1.85	5.59	1074

8.4 Experiment 10: Group Membership and Effects of Crowding [1]

As social crowding concerns not only an individual's awareness of spatial restriction in relation to the presence of others, but also one's relationship with them (Stokols, 1972), it follows that a defensive reaction to a personal space violation depends on perceptions of the invaders and one's relationship with them (i.e., in-group vs. out-group). The origins of in-group formation and out-group hostility can be found in the evolutionary argument of bounded social cooperation in the context of conflict over scarce natural resources. The idea is that desire to band together in a group is a necessity for survival, to compete successfully with other groups over these resources. The emergence of intra-group conflict and tribal warfare in human history induces in-group cohesion and aggressiveness toward out-groups (Sumner 1906; Sherif and Sherif, 1953). In the absence of actual conflict over scarce natural resources in modern society, the same behavioral patterns are maintained as in-group love and out-group distrust (Allport 1954; Brewer 1999). Put differently, the perceived threat from out-groups to in-group interests or survival (whether actual or imagined) generates a situation in which identification and coalition with the in-group is directly related to fear and hostility toward the out-group (Brewer 1999).

This tendency of in-group favoritism and out-group antagonism is also supported by social identity theory (Tajfel, 1981; Tajfel and Turner, 1986). This theory assumes that individuals' personal identity (i.e., their unique differences from other individuals) is activated as default; however, when social identity is activated in a certain situation, individuals flexibly and quickly categorize themselves according to a social identity (i.e., their differences from out-group members and their similarities to other in-group members). This depersonalization procedure influences one's social perception in such a way that other in-group members are

[1] Thanks Dilip Soman for his input for this experiment.

perceived as psychologically closer to self, whereas out-group members are perceived as distant from self. This also applies to judgments of similarity-dissimilarity, such that increasingly perceived similarity within groups is associated with increasing dissimilarity between groups. The core of this theory is that once depersonalization occurs, individuals tend to show in-group favoritism and out-group antagonism (Hogg and Abrams, 1988; Tajfel and Turner, 1986). This in-group favoritism has been found to be robust not only for categorization based on race or ethnicity, but even for mere assignment to an arbitrary group (i.e., the minimal-group paradigm) (Tajfel, 1970). In-group favoritism and out-group antagonism has been demonstrated in diverse ways, such as disproportionally allocating limited resources (Tajfel, Billig, Bundy, and Flament, 1971), and even when allocation decisions involve the distribution of negative outcomes or high costs (e.g., Mummendey et al., 1992).

Personal space describes the physical boundary between self and other, the purpose of which is to manage uncertain threats in the environment. Furthermore, it has been shown that salient group identity can determine the social perceptions of others. Therefore, it is quite possible that perception of potential threat from a personal space violation might depend on in-group and out-group categorization, and that the composition of crowding might determine the degree of defensive reaction to the personal space violation. If an individual is in a crowd in which no contextual cues to a social identity are apparent, all the other individuals in the crowd may be perceived as “other” and the perceiver may retain distance. However, when social identity becomes salient, the process of grouping (categorizing others as in-group or out-group members) can determine who is more threatening (or less threatening) and when close proximity will be perceived as a violation (or less of a violation) of the boundary of safety. Therefore, the perception of close proximity as a violation of personal space might depend on how we

categorize ourselves, and whether others around us in a crowd are in fact perceived as in-group or out-group. As such, group level relationships between self and others actually influence perceptions of crowding and thus influence choice behavior.

Empirical evidence supports this proposition. Much research has shown that group membership influences personal proximity behavior. Novelli, Drury, and Reicher (2010) showed that measured personal space (the distance between chairs) was significantly less in intra-group contexts than in inter-group contexts. Also, Shah, Brazy, and Higgins (2004) found that participants who were expecting to engage in competition tended to choose a seat closer to an in-group member (their team-mate) than to an out-group member (a competitor). High-density contexts could even be experienced positively when the group is formed with only in-group members (Schultz-Gambard, 1977). Similarly, Glick, DeMorest, and Hotze (1988) found that out-group members produced more anxiety and less compliance with a small request than in-group members when both were in close proximity compared to the distant condition.

Given all the above, it is hypothesized that the proposed effects that socially crowded individuals are more likely to choose options with personal safety connotation will be moderated by the composition of the crowd. Specifically, when individuals' social identity is salient, the effect of crowding on safety-oriented choices will be strengthened when the crowd is composed of out-group members, whereas the effect will be mitigated when the crowd is composed of in-group members.

8.4.1 Methods

Participants

Two hundred and sixty-two students participated in the study for extra credit.

Materials and procedures

The study was a 2 (crowded vs. uncrowded) X 2 (in- vs. out-group) between subject design. Participants were randomly assigned to one of four conditions. Participants were instructed to imagine going to a local bar before attending a college football game. The bar is very crowded and full of supporters (vs. only a few supporters) of your home team (vs. your rival team). The images of an identical bar that was either crowded (containing 43 people) or uncrowded (containing 4 people) were created using Photoshop. To avoid any suspicion about the silhouettes in the picture, participants were told that the image was based on a real photo of a bar but that the actual people in the image had been replaced by silhouettes to protect their identities. Group identity was manipulated using T-shirts with school logos of their own school and a rival school: Wisconsin and Michigan, respectively (see Appendix I). They were then asked to pretend they were in the scene and then briefly describe their feelings to be in the scene. The category inclusion task was then presented as an ostensibly unrelated study, in which their degree of category inclusion of two typical and two atypical exemplars for each category was measured using the same task used in Experiment 9 (Appendix G).

8.4.2 Results and Discussion

A mixed-design ANOVA was performed on the ratings of category inclusion with average ratings of the typical and atypical exemplars as a repeated measures factor and crowding and group membership as between-subject factors. Table 8.5 presents the ratings of the typical and atypical exemplars. While no main effects were found on either crowding or group membership, a significant three-way interaction effect was found, $F(1,258)=6.33$, $p < .02$.

However, break down analysis of the data by typicality of exemplars reveals that this three-way interaction was primarily driven by inclusion of atypical exemplars. As expected, a significant interaction on the inclusion of atypical exemplars was found between levels of crowding and types of group membership, $F(1,258)=4.37$, $p < .04$. In contrast, interaction did not influence typical exemplar ratings ($p > .06$).

Simple effect analyses further confirmed that the interaction was primarily driven by participants in the out-group crowded condition being more likely to be less inclusive of atypical exemplars. Specifically, participants who were in the out-group crowded condition were significantly less inclusive of atypical exemplars (M=3.91) than those in the uncrowded condition with out-group members (M=4.53; $p<.02$). However, inclusion of atypical exemplars was not different across crowded (M=4.62) or uncrowded conditions with in-group members (M=4.45; $p>.5$). Furthermore, inclusion of typical exemplars was not statistically different across conditions. Participants in the out-group crowds condition showed higher rates of inclusion of typical exemplars (M=9.91) than those in the uncrowded room with out-group members (M=9.69); however, the difference was not significant ($p>.06$). Inclusion of typical exemplars in both in-group conditions was almost identical ($M_{crowded}=9.67$; $M_{uncrowed}=9.76$; $p>.47$). The mean rating of the category inclusion by conditions are displayed in Table 8.6 below.

Experiment 10 thus provides further evidence that the influence of social crowding on concrete mental representation is modulated by crowd composition. Specifically, out-group crowds strengthen the effect, whereas in-group crowds weaken it.

Table 8.5 Exemplar Ratings as a Function of Level of Crowdedness and Group Membership (Experiment 10)

	Dependent variable	Level of crowdedness			
		Crowded (N=128)		Uncrowded (N=134)	
		M	SD	M	SD
In-Group	Atypical exemplar rating	4.62 [a b]	1.53	4.45 [b]	1.63
	Typical exemplar rating	9.67 [d]	.81	9.76 [d]	.69
Out-Group	Atypical exemplar rating	3.91 [a c]	1.31	4.53 [b c]	1.57
	Typical exemplar rating	9.91 [d]	.29	9.69 [d]	.84

Note. – [a, c] indicates significant differences and [b, d] indicates no significant differences (CI: 95%)

Table 8.6 Category Inclusion by Level of Crowdedness and Group Membership (Experiment 10)

		Crowded (N=128)		Uncrowded (N=134)	
		Typical exemplars	Atypical exemplars	Typical exemplars	Atypical exemplars
In-Group	Furniture	9.55 (1.02)	3.45 (2.21)	9.63 (1.23)	3.12 (1.86)
	Clothing	9.80 (.73)	3.53 (2.17)	9.82 (.95)	3.71 (2.4)
	Vegetables	9.65 (.95)	6.87 (2.22)	9.81 (.73)	6.51 (2.19)
	Average	9.67 (.81)	4.62 (1.53)	9.75 (.69)	4.45 (1.62)
Out-Group	Furniture	9.94 (.24)	2.91 (1.78)	9.45 (1.37)	3.33 (1.78)
	Clothing	9.92 (.56)	2.68 (1.7)	9.82 (.95)	3.65 (2.38)
	Vegetables	9.87 (.59)	6.16 (2.37)	9.78 (.78)	6.59 (2.48)
	Average	9.91 (.29)	3.91 (1.31)	9.69 (.84)	4.53 (1.56)

Chapter 9

GENERAL DISCUSSION

The first part of my dissertation (Essay 1) provides a new theory by presenting the idea that the crowdedness of the consumer environment influences the way product features are mentally represented. Ten studies support the idea that a crowded environment tends to lead individuals to mentally represent product features at a lower level, whereas less crowded environments show the opposite pattern. Specifically, a crowded environment leads consumers to prefer a product described with concrete and contextualized features over one described with abstract and global features, while a less crowded environment leads to the opposite preference. Also, consumers used narrower and less inclusive category breadth when part of a crowded environment compared to those in a less crowded environment. Further, these effects are demonstrated to be moderated by composition of crowds (i.e., group membership).

Theoretical Implications

The key contribution of this research is in demonstrating that consumers' evaluation and preferences of products are modulated by the level of crowdedness in the environment. These findings extend previous research on social crowding, which has to date primarily focused on examining how crowding-induced stress moderates task performance or social behavior (e.g., Evans & Lepore, 1993). In particular, these findings are the first to demonstrate that being socially crowded can materially influence how people mentally represent their environment. Instead, consistent with the broad idea that motivational intensity (i.e., arousal) constricts the span of perceptual and conceptual attention (Harmon-Johns and Gable, 2008; Easterbrook, 1959;

Tucker and Williamson, 1984), it is suggested that the relationship between social crowdedness and construal level may ultimately reflect an adaptive response to non-volitional violations of personal space. After all, throughout human evolution, such violations of personal space may often have been indicative of threats to immediate physical safety (Neuberg et al. 2011; Boyer and Bergstrom 2011). Certainly, the fact that crowding leads to increased anxiety and increased accessibility of avoidance-related words appears indicative of the fact that social crowding induces an avoidance response.

In my view, such a link between avoidance motivation and construal level is not inconsistent with the observation of construal level theory that distance has evolved to be a critical determinant of how objects are construed. From an approach and avoid motivation perspective, distance from the organism is a vitally important determinant of the degree of motivation required to deal with the threat or opportunity represented by a particular object in the environment. Moreover, both approach and avoid motivations have been shown to reduce attentional breadth (Lang, Bradley and Cuthbert, 1997; Gable and Harmon-Johns, 2008). As such, perhaps the effect of psychological distance on construal level ultimately reflects the critical role distance has historically played in moderating the optimal deployment of our approach and avoidance motivations.

This dissertation also makes an important contribution to the affect literature, which is heavily skewed to the role of positive affect on categorization (Isen and Daubman, 1984) and the influences of positive affect on focusing global features (Gasper and Clore, 2002) and perceptual fluency (Schwarz and Clore, 1983; 2003). However, the role of arousal in higher mental cognition is comparatively under-studied. In this sense, this dissertation is meaningful in demonstrating the role of arousal on mental representation.

Practical Implications

From a purely marketing perspective, one can imagine a variety of practical implications. First, retailers can use different persuasive appeals depending on store traffic. High traffic stores might better position products with local/concrete/feasible features, while low traffic stores might better position their products with global/abstract/desirable features. Moreover, retailers could dynamically alter certain appeals based on the level of crowdedness of the store. During the evenings and on weekends, when traffic is heavy, they may use appeals with a concrete message, while on weekday mornings and afternoons when there is not much traffic, appeals with abstract messages may be more effective.

Limitations and Future Research

The research reported here would seem to indicate evidence of the role of crowding on the modulation of mental construal. Although this study provides initial evidence for the mechanisms described, there is room for further research on this topic. First, the effect found here may not be generalizable to all cultures; however, there is evidence that it could be generalizable. It has been widely accepted that cultures vary in their tolerance for crowding. This belief is based on the argument that people in some cultures prefer more proximate interpersonal interactions (e.g., Hall, 1966). Therefore, in one sense, it is possible that people from those cultures may be tolerant to crowding, and therefore, less susceptible to this effect. However, in another sense, it has also been proven that perception of crowding and tolerance for crowding are different constructs. Studies have not shown differential tolerance to crowding, although they have found cultural differences in perceptions of crowding (Evans et al., 2000). Therefore,

people from any culture should have some level of psychological distress and physiological reaction within a crowded environment, and thus be susceptible to this effect. Moreover, chronic exposure to high residential density has been shown to be harmful across cultural groups (Myers, Baer, and Choi, 1996). Therefore, it could be possible that the crowded environment of a particular culture may lead those in that culture to exhibit a certain chronic level of construal.

Another theoretical underpinning for expecting cultural difference in the effect of crowding is the difference between collectivism and individualism. Individuals from collectivist cultures are closely linked to each other in terms of their connectedness to being members of that culture, such as a family, region, or country. Therefore, it is possible that when they are surrounded by crowds with in-group members, they are primed by interdependency which leads to holistic thinking (Kuhnen and Oyserman, 2002). Although holistic thinking and abstract thinking are orthogonal constructs, it is possible that people within more collectivistic cultures respond at a more global level when they are part of crowds through the priming of interdependency.

Moreover, the crowded conditions tested in these studies were all task-oriented situations. Also, participants did not participate in any group interaction activities. However, it is possible that on some occasions people may be excited or enjoy being in crowded environments, such as when watching competitions at stadiums, drinking at bars, or eating in restaurants. These situations may possibly lead people to phasic arousal status, meaning people may think in global or abstract terms. Also, it is possible that there are individual differences in crowding effects. People with certain traits (e.g, BIS) may be more motivated to assess risk in their environment, leading them to be more cautious and have increased arousal compared to people with the opposite trait (e.g., BAS). Therefore, it may be the case that those people are more susceptible to

the effect of crowding. Finally, it would be interesting to consider the role of conscious control in the effect of crowding in higher mental systems, specifically, whether the conscious can affect the influence of crowding in the modulation of mental construal.

ESSAY 2

Context of Crowds:

The Effect of Social Density on Willingness to Pay

Chapter 10

THEORETICAL BACKGROUND

10.1 Introduction

Research over the past ten years has shown that shopping environment influences consumer buying behavior (e.g., Underhill, 2007). It has been shown that not only the physicality of store environments (e.g., Meyers-Levy and Zhu, 2007; Levav and Zhu, 2008) but also social presence in store environments has a significant influence on consumer behavior. For example, the presence of others in a store environment has been shown to lead shoppers to buy more expensive items to impress others compared to shopping alone (Argo et al., 2005). However, the social aspects of store environments go beyond simply the presence or absence of other people. One notable social aspect of retail environments is social density, that is, how many people occupy the store space.

While few studies have examined the influence of social density on consumer decisions, some scholars have explored the influences of spatial confinement on choice behavior (Levav and Zhu, 2008; Xu, Shen, and Wyer, 2011). However, influences of social context on consumption decisions are not limited only to what consumers choose to purchase. This research examines one such influence: the effect retail social density has on consumers' willingness to pay. Willingness to pay is one of the most important aspects of consumer decision-making, as it is crucial in estimating demand and figuring optimal pricing. Given that levels of store density fluctuate depending on time (i.e., time of day, day of the week, and season) as well as location (i.e., countries or cities with different levels of population), understanding the influences of social density on willingness to pay will provide vital information to marketing managers.

Research examining willingness to pay has primarily focused on how reference prices (i.e., price anchor) are constructed and used. The primary questions that has been investigated are 1) whether evaluation of product price is influenced by externally presented prices (e.g., advertised prices or displayed prices in-store) (Lichtenstein and Bearden, 1989; Urbany, Bearden, and Weilbacker, 1988), and if so, 2) whether previous exposure to a certain price automatically anchors consumers' willingness to pay (Adaval and Monroe, 2002), and 3) whether price anchors are from within the product category (Krishna et al., 2006) or whether anchors from other product categories also generate anchoring effects (Nunes and Boatwright, 2004).

However, the current research differs from the traditional research paradigm in three key ways. First, while research in willingness to pay has primarily examined the role of prices that individuals were previously exposed to as an anchor, actual purchase environments can semantically offer consumers a much larger field of contextual information. Therefore, this research explores the possibility that contextual information activates a set of associated constructs, influencing the way the object for sale is mentally represented. Second, while most previous research adopts sequential incidence of anchoring and price estimation, in a real purchasing incidence, without previous exposure to anchors, consumers might use situational information to judge product value. This research explores this possibility, testing simultaneous rather than sequential value estimations. Third and most importantly, while the traditional research paradigm considers only certain numbers as anchors, this research demonstrates how social perception can anchor consumers' willingness to pay, an approach which has not been previously investigated.

In sum, the purpose of this second essay is to broaden our understanding of the effects of social presence and investigate its effects on consumers' willingness to pay. In particular, I

examine the extent to which the degree of store space occupied by shoppers affects an individual's willingness to pay for a product displayed in the same context.

10.2 The Effect of Social Density on Willingness to Pay

10.2.1 Research on Willingness to Pay

Traditional expected utility theory assumes that willingness to pay (henceforth WTP) is based on the factual evaluation of focal objects by rational individual whose value judgments will not be altered by the decision context. However, this traditional perspective—that people's decisions are made independent of context—has been increasingly challenged by growing evidence suggesting that judgment and evaluation made under uncertainty are susceptible to arbitrary influence from decision contexts (Chapman and Johnson, 1999; Jacowitz and Kahneman, 1995; Tversky and Kahneman, 1974).

One of the most robust influences in decision contexts, the anchoring phenomenon, posits that individuals tend to rely on the anchor (i.e., pre-exposed numbers) that is most readily available (Tversky and Kahneman, 1974) or that first comes to mind (Taylor and Fiske, 1978) to make subsequent evaluations. This anchor alters subjective numeric estimation about information (e.g., estimated numbers such as length of a river) such that subsequent evaluations tend to result in assimilation towards the anchor: a smaller anchor is likely to produce smaller subsequent estimates, whereas a larger anchor is likely to lead to larger subsequent estimates (Ariely, Loewenstein, and Prelec, 2003; 2006). For example, respondents' absolute estimates of the percentage of African countries in the UN were significantly influenced by the magnitude of the initially provided anchor, given as a random number between 1 and 100, such that those who randomly received a higher number gave higher absolute estimates of percentage of African countries in the UN and vice versa (Tversky and Kahneman, 1974).

Although the majority of studies demonstrating anchoring have focused on how anchoring alters subjective numeric estimation, some researchers have demonstrated that

valuation (e.g., WTP) can also be altered by anchoring. Johnson and Schkade (1989) first demonstrated this possibility, finding that asking subjects for an anchor value influences subsequently stated certainty equivalents. Subsequently, Green, Jacowitz, Kahneman, and McFadden (1998), and Kahneman and Knetsch (1993), also found anchoring effects on judgments of WTP for public goods, such that higher values in the initial question led to higher subsequent WTP in the subsequent open-ended question. The same results—that arbitrary anchors alter WTP—have also been replicated with products (e.g., phone, backpack) (Ariely, Loewenstein, and Prelec, 2003; Simonson and Drolet, 2004).

While these experiments used arbitrary numbers as anchors, much marketing research on WTP has focused on how exposure to certain prices influence how price anchors (i.e., reference price) are constructed and used for subsequent price evaluation. For example, research has examined whether previous exposure to a certain price anchors consumers' WTP across categories (Nunes and Boatwright, 2004) or within category (Adaval and Monroe, 2002; Krishna et al., 2006). This research proposes that the anchoring process can explain differences in consumers' WTP, where WTP systematically changes depending on the price of products displayed in the same market context. More specifically, these studies explore the effect of price exposure to items immediately prior to purchase in an experimental context. These anchoring effects have often been explained as insufficient adjustments away from the anchor; therefore, the anchor inevitably has to be a certain number. However, recently, a new explanation for anchoring has been proposed by several researchers, which posits that anchoring is an outcome of selective activation of associative semantic constructs (e.g., Mussweiler and Strack 2001).

10.2.2 Semantic Anchoring and Selective Accessibility

The recently proposed anchor-as-activation perspective views anchoring as a special case of semantic priming. The most important property of these activation accounts is that the presence of an anchor increases the likelihood of activation of anchor-consistent features of the focal target; therefore, the anchor selectively activates information that the anchor and the target hold in common, while reducing the availability of features of the target that differ from the anchor (Chapman and Johnson, 1999; Mussweiler and Strack, 1999). This selective facilitation thus influences the availability or retrieval of focal object features to be judged similar to the anchor, and, as a consequence, this selective facilitation biases the information used in the target evaluation. In other words, decision makers tend to give more attention to target features that are similar to the anchors due to decision makers' increased accessibility to these features as compared to features that are different from the anchors. For example, suppose a decision maker was asked to evaluate a trip to South America that was presented with a high anchor (e.g., expensive dress). She might envision a luxurious cruise ship with a wet bar, swimming pool, and evening parties. Conversely, if a low anchor (e.g., cheap dress) were presented, the decision maker might imagine a bumpy, noisy, crowded bus trip with no air conditioning (Chapman and Johnson, 1999).

In accordance with the anchor-as-activation perspective, the selective accessibility model further posits that the primed information will influence the target only if it is semantically relevant, and that this information retrieved in order to compare the anchor to the target is consequently more available for use when estimating the target value (Strack and Mussweiler, 1997; Mussweiler and Strack, 2001). That is, comparing the value of a stimulus with an anchor stimulates people to think about features of the stimulus with values similar to that of the anchor.

As in the trip example, a low anchor semantically activates features of a cheap lousy bus trip. Once these features become accessible in memory, they are used as a basis for subsequently reported judgments. Therefore, the value of the trip would be estimated to be lower.

This perspective predicts that the assimilation of a numeric estimate to a previously considered standard is also semantic in nature. Further, the anchor not only biases participants' estimates of the product's actual price, but also influences the price that participants are willing to pay for a product of the type being described. Consistent with these predictions, it has been demonstrated that the anchor also influences the price that participants are willing to pay for a product (Adaval and Wyer, 2011). That is, an external price anchor can stimulate thoughts about the features of products sold at these prices; therefore, the price estimates are higher in the presence of a high anchor, which increases WTP for the product. This result suggests that, if these features are retrieved at the moment in which participants judge how much they are willing to pay for a target product, the WTP is likely to be assimilated towards the anchor.

While most studies testing the selective accessibility model demonstrate the activation of semantic concepts by numeric anchors, it has also been demonstrated that semantic concepts actually activate numeric anchors, and in turn, influence subsequent numeric estimations. For example, Chernev (2011) tested anchoring effects in the sequential estimation of the numeric values of the caloric contents of foods and found that healthiness and harmfulness of food category anchor subsequently affected the caloric estimation of an item in a way that items classified into the same category (e.g., french fries and hamburger) lead to assimilation, whereas items classified into different categories (e.g., salad and hamburger) lead to contrast. These results highlight two important points: semantic concepts activate numeric anchors, and these activated anchors influence subsequent numeric estimation in an anchor-consistent manner.

Given all of the above, it is clear that semantically activated anchors influence subsequent numeric evaluations. Recall the main proposition: that social density lowers consumers' WTP. The next question, then, is what role social density plays in the activation of the anchors. I propose that person judgments occurring in a dense context influence judgmental anchoring of WTP on displayed products in the same context.

10.2.3 The Influences of Social Density on Person Judgments

Researchers have found that situational contexts spontaneously activate internal representations associated with those contexts, which in turn influence judgments made by individuals in those contexts. Individuals, in essence, tend to infer domain meaning from the broader environmental context and apply this meaning to their judgments and evaluations of people presented therein (see Blair 2002 for a review). For example, Barden et al. (2004) observed that specific situational contexts could entirely attenuate or reverse typical patterns of social judgment (e.g., racial bias). In particular, participants displayed an evaluative bias in favor of Asians relative to Blacks when an individual was presented in the context of a student role, but that this pattern was reversed in the context of a basketball player role.

Similarly, in their research on racial stereotyping, Wittenbrink et al. (2001) presented individuals with a picture of either a ghetto or a church and found that the ghetto context amplified a racial bias toward black people, but that the church context completely attenuated it. They argued that the situational context (i.e., the picture of the ghetto or church) activated a stereotypical exemplar of individuals commonly represented in these contexts. In turn, the contextually activated representations influenced evaluations of other individuals. Specifically, the results suggest that semantic associations of particular contexts retrieve a typical exemplar associated with the specific context and the target person's evaluation tends to be assimilated towards the activated exemplar.

Importantly, the effects of context on social judgment have been found beyond purely evaluative measures. For example, by exposing individuals to pictures of neighborhoods that imply different socio-economic status (e.g., pictures depicting impoverished neighborhoods vs. wealthy neighborhoods), Shriver et al. (2008) found that middle-class white perceivers showed

superior recognition for known same-race faces which had previously been presented in a wealthy but not impoverished context during a learning phase. Thus, the extent of actual recognition of a focal object (in this case a human face) was contingent on the social context in which the face was originally presented. This evidence clearly suggests the role of contextual semantic associations on person evaluation judgments. Given all of the above, it is clear that social context activates a typical mental representation (i.e., typical person exemplar), which is in turn used as an anchor and a subsequent judgment and evaluation of a target person.

The present study is interested in what type of person exemplar is activated in high and low socially dense store contexts. It is hypothesized that socially dense store contexts are strongly associated with deal-prone store patrons, as it is common knowledge that high store traffic is associated with price discounts and sales deals. It can be argued that individuals have naturally learned this association between high store traffic and sales deals though a lifetime of socialization. For example, during one of the biggest price discount events, Black Friday, store visits were over 300 million at US retail locations nationwide in 2012 (Ridgway and Meinero, 2012). In fact, much research has empirically demonstrated the positive relationship between price promotion and high store traffic. Price promotions, which provide greater value via discount, have been used to attract consumers to retail stores, generating increased store traffic (Grewal, Monroe, and Krishnan, 1998; Lichtenstein and Bearden, 1989). Walters and MacKenzie (1988) also empirically demonstrated that loss leader pricing produces an increase in store traffic. Therefore, this strong association between high store traffic and price discount is very likely to lead to spontaneous associative activation of deal prone customer exemplars as store density increases.

Collectively, then, these studies provide strong evidence that the situational context itself can lead individuals to make differential evaluations of people presented in that context. In particular, one distinct situational cue in retail environments that may impact these internal representations is the level of social density, that is, how many other shoppers occupy the store's space. In this paper, I propose that social density is a relevant piece of contextual information that acts as an anchor that can ultimately influence consumers' WTP.

Chapter 11

THEORY AND PROPOSITIONS

11.1 Overview of Research and Hypotheses

The second essay of my dissertation, then, explores whether the social density of store environments might modulate consumer WTP. My core proposition is that semantic activation of typical exemplars from different socially dense environments can systematically change people's WTP. Specifically, I propose that the level of social density in a given situational context can activate a typical exemplar of a certain type of individual, which in turn biases expectations of the type of individuals one would expect to encounter in that context. I propose that a high-density store context will activate an exemplar of deal-prone customers, whereas a low-density store context will activate an exemplar of quality-seekers. Further, I propose that these representations of typical customers are used as anchors, which will be shown to influence WTP.

In particular, when consumers consider a particular context (e.g., high-density store), specific features of a typical customer whom they are likely to encounter in this context are activated (i.e., features of a typical deal-prone customer). Once this selective subset of exemplars becomes accessible in memory, it is used as a basis for assessing product price in the context (Mussweiler and Strack, 1999). In particular, consumers spontaneously think about features of cheap shoes when they evaluate the deal-proneness of a typical customer as high. The anchor not only biases participants' estimates of the product's actual price, but also influences the price that participants are willing to pay for a product of the type being described (Adaval and Wyer, 2011). Therefore, it is expected that a highly dense store context will lower consumers' WTP for a focal product presented in the same context.

Main proposition: The social density of a store context induces anchoring effects, altering consumers' WTP.

If social density does indeed alter inferences regarding the judgments of individuals expected within the prevailing context, then accessibility to the features associated with those individuals will be facilitated and influence estimation of WTP for the focal product offered in the same context. Therefore, I propose that, in a high density store context, a target product (with ambiguous properties) will be evaluated as being less expensive (and thus the shopper will be less willing to pay for that product), whereas in a low-density store context, that same target product will be evaluated as being more expensive (and thus the shopper will be more willing to pay for that product). It is hypothesized that the inferred deal-proneness of the typical customer in both the high-density and low-density contexts will mediate the valuation of a typical product (with ambiguous properties) and, therefore, WTP in each context.

Extant research also suggests that memory for the target price, after a period of time has elapsed, presumably becomes partially assimilated to the adaptation level (Upshaw 1969; see also Helson 1964). Thus, these values (remembered prices) become less distinguishable both from one another and from the adaptation level (anchored price) itself. Therefore, I propose that individuals will recall the price as having been lower (higher) after encoding the value in a high-density (low-density) context, since the memory of the objective price will be assimilated to the adaptation level formed in the context that might be lower (higher) than in actuality.

Hypothesis of Social Density on Willingness to Pay: High-density (vs. Low-density) store context will lower (vs. increase) consumers' WTP. Social perception mediates this effect.

H1. Individuals are willing to pay less for products that are presented in a high (vs. low) socially dense store context.

H2. The effects will be mediated by activated social perception (e.g., features of a typical deal-prone customer) as an anchor.

H3. Over time, the actual price will be assimilated toward the activated anchor, meaning participants will remember the price as having been lower (vs. higher) when it was encountered in a higher (vs. lower) density context.

11.2 Tests for Effect of Density on WTP and Overview of Studies

Five studies tested my propositions. The effect of social density on consumers' WTP was tested in a variety of contexts, including imagined and authentic contexts. Throughout experiments, store images with different levels of social density were used to measure participants' WTP in both hypothetical purchase situations as well as an incentive-compatible real auction. Experiments 13 and 14 test Hypothesis 1, that high social density decreases WTP, and rules out an alternative explanation of this effect. Experiment 15 replicates this result and further shows that the perceptions of a typical customer mediate these effects (Hypothesis 2). Experiment 16 tests WTP assimilation to the internal standards constructed in each density context (Hypothesis 3). Finally, completing this initial sequence of studies, Experiment 17 demonstrates the external validity of the findings by replicating the effects in an auction involving participants' real money.

Chapter 12

INFLUENCES OF STORE DENSITY ON WILLINGNESS TO PAY

12.1 Experiment 13: Influence of Store Density on Willingness to Pay

While the main goal of the first study is to explore the basic relationship between social density and WTP, another important goal is to examine, if there is an effect, whether it comes from density or number of people in a given space. To tease apart the source of the effect, density is manipulated using both number of people and available store space per person. If number of people matters, manipulating available space per person should lead to the same consequences as crowding; however, if density matters, a set number of people should be evaluated differently in a larger space than a smaller space.

12.1.1 Methods

Subjects and Design

Eighty-six participants from an online panel participated in this study for payment and were randomly assigned to one of three conditions: high-density, low-density, and number-control conditions.

Materials and Procedure

Photoshop was used to modify images of a store to create a crowded scene (containing 35 people), an uncrowded scene (containing 4 people), or low-density scene (containing 35 people in a triple-sized space, see Appendix J). To control for individual level cues that may influence inference of type of person, store images were populated with human silhouettes rather than

images of real people. The study was administered online and was presented to participants as a store image study. To avoid suspicion about the silhouettes, participants were told that the image was based on a real photo of a store but that the images had been replaced by silhouettes to protect their identities.

Participants were asked to spend a few moments examining the store image and to then imagine they had entered the store to buy a pair of shoes. They were then asked to report the amount they would be willing to pay for a pair of shoes at this store by marking a continuous scale anchored from $20 to $400.

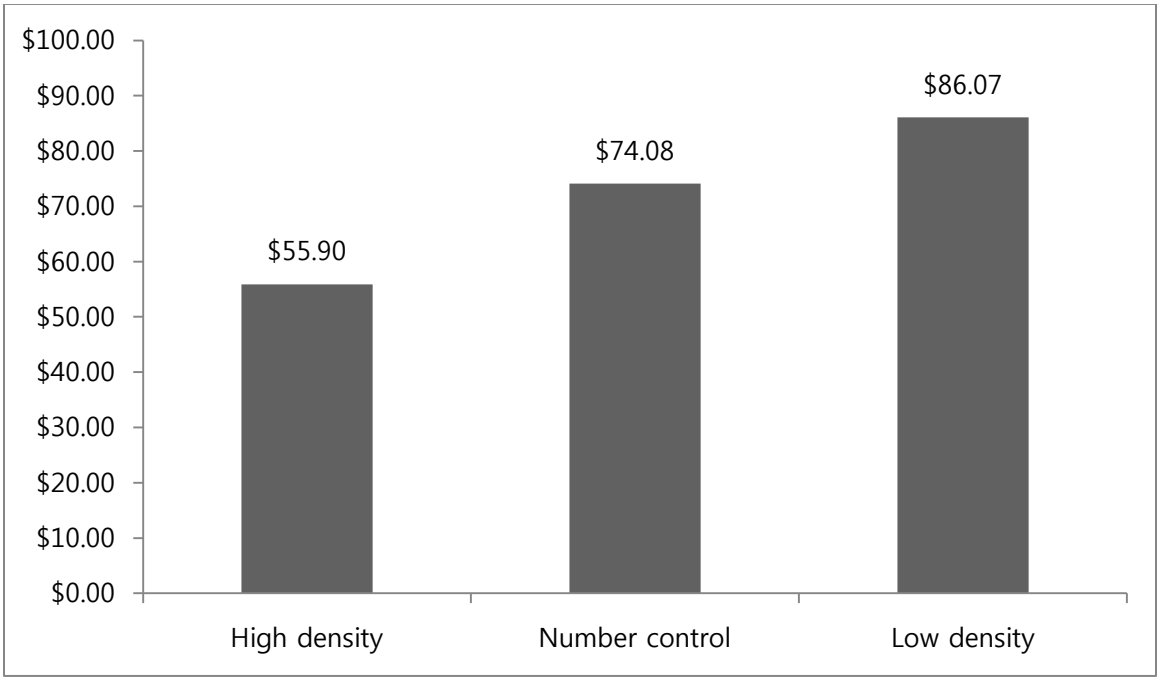
12.1.2 Results and Discussion

As shown in Figure 12.1, participants indicated they would be willing to spend significantly more in the uncrowded store (M= $86.07) than in the crowded store (M = $55.9), with the low-density condition falling between (M=$74.08; $F(2, 83) = 5.96$, $p < .005$). A planned contrast with weight 1, -1, 0 revealed a significant difference between the crowded and uncrowded store, $t(83)=-3.4$, $p<.001$. However, a test with weights 0, 1, -1 did not show significant results ($p>1$, ns), indicating that density rather than simply a high number of people influence WTP. In particular, viewing the image in both the uncrowded scene and the low-density condition (i.e., with fewer people and the same number of people in a larger space). Thus, the level of store density appears to have a significant impact on general WTP. The results from this study also allow a possible confound effect from number of people to be ruled out.

However, a potential alternative explanation for these results is that the high-density context may have led participants to imagine the store as a stressful environment, or perhaps invoked thoughts about a long wait period to check out. Either may have led participants to

imagine a shorter stay at the store, thus leading them to offer lower estimates of WTP. (Even though, since participants were asked about WTP for a single product, rather than a basket of goods, this is perhaps a little unlikely). To remedy this concern, in the next study, participants were asked to infer the price of an ambiguous product, rather than to state how much they would spend in the store.

Figure 12.1 Mean WTP by Level of Density (Experiment 13)



12.2 Experiment 14: Store Density and Price Inferences

Experiment 14 has two main goals. First, in an attempt to not influence participants' potential expectations regarding stress levels in the store, a price inference dependent measure is used. Second, while Experiment 13 was binary in nature (i.e., crowded vs. uncrowded), this study implements a condition with an intermediate level of crowding.

12.2.1 Methods

Subjects and Design

Eighty-four undergraduate students participated in this study voluntarily and were randomly assigned to either a high-density, medium-density, or low-density condition.

Materials and Procedure

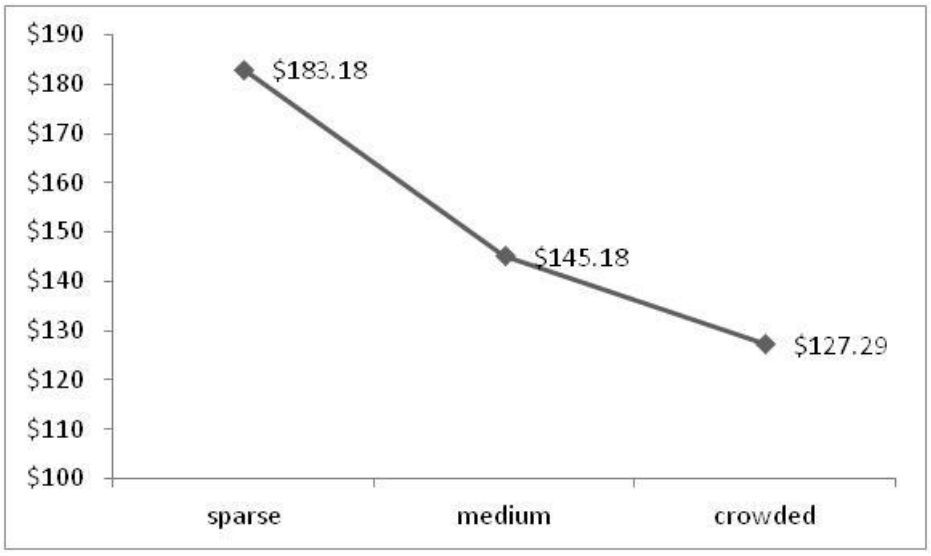
The same images used in Experiment 13 were utilized here: the low-density condition used a store context with four silhouettes, the medium-density condition used a store context with 14 silhouettes, and the high-density condition used a store context with 35 silhouettes (see Appendix J).

The study was administered via a paper and pencil packet and, once again, was presented as a store image study. Participants followed the same instructions as in Experiment 13; however, this time, instead of asking about their WTP, participants were instead instructed to estimate the price of a pair of shoes for sale in the store. To minimize the chance that other product cues would be used to make this estimate, participants were simply shown an ambiguous shoebox that they were told was from the store presented, and they were asked to estimate the price of the shoes given the information provided on a scale anchored from $20 to $400.

12.2.2 Results and Discussion

As shown in Figure 13.2, participants estimated the shoe price highest at the uncrowded store (M = $183.18), lowest at the crowded store (M = $127.29; F (2, 81) = 3.62, p < .04), and in-between at the medium-density store (M = $145.18). A linearity test revealed that the relationship between store density and estimated price did indeed appear to be linear (F(1, 81) = 6.9, p < .01).

Figure 12.2 Price Inferences by Level of Density (Experiment 14)



Recall that the main proposition was that social density alters perceptions of individuals expected within the prevailing context, and that these perceptions modulate WTP for products appearing in the context. To test this proposition, the next study explores whether these effects of social density on WTP are mediated by a stereotypic valuation of a typical customer.

12.3 Experiment 15: Mediation by Social Perception: Deal-proneness

The main goal of Experiment 15 is to explore process evidence of the social density related WTP observed in Experiment 13 and 14. In particular, this study investigates whether perceptions of a typical customer from different density contexts might alter participant expectations of how much money they would spend in a store depending on level of social density. As such, this study extends Experiment 13 and 14 by demonstrating the mechanism of this effect.

12.2.1 Methods

Subjects and Design

Ninety six participants from an online panel participated in this study for payment and were randomly assigned to either high-density or low-density condition.

Materials and Procedure

The study was administered online and was presented to participants as a store image study. The crowded and uncrowded condition store images from Experiment 13 were used, and the same methodology was employed. Participants were then asked to provide their immediate impressions of the degree of deal-proneness of the individuals in the image, and the estimated price of the shoes that the shoppers were wearing. In particular, participants rated the estimated deal-proneness of a typical customer presented on a 7-point scale anchored from 1 (not at all) to 7 (very much so) and provided an estimate of average price of the shoes they were currently wearing on a continuous scale anchored from $20 to $400 as a proxy measure of deal-proneness.

12.2.2 Results and Discussion

Willingness to Pay

As predicted, participants indicated they would be willing to spend more at the uncrowded store (M= $112.3) than the crowded store (M = $75.08; t (94) = -2.75, p < .007). Thus, the mere crowdedness of the store appeared to have a significant impact on general WTP.

Deal-Proneness of a Typical Customer

Participants rated the deal-proneness of a typical customer at the crowded store to be higher (M = 4.8) than a typical customer at the uncrowded store (M = 2.6; t (94) = 8.52, p < .001). Moreover, participants estimated the price of shoes that the shoppers were wearing to be considerably higher in the uncrowded store (M = $149.94) than that of typical customers in the crowded store (M = $82.69; t (94) = -4.4, p <.001).

Mediation Analysis

To explore whether this effect of density on WTP was mediated by perception of deal-proneness of a typical customer, the indirect effect of store density on WTP was examined through the proxy measure of deal-proneness, namely, the estimated price of shoes that shoppers were currently wearing (Preacher and Hayes, 2004). Using 5,000 bootstrap samples, this analysis revealed a significant indirect effect of the level of density through shoes price with a 95% confidence interval (CI), excluding zero (19.72 and 58.49). A series of regressions were then conducted (see Table 12.1 for the step-by-step procedure). The effect of social density on WTP (β) was still significant when the deal-proneness of a typical customer was included; however,

the effect (β) decreased from 37.23 to -0.19. As such, it appears that the estimated deal-proneness of a typical customer at the store partially mediated the influence of density on WTP (Preacher and Hayes, 2004, 717).

Table 12.1 The Mediating Role of Deal-proneness of a Typical Customer (Experiment 15)

	B	*T*	*P value*
Social density predicting WTS	37.2	$t(94) = 2.75$	$p<.007$
Social density Predicting Deal-proneness	68.3	$t(94) = 4.41$	$p<.001$
Deal-proneness and	.54	$t(94) = 7.65$	$p<.001$
social density predicting WTS	.19	$t(93) = .02$	$p>.98$*

Note. – * indicates a partial mediation.

Experiment 15 built on the results of Experiment 14 by demonstrating that the mere density of a store, without any other contextual price information, is sufficient to systematically bias inference of perceptions of individuals and thus influences WTP. In other words, these data demonstrate that an entirely non-product related piece of contextual information, namely social density, can systematically influence WTP. Our mediation analysis further showed that this effect on WTP appeared to be partially determined by the underlying perceptions of store patrons.

12.4 Experiment 16: Formation of Anchor and Delayed Recall

The purpose of Experiment 16 is to further illuminate the proposed mediating process by showing evidence of WTP assimilation to the internal standards (i.e., the expected price that a typical customer is likely to spend on shoes) constructed in each level of density. It is predicted that the expectation of higher prices raises customers' reference prices, and the expectation of lower prices drops reference prices, which customers then use as an anchor for assessing WTP. To measure reference price, a delayed memory paradigm, which suggests that the remembered values of individual stimuli gradually become assimilated to the adaptation level over time, is adopted (Upshaw 1969; see also Helson 1964). Thus, remembered prices become less distinguishable both from one another and from the anchored price (reference price). If consumers are asked to recall the price of the target product immediately after the information is presented, they should report it fairly accurately, regardless of the context in which it was encountered. However, memory for the target price after a period of time has elapsed presumably becomes partially assimilated to the adaptation level. Given this, it is predicted that participants will recall the price as having been lower (higher) after encoding the value in a high-density (low-density) context, since the memory of the objective price will be assimilated to the adaptation level formed in that context.

12.4.1 Methods

Subjects and Design

One hundred sixty-six undergraduate students participated in this study for extra-credit. To measure participants' delayed memory, this study was designed with two phases: encoding and recall. The encoding phase was designed to precede the recall phase by 48 to 96 hours.

Materials and Procedure

Participants were randomly assigned to one of two density conditions (high vs. low density), received stimulus materials and instructions containing a link to the task via email. Participants were presented one of the two images used in the previous experiments (see Appendix J) and were asked to spend a few moments examining the image provided and imagine entering the presented store to buy a pair of shoes.

After context exposure, they were presented a picture of a box containing a pair of dress shoes (image pictured in Appendix K) and completed a series of rating tasks about their perceptions of the quality of the presented shoes. The shoes were presented simply as a box with a brief description of ten product features and a price of $76.99; an image of the shoes was not presented in order to limit confounding variables. To have participants unobtrusively encode the given price without any suspicion, they were then presented with five sets of rating tasks to evaluate overall quality, durability, fashionableness, comfortableness, and expensiveness. Finally, as a manipulation check, participants' degree of perceived crowdedness of the presented store was assessed using a 7-point scale anchored from 1 (not at all crowded) to 7 (very crowded).

At the conclusion of the encoding phase, all participants were invited to complete another online survey 48 to 96 hours later. Emails were sent to participants 48 to 96 hours later to remind them of the recall phase with a link to the memory task. In the memory task, they were asked to recall the price of the item they had encountered in the prior task as accurately as possible. Their answers were matched with the previous response using identification information.

12.4.2 Results and discussion

Manipulation Check

Participants rated the crowded store as significantly more crowded (M= 6.24) than the uncrowded store (M= 1.96; $F(1, 164) = 829.5$, $p < .001$).

Quality Judgment

Participants in the crowded store rated the pair of shoes as being of significantly less quality (M= 5.58) than those from the uncrowded store (M= 5.88; $F(1, 164) = 3.72$, $p < .05$). Participants in the crowded store also rated the pair of shoes as significantly less expensive (M= 4.74) than participants in the uncrowded store (M= 5.19; $F(1, 164) = 4.06$, $p < .04$). However, other indicators (i.e., durability, fashionable, comfortable) were not significantly different (*n.s*).

Recalled Price

It was proposed that participants in the high-density context would recollect the actual price of the product as being lower than participants in the low-density context. Consistent with this prediction, participants in the uncrowded store recalled the price as being higher (M= \$82.06) than those in the crowded store (M= \$75.51; $F(1, 164) = 4.01$, $p < .04$). These results show that participants' memory of the price was distorted, such that the recalled price was assimilated to the adaptation level formed in each context. Specifically, the effects of context that were detected after 48 – 96 hours showed that the initial context led to the construction of a standard, affecting the price estimates of the shoes.

12.5 Experiment 17: Measuring Behavioral WTP Through an Actual Auction

The primary purpose of Experiment 17 is to test the external validity of the core finding: that high social density tends to lower consumers' WTP. An ideal setting to achieve this goal is an auction, where the bidders' true reservation price (i.e., WTP) is revealed. A focal product (i.e., a hat) was presented in either a high-density or low-density store context. The central question is whether the density of the store affects the bidders' reservation price (i.e., actual bidding amount) for the hat.

12.5.1 Methods

Subjects and Design

Four hundred and ninety-eight undergraduate students were invited to participate in a real auction for course credit. Before beginning the auction, all participants were given the choice either to participate in the auction for an item that they would need to purchase if won or to participate in another activity. To increase participation rate, they were told that the auction would start at 50 cents and that the hat will be sold around 10% of the actual retail price in this auction. Two hundred forty-seven participants chose to participate in the auction, all of whom confirmed that they understood they would need to pay actual money. Participants were randomly assigned to two conditions: high- and low-density.

Materials and Procedure

Once participants decided to participate in the online auction, they were presented a detailed description of the procedure. They were told that we would like to know how much money they would be willing to spend for a brand new knitted beanie hat, the price of which had

not yet been determined. They were further told that their bidding success would be determined by their drawing a random price from a pool of potential prices: If they drew a price less than or equal to the price they bid, they must buy the hat for the price they drew, whereas if they drew a price greater than the price they bid, they would be unable to buy the hat. Therefore, they were told that to bid the maximum "true" price they would be willing to pay for the hat would be the best strategy. This incentive-compatible procedure for assessing WTP helps reduce overbidding and elicits more reliable valuations at the point of purchase (Becker, DeGroot, ad Marschak, 1964; Wertenbroch and Skiera, 2002).

In the actual auction, the bidders were shown one of the two store images used in the previous experiments (either high- or low-density stores; see Appendix L) and were told that the beanie would be sold in the pictured store. Based on this limited information, they were asked to report the maximum amount they would be willing to pay by dragging a slider from 5 cents to 10 dollars in 10 cent increments. After selecting the amount they were willing to pay, their success of bidding was determined by their drawing a random price. In reality, all the participants drew $5, and all participants who bid more than $5 won the hat.

12.5.2 Results and Discussion

The previous four studies showed that a high-density store context lowers consumers' WTP. Building on these findings, in the current experiment, the influence of social density on WTP was tested with real money in an actual incentive-compatible auction setting. It was predicted that participants would bid a smaller amount on the focal product when it was presented as being sold in a high-density retail context compared to a low-density context. As predicted, participants who viewed the product in a low-density context bid more (M= $4.1) than

those presented the product in a high-density context (M= $3.52; $F(1, 245) = 4.23, \quad p < .04$). These results are key, in that the core finding obtained in this essay was found not only in a laboratory, but also in a real auction.

Chapter 13

GENERAL DISCUSSION

The current research provides the first demonstration that the social density of an environment influences consumers' WTP. The first study (Experiment 13) examined the basic relationship between social density and WTP, showing that as social density increases, consumers' WTP decreases, and ruling out the possible alternative explanation that these effects are the result of an increased number of people in the store space rather than density per se. The next two studies replicated this finding and further showed that expected income of a typical customer mediates this effect (Experiments 14 and 15). In Experiment 16, evidence of assimilation of WTP to the internal standards was further demonstrated. Finally, in Experiment 17, the effect was replicated in an incentive-compatible auction involving participants' real money.

This dissertation contributes to the existing literature in a variety of ways. Previous research about anchoring and WTP has focused on whether the influence of exposure to extreme prices on WTP is only relevant for products from the same category (Krishna et al., 2006; Lichtenstein and Bearden, 1989; Urbany, Bearden, and Weilbaker, 1988) or whether the anchor influences WTP for products from different categories (Nunes and Boatwright, 2004; Adaval and Wyer, 2011). This study goes beyond this traditional approach and proposes a novel approach to WTP research. As the traditional approach uses primarily externally-presented price anchors, in which presentation of price anchors and estimations of WTP is sequential, applications of the findings are limited to situations where prior exposure to a certain price influences price estimation on a later-presented product. However, the current research shows that previously

exposed price is not the only information consumers use to form their reference price. Note that, in these studies, neither have external price anchors been offered nor sequential estimation tasks been presented. Therefore, as might be the case in real world situations, consumers seem to construct price anchors, in part, from social context and use this information to estimate their WTP.

Some studies do demonstrate that people often use self-generated anchors (Epley and Gilovich, 2001; Chandon and Wansink, 2007; Chernev, 2011). For example, Chernev (2011) examines anchoring effects in a scenario in which individuals make a series of evaluations, each followed by a numeric value estimate, finding that this activated anchor influences subsequent numeric estimation in anchor consistent manners. Studies have also examined the role of store level information on consumer WTP. Thaler (2008) showed that consumers' WTP for a beer changes depending on whether the beer is sold in a luxurious hotel lounge or a run-down store. His account for this effect is that the buyers' perceptions of a seller's costs influence their judgments about what price is fair, and in turn, influences their WTP.

However, none of these studies have examined whether self-generated anchors from social contexts (i.e., judgments of other people) anchor WTP of presented items. This dissertation is the first to demonstrate anchoring effects in a social context, suggesting that people are adept at generating an anchor from social cues in the environment, and that they use this information to estimate their WTP when the real value of the product is uncertain. This is an important step toward a new direction of WTP research, as individuals' adeptness at using contextual information is likely to activate a set of associated representations that may influence the way the object for sale is mentally represented.

One can imagine a variety of practical implications of this research. Perhaps the most direct implications pertain to the retail industry, especially to the extent that retailers can manipulate the actual or perceived social density of their retail space. As far as actual density is concerned, certain high-end fashion boutiques have long restricted how many people can be present in certain parts of the store at a given time. Our data suggests a new logic supporting this practice, as not only might the quality of customer service, and a general sense of prestige, be increased, but customers might actually perceive their potential purchases to be more valuable when they are less-crowded by fellow customers. Moving beyond managing the actual number of customers in the store, a related implication is that retailers might want to consider, via the creative use of walls and mirrors, designing stores in such a way as to manipulate the perceived crowdedness of the space.

Taken together, the data strongly support my proposition that level of social density influences how we perceive people and products. Real world consumption contexts are inherently social, and objects for sale are perceived as being more valuable, and thus shoppers are more willing to pay in a less-crowded shopping environment.

REFERENCES

ESSAY 1

Aiello, John. R., Epstein, Y. M., and Karlin, R. A. (1975), “Effects of crowding on electrodermal activity,” *Sociological Symposium, 14*, 42-57.

Allport, Gordon W. (1954), *The nature of prejudice*. Oxford England: Addison-Wesley.

Aureli, F., and De Waal, F. (1997), “Inhibition of social behavior in chimpanzees under high-density conditions,” *American Journal of Primatology, 41*(3), 213-228.

Barefoot, John C., Howard Hoople, and David McClay (1972), "Avoidance of an act which would violate personal space," *Psychonomic Science*, 28, no. 4: 205-206.

Baron, Reuben M., and David A. Kenny (1986), "The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations." *Journal of Personality and Social Psychology* 51, no. 6: 1173-1182.

Basso, Michael R., Bruce K. Schefft, M. Douglas Ris, and William N. Dember (1996), "Mood and global-local visual processing," *Journal of the International Neuropsychological Society*, 2(3), 249-255.

Baum, Andrew, Marc Riess, and John O'Hara (1974), "Architectural variants of reaction to spatial invasion," *Environment and Behavior*, 6, no. 1: 91-100.

Blanchard, Robert J., and D. Caroline Blanchard (1977), "Aggressive behavior in the rat," *Behavioral & Neural Biology* 21, no. 2: 197-224.

Blascovich, Jim, Wendy Berry Mendes, Sarah B. Hunter, and Kristen Salomon (1999), "Social 'facilitation' as challenge and threat," *Journal of Personality and Social Psychology*, 77(1) 68-77.

Boyer, Pascal and Brian Bergstrom (2011), "Threat-detection in child development: An evolutionary perspective,." *Neuroscience and Biobehavioral Reviews* 35, no. 4: 1034-1041.

Brewer, Marilynn B. (1999), "The psychology of prejudice: Ingroup love or outgroup hate?." *Journal of Social Issues,* 55, no. 3: 429-444.

Burke, Alafair, Friderike Heuer, and Daniel Reisberg (1992), "Remembering emotional events," *Memory & Cognition*, 20(3), 277-290.

Bursill, A. E. (1958), "The restriction of peripheral vision during exposure to hot and humid conditions," *The Quarterly Journal of Experimental Psychology* 10, 114-129.

Cacioppo, John T., Gary G. Berntson, and Stephen L. Crites (1996), "Social neuroscience: Principles of psychophysiological arousal and response," In *Social psychology: Handbook of basic principles*, 72-101. New York, NY US: Guilford Press.

Calhoun, John C. (1962), "Population Density and Social Pathology," *Scientific American*, *206*(2), 139-150.

Cannon, W. (1929), "The sympathetic division of the autonomic system in relation to homeostasis," *Archives of Neurology and Psychiatry*, 22, 282-294.

Christian, J . J., Flyer, V . & Davis, D. E . (1960), "Factors in Mass Mortality of a Head of Silka Deer, Cervus Nippon." *Chesapeake Science*, 1, 79-95.

Christens, Brian, and Paul W. Speer (2005), "Predicting violent crime using urban and suburban densities." *Behavior and Social Issues,* 14, no. 2: 113-127.

Clore, Gerald L., Karen Gasper, and Erika Garvin (2001), "Affect as information." In *Handbook of affect and social cognition*, 121-144. Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Cottrell, Nickolas B., Dennis L., Wack, Gary J. Sekerak, and Robert H. Rittle (1968), "Social Facilitation of Dominant Responses by the Presence of an Audience and the Mere Presence of Others," *Journal of Personality and Social Psychology*, 9 (3), 245-250.

Delevoye-Turrell, Yvonne, Cyril Vienne, and Yann Coello (2011), "Space Boundaries in Schizophrenia: Voluntary Action for Improved Judgments of Social Distances," *Social Psychology*, 42 (3), 193-204.

Derryberry, Douglas, and Don M. Tucker (1994), "Motivating the Focus of Attention." *In The Heart's Eye: Emotional Influences in Perception and Attention*, 167-196. San Diego, CA US: Academic Press.

Desor, J. A. (1972), "Toward a Psychological Theory of Crowding." *Journal of Personality and Social Psychology*, 21(1), 79-83.

Dosey, Michael A. and Murray Meisels (1969), "Personal space and self-protection," *Journal of Personality and Social Psychology* 11, no. 2: 93-97.

DeVore, Irven (1965), *Primate behavior: field studies of monkeys and apes*. n.p.: Holt, Rinehart and Winston.

Easterbrook, J. A. (1959), “The Effect of Emotion on Cue Utilization and the Organization of Behavior,” *Psychological Review*, 66(3), 183-201.

Eroglu, Sevgin A., and Karen A. Machleit (1990), "An empirical study of retail crowding: Antecedents and consequences," *Journal of Retailing* 66, no. 2: 201-221.

Eroglu, Sevgin A., Karen Machleit, and Terri Feldman Barr (2005), "Perceived retail crowding and shopping satisfaction: The role of shopping values," *Journal of Business Research*, 58(8), 1146-1153.

Eyal, Tal, Nira Liberman, Yaacov Trope, and Eva Walther (2004), "The Pros and Cons of Temporally Near and Distant Action," *Journal of Personality and Social Psychology*, 86(6), 781-795.

Eysenck, Hans. J. (1967), *The biological basis of personality,* Thomas: Spring-field, Ill.

Eysenck, Hans J. (1990), "Genetic and environmental contributions to individual differences: The three major dimensions of personality," *Journal of Personality*, 58(1), 245-261.

Evans, Gary W. (1979), "Behavioral and Physiological Consequences of Crowding in Humans." *Journal of Applied Social Psychology*, 9(1), 27-46.

Evans, Gary W. (2000), "Crowding," In *Encyclopedia of psychology*, Vol. 2, 377-380. Washington, DC New York, NY USUS: American Psychological Association, 2000.

Evans, Gary W., Stephen J. Lepore, and Karen Mata Allen (2000), "Cross-cultural differences in tolerance for crowding: Fact or fiction?," *Journal of Personality and Social Psychology* 79(2), 204-210.

Evans, Gary W., and Stephen J. Lepore (1993), "Household crowding and social support: A quasiexperimental analysis," *Journal of Personality and Social Psychology* 65, no. 2: 308-316.

Evans, Gary W., and Richard E. Wener (2007), "Crowding and personal space invasion on the train: Please don't make me sit in the middle," *Journal of Environmental Psychology* 27, no. 1: 90-94.

Fanselow, Michael S. (1994), "Neural organization of the defensive behavior system responsible for fear," *Psychonomic Bulletin & Review* 1, no. 4: 429-438.

Fazio, Russell H., and Cooper, J. (1983), “Arousal in the Dissonance Process,” In J. T. Cacioppo & R.E. Petty (Eds.), Social Psychophysiology: A sourcbook (pp.137-155). New York: Guilford Press.

Felipe, Nancy J., and Robert Sommer (1966), "Invasions of Personal Space," *Social Problems* 14, no. 2: 206-214.

Fiske, Susan T., and Shelley E. Taylor (1991), *Social cognition (2nd ed.)*, New York, NY England: Mcgraw-Hill Book Company.

Förster, Jens, Nira Liberman, and E. Tory Higgins (2005), "Accessibility from active and fulfilled goals," *Journal of Experimental Social Psychology* 41, no. 3: 220-239.

Fowles, Don C. (1980), "The three arousal model: Implications of Gray's two-factor learning theory for heart rate, electrodermal activity, and psychopathy," *Psychophysiology*, 17(2), 87-104.

Freedman, J., Klevansky, S., and Ehrlich, P. (1971), “The Effect of Crowding on Human Task Performance,” *Journal of Applied Social Psychology*, *1*(1), 7-25.

Freedman, Jonathan L. (1975), *Crowding and behavior,* Oxford England: W. H. Freedman.

Freitas, Antonio L., Peter Salovey, and Nira Liberman (2001), "Abstract and concrete self-evaluative goals," *Journal of Personality and Social Psychology* 80, no. 3: 410-424.

Fujita, Kentaro, Tal Eyal, Shelly Chaiken, Yaacov Trope, and Nira Liberman (2008), "Influencing attitudes toward near and distant objects," *Journal of Experimental Social Psychology*, 44(3), 562-572.

Gable, Philip A., and Eddie Harmon-Jones (2008), "Approach-motivated positive affect reduces breadth of attention," *Psychological Science* 19, no. 5: 476-482.

Galle, Omer R., Walter R. Gove, and J. Miller McPherson (1972), "Population density and pathology: What are the relations for man?," *Science,* 176, no. 4030: 23-30.

Gasper, Karen, and Gerald L. Clore (2002), "Attending to the Big Picture: Mood and Global versus Local Processing of Visual Information." *Psychological Science,* 13(1), 34-40.

Gasper, Karen. (2004), "Do You See What I See? Affect and Visual Information Processing," *Cognition and Emotion*, *18*(3), 405-421.

Glass, David C., and Jerome E. Singer (1972), *Urban Stress: Experiments on Noise and Social Stressors*. New York: Academic Press.

Glick, Peter, Judith A. DeMorest, and Carla A. Hotze (1988), "Keeping your distance: Group membership, personal space, and requests for small favors," *Journal of Applied Social Psychology* 18, no. 4, Pt 2: 315-330.

Goffman, Erving (1963), "Embarrassment and Social Organization," In *Personality and social systems*, 541-548. Hoboken, NJ US: John Wiley & Sons Inc, 1963.

Gray, Jeffrey A. (1982), *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. New York, NY US: Clarendon Press/Oxford University Press, 1982.

Gray, Jeffrey A., and Neil McNaughton (1996), "The neuropsychology of anxiety: Reprise," In *Nebraska Symposium on Motivation, 1995: Perspectives on anxiety, panic, and fear*, 61-134.

Graziano, Michael S. A., and Dylan F. Cooke (2006), "Parieto-frontal interactions, personal space, and defensive behavior," *Neuropsychologia* 44, no. 6: 845-859.

Gray, John E. (1972), "Self-rating and Eysenck Personality Inventory estimates of neuroticism and extraversion," *Psychological Reports*, 30(1), 213-214.

Gray, Jeffrey. A. (1987), *The psychology of fear and stress*, Cambridge: Cambridge University Press.

Griffitt, W., and R. Veitch (1971). “Hot and Crowded: Influences of Population Density and Temperature on Interpersonal Affective Behavior,” *Journal* of *Personality and Social Psychology*, 17(1): 92-98.

Hall, Edward. (1966). *The Hidden Dimension (1st ed.)*. New York, NY US: Doubleday & Co.

Harmon-Jones, Eddie, and Philip A. Gable (2008), "Incorporating motivational intensity and direction into the study of emotions: Implications for brain mechanisms of emotion and cognition-emotion interactions," *Netherlands Journal of Psychology* 64, no. 4: 132-142.

Harrell, Gilbert D., Michael D. Hutt, and James C. Anderson (1980), "Path analysis of buyer behavior under conditions of crowding," *Journal of Marketing Research* 17, no. 1: 45-51.

Hediger, Heini (1955), Studies of the psychology and behavior of captive animals in zoos and circuses. Oxford England: Criterion Books, Inc.

Hogg, Michael A., and Dominic Abrams (1988), *Social identifications: A social psychology of intergroup relations and group processes.* Florence, KY US: Taylor & Frances/Routledge.

Hui, Michael K., and John E. Bateson (1991), "Perceived control and the effects of crowding and consumer choice on the service experience," *Journal of Consumer Research*, 18(2), 174-184.

Irwin, Altman (1975). Environmental Psychology: At the Start of Something Big. PsycCRITIQUES, 20(3), 205-207.

Isen, Alice M., and Kimberly A. Daubman (1984), "The influence of affect on categorization," *Journal of Personality and Social Psychology*, 47(6), 1206-1217.

Ittelson, W., H. Proshansky, and L. Rivlin (1970) “The Environmental Psychology of the

Psychiatric Ward.” In H. Proshansky, W. Ittelson, and L. Rivlin (eds.), *Environmental Psychology* (New York: Holt).

Kennedy, Daniel P., Jan Gläscher, J. Michael Tyszka, and Ralph Adolphs (2009), "Personal space regulation by the human amygdale," *Nature Neuroscience*, 12(10), 1226-1227.

Kühnen, Ulrich, and Daphna Oyserman (2002), "Thinking about the self influences thinking in general: Cognitive consequences of salient self-concept," *Journal of Experimental Social Psychology* 38(5), 492-499.

Liberman, Nira, and Yaacov Trope (1998), "The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory," *Journal of Personality and Social Psychology,* 75(1), 5-18.

Liberman, Nira, Michael D. Sagristano, and Yaacov Trope (2002), "The effect of temporal distance on level of mental construal," *Journal of Experimental Social Psychology,* 38(6), 523-534.

Lang, Peter J. and Bradley, Margaret M. (2008). Appetitive and defensive motivation is the substrate of emotion. *Handbook of approach and avoidance motivation* (pp. 51-65). New York, NY US: Psychology Press.

Lang, Peter J., Margaret M. Bradley, and Bruce N. Cuthbert (1997), "Motivated attention: Affect, activation, and action." In *Attention and orienting: Sensory and motivational processes*, 97-135. Mahwah, NJ US: Lawrence Erlbaum Associates Publishers, 1997

LeDoux, Joseph E. (1990), "Fear pathways in the brain: Implications for a theory of the emotional brain," In *Fear and defence*, 163-177. Amsterdam Netherlands: Harwood Academic Publishers.

Levav, Jonathan, and Rui (Juliet) Zhu (2009), "Seeking Freedom Through Variety." *Journal of Consumer Research,* 36(4), 600-610.

Liberman, Nira, and Yaacov Trope (1998), "The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory," *Journal of Personality and Social Psychology* 75, no. 1: 5-18.

Liberman, N., Sagristano, M., & Trope, Y. (2002), "The Effect of Temporal Distance on Level of Mental Construal," *Journal of Experimental Social Psychology*, 38(6), 523-534.

Loo, Chalsa M. (1978), "Behavior problem indices: The differential effects of spatial density on low and high scorers," *Environment and Behavior* 10, no. 4: 489-510.

Loo, Chalsa, and Denise Kennelly (1979), "Social density: Its effects on behaviors and perceptions of preschoolers," *Environmental Psychology & Nonverbal Behavior* 3, no. 3: 131-146.

Luu, Phan, Don M. Tucker, and Douglas Derryberry (1998), "Anxiety and the motivational basis of working memory," *Cognitive Therapy and Research* 22, no. 6: 577-594.

Machleit, Karen A., Sevgin A. Eroglu, and Susan Powell Mantel (2000), "Perceived retail crowding and shopping satisfaction: What modifies this relationship?" *Journal of Consumer Psychology* 9, no. 1: 29-42.

Mandler, George (1975), "Memory Storage and Retrieval: Some Limits on the Reach of Attention and Consciousness," In P. M. A. Rabbitt & S. Dornic (Eds.), *Attention and Performance V* (pp.499-516). New York: Academic Press.

Matlin, Margaret W., and Robert B. Zajonc (1968), "Social facilitation of word associations," *Journal of Personality and Social Psychology*, 10(4), 455-460.

McBride, G., M. G. King, and J. W. James (1965), "Social proximity effects on galvanic skin responses in adult humans," *Journal of Psychology: Interdisciplinary and Applied,* 61(1), 153-157.

McClelland, Lou, and Nathan Auslander (1978), "Perceptions of crowding and pleasantness in public settings," *Environment and Behavior* 10, no. 4: 535-553.

McDowell, Kenneth V. (1972), "Violations of personal space," *Canadian Journal of Behavioural Science/Revue Canadienne Des Sciences Du Comportement* 4, no. 3: 210-217.

McNaughton, Neil, and Philip J. Corr (2004), "A two-dimensional neuropsychology of defense: Fear/anxiety and defensive distance," *Neuroscience and Biobehavioral Reviews* 28, no. 3: 285-305.

McNaughton, Neil, and Jeffrey A. Gray (2000), "Anxiolytic action on the behavioural inhibition system implies multiple types of arousal contribute to anxiety," *Journal Of Affective Disorders* 61, no. 3: 161-176.

Mikulincer, Mario, Peri Kedem, and Dov Paz (1990), "The impact of trait anxiety and situational stress on the categorization of natural objects," *Anxiety Research*, 2(2), 85-101.

Mikulincer, Mario, Peri Kedem, and Dov Paz (1990), "Anxiety and Categorization: I. The Structure and Boundaries of Mental Categories," *Personality and Individual Differences*, 11(8), 805-814.

Mummendey, Amélie, Bernd Simon, Carsten Dietze, Melanie Grünert, Gabi Haeger, Sabine Kessler, Stephan Lettgen, and Stefanie Schäferhoff (1992), "Categorization is not enough: Intergroup discrimination in negative outcome allocation," *Journal of Experimental Social Psychology* 28, no. 2: 125-144.

Myers, Dowell, William C. Baer, and Seon-Youn Choi (1996), “The Changing Problem of Overcrowded Housing,” Journal of American Planning Association, 62:66-84.

Neiss, Rob (1988), "Reconceptualizing arousal: Psychobiological states in motor performance," *Psychological Bulletin*, 103(3), 345-366.

Neuberg, Steven L., Douglas T. Kenrick, and Mark Schaller (2011), "Human threat management systems: Self-protection and disease avoidance," *Neuroscience and Biobehavioral Reviews* 35, no. 4: 1042-1051.

Nicosia, Gregory J. (1979), "Effects of bodily contact on reactions to crowding," *Journal of Applied Social Psychology*, 9(6), 508-523.

Novelli, David, John Drury, and Steve Reicher (2010), "Come together: Two studies concerning the impact of group relations on ‘personal space’," *British Journal of Social Psychology* 49, no. 2: 223-236.

Nussbaum, Shiri, Yaacov Trope, and Nira Liberman (2003), "Creeping dispositionism: The temporal dynamics of behavior prediction," *Journal of Personality and Social Psychology* 84(3), 485-497.

Oldham, Greg R., and Yitzhak Fried (1987), "Employee reactions to workspace characteristics." *Journal of Applied Psychology* 72, no. 1: 75-80.

Reeves, Frank B., and Bruce O. Bergum (1972), "Perceptual narrowing as a function of peripheral cue relevance," *Perceptual and Motor Skills* 35, no. 3: 719-724.

Revelle, William, Phyllis Amaral, and Susan Turriff (1976), "Introversion/extroversion, time stress, and caffeine: Effect on verbal performance," *Science*, 192(4235), 149-150.

Revelle, William, Michael S. Humphreys, Lisa Simon, and Kirby Gilliland (1980), "The interactive effect of personality, time of day, and caffeine: A test of the arousal model," *Journal of Experimental Psychology: General*, 109(1), 1-31.

Rosch, Eleanor (1975), "Cognitive representations of semantic categories," *Journal of Experimental Psychology: General* 104, no. 3: 192-233.

Rosch, Eleanor (Ed.), and Barbara B. Lloyd (Ed.) (1978), *Cognition and categorization*. Oxford England: Lawrence Erlbaum.

Russell, James A., Anna Weiss, and Gerald A. Mendelsohn (1989), "Affect Grid: A single-item scale of pleasure and arousal," *Journal of Personality and Social Psychology* 57, no. 3: 493-502.

Sagristano, Michael D., Yaacov Trope, and Nira Liberman (2002), "Time-dependent gambling: Odds now, money later," *Journal of Experimental Psychology: General*, 131(3), 364-376.

Schachter, Stanley, and Jerome Singer (1962), "Cognitive, social, and physiological determinants of emotional state," *Psychological Review*, 69 (5), 379-399.

Schaeffer, Gerald H., and Miles L. Patterson (1980), "Intimacy, Arousal, and Small Group Crowding," *Journal of Personality and Social Psychology,* 38(2), 283-290.

Schuessler, K. (1962). Components of variation in city crime rates. *Social Problems*, 9(Spring), 314-323.

Schwarz, Norbert, and Gerald L. Clore (1983), "Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states," *Journal of Personality and Social Psychology,* 45(3), 513-523.

Schwarz, Norbert, and Gerald L. Clore (2003), "Mood as Information: 20 Years Later." *Psychological Inquiry,* 14(3-4), 296-303.

Semin, Gün R., and Klaus Fiedler (1988), "The cognitive functions of linguistic categories in describing persons: Social cognition and language," *Journal of Personality and Social Psychology*, 54(4), 558-568.

Shah, James Y., Paige C. Brazy, and E. Tory Higgins (2004), "Promoting us or preventing them: Regulatory focus and manifestations of intergroup bias," *Personality and Social Psychology Bulletin* 30, no. 4: 433-446.

Sherif, Muzafer, and Carolyn W. Sherif (1953), *Groups in harmony and tension; an integration of studies of intergroup relations*. Oxford England: Harper & Brothers.

Smith, Eliot R. (1998), "Mental representation and memory," In *The handbook of social psychology*, Vols. 1 and 2 (4th ed.), 391-445. New York, NY US: McGraw-Hill.

Stokols, Daniel (1972), "On the Distinction Between Density and Crowding: Some Implications for Future Research," *Psychological Review,* 79(3), 275-277.

Stokols, D., Rall, M., Pinner, B., & Schopler, J. (1973). "Physical, Social, and Personal Determinants of the Perception of Crowding,"*Environment and Behavior*, *5*(1), 87-115.

Sundstrom, Eric (1975), "An experimental study of crowding: Effects of room size, intrusion, and goal blocking on nonverbal behavior, self-disclosure, and self-reported stress," *Journal of Personality and Social Psychology* 32, no. 4: 645-654.

Tajfel, Hery (1970). Experiments in intergroup discrimination. Scientific American, 223, 96-102

Tajfel, Henri, M. G. Billig, R. P. Bundy, and Claude Flament (1971), "Social categorization and intergroup behaviour." *European Journal Of Social Psychology* 1, no. 2: 149-178.

Tajfel, Henry (1981). *Human Groups and Social Categories*. Cambridge University Press, Cambridge.

Tajfel, Henry and Turner, John. C. (1986). The social identity theory of inter-group behavior. In S. Worchel & L. W. Austin (Eds.), Psychology of Intergroup Relations. Chicago: Nelson-Hall

Thayer, Robert E. (1978), "Toward a Psychological Theory of Multidimensional Activation (Arousal)," *Motivation and Emotion*, 2(1), 1-34.

Thayer, Robert E. (1986), "Activation–Deactivation Adjective Check List: Current overview and structural analysis," *Psychological Reports*, 58(2), 607-614.

Todorov, Alexander, Amir Goren, and Yaacov Trope (2007), "Probability as a psychological distance: Construal and preferences," *Journal of Experimental Social Psychology* 43, no. 3: 473-482.

Tooby, John, and Leda Cosmides (1990), "The past explains the present: Emotional adaptations and the structure of ancestral environments." *Ethology & Sociobiology,* 11(4-5), 375-424.

Todorov, Alexander, Amir Goren, and Yaacov Trope (2007), "Probability as a psychological distance: Construal and preferences," *Journal of Experimental Social Psychology* 43, no. 3: 473-482.

Trope, Yaacov, and Nira Liberman (2000). "Temporal construal and time-dependent changes in preference," *Journal of Personality and Social Psychology,* 79(6), 876-889.

Trope, Yaacov, and Nira Liberman (2003), "Temporal Construal," *Psychological Review,* 110(3), 403-421.

Tucker, Don M., and Peter A. Williamson (1984), "Asymmetric Neural Control Systems in Human Self-Regulation," *Psychological Review*, 91(2), 185-215.

Tyler, Shirley K., and Donald M. Tucker (1982), "Anxiety and perceptual structure: Individual differences in neuropsychological function," *Journal of Abnormal Psychology* 91, no. 3: 210-220.

Ursin, Holger (1965), "The effect of amygdaloid lesions on flight and defense behavior in cats." Experimental Neurology 11, no. 1: 61-79.

Valins, Stuart, and Andrew Baum (1973), "Residential group size, social interaction, and crowding," *Environment and Behavior*, 5(4), 421-439.

Vallacher, Robin R., and Daniel M. Wegner (1987), "What do people think they're doing? Action identification and human behavior," *Psychological Review*, 94(1), 3-15.

Vallacher, Robin R., and Daniel M. Wegner (1989), "Levels of personal agency: Individual variation in action identification," *Journal of Personality and Social Psychology* 57, no. 4: 660-671.

Wakslak, Cheryl J., Shiri Nussbaum, Nira Liberman, and Yaacov Trope (2008), "Representations of the self in the near and distant future," *Journal of Personality and Social Psychology* 95(4), 757-773.

Wegner, Daniel M., and Robin R. Vallacher (1986), "Action identification," In *Handbook of motivation and cognition: Foundations of social behavior,* 550-582. New York, NY US: Guilford Press.

Williams, Lawrence E. and John A. Bargh (2008), "Keeping One's Distance: The Influence of Spatial Distance Cues on Affect and Evaluation," *Psychological Science*, 19 (3), 302-08.

Worchel, Stephen, and Charles Teddlie (1976), "The Experience of Crowding: A Two-Factor Theory," *Journal of Personality and Social Psychology*, 34(1), 30-40.

Zajonc, Robert B. (1965), "Social facilitation." *Science*, 149, no. Whole No. 3681: 269-274.

Zajonc, Robert B., and Stephen M. Sales (1966), "Social facilitation of dominant and subordinate responses," *Journal of Experimental Social Psychology*, 2(2), 160-168.

Zillmann, Dolf, and Jennings Bryant (1974), "Effect of residual excitation on the emotional response to provocation and delayed aggressive behavior," *Journal of Personality and Social Psychology,* 30(6), 782-791.

ESSAY 2

Adaval, Rashmi, and Kent B. Monroe (2002), "Automatic construction and use of contextual information for product and price evaluation." *Journal of Consumer Research* 28, no. 4: 572-588.

Adaval, Rashmi, and Robert S. Jr. Wyer (2011), "Conscious and nonconscious comparisons with price anchors: Effects on willingness to pay for related and unrelated products." *Journal Of Marketing Research* 48, no. 2: 355-365.

Argo, Jennifer J., Darren W. Dahl, and Rajesh V. Manchanda (2005), "The Influence of a Mere Social Presence in a Retail Context." *Journal of Consumer Research* 32, no. 2: 207-212.

Ariely, Dan, George Loewenstein, and Drazen Prelec (2003), "Coherent Arbitrariness: Stable Demand Curves Without Stable Preferences," *The Quarterly Journal of Economics,* February 2003*:*73-105.

Ariely, Dan, George Loewenstein, and Drazen Prelec (2006), "Tom Sawyer and the construction of value." *Journal of Economic Behavior & Organization* 60, no. 1: 1-10.

Barden, Jamie, William W. Maddux, Richard E. Petty, and Marilynn B. Brewer (2004), "Contextual Moderation of Racial Bias: The Impact of Social Roles on Controlled and Automatically Activated Attitudes." *Journal of Personality and Social Psychology,* 87 (1), 5-22.

Becker, Gordon M., Monis H. DeGroot, and Jacob Marschak (1964), "'Measuring Utility by a Single-Response Sequential Method," Behavioral Science, 9, 226-32.

Blair, Irene V. (2002), "The Malleability of Automatic Stereotypes and Prejudice," *Personality and Social Psychology Review*, 6, 242-61.

Chandon, Pierre, and Brian Wansink (2007), "Is Obesity Caused by Calorie Underestimation? A Psychophysical Model of Meal Size Estimation," *Journal of Marketing Research* 44, no. 1: 84-99.

Chapman, Gretchen B., and Eric J. Johnson (1999), "Anchoring, activation, and the construction of values." *Organizational Behavior and Human Decision Processes* 79, no. 2: 115-153.

Chernev, Alexander. (2011), "Semantic anchoring in sequential evaluations of vices and virtues." *Journal of Consumer Research* 37, no. 5: 761-774.

Epley, Nicholas, and Thomas Gilovich (2001), "Putting adjustment back in the anchoring and adjustment heuristic: Differential processing of self-generated and experimenter-provided anchors," *Psychological Science* 12, no. 5: 391-396.

Green, Donald, et al. "Referendum Contingent Valuation, Anchoring, and Willingness to Pay for Public Goods." *Resource and Energy Economics* 20.2 (1998): 85-116.

Grewal, Dhruv, R. Krishnan, Julie Baker, and Norm Borin. 1998. "The Effects of Store Name, Brand Name and Price Discounts on Consumers' Evaluations and Purchase Intentions." *Journal Of Retailing* 74, no. 3: 331-352.

Helson, Harry (1964), *Adaptation-level theory*, Oxford England: Harper & Row.

Jacowitz, Karen E., and Daniel Kahneman (1995), "Measures of anchoring in estimation tasks." *Personality and Social Psychology Bulletin* 21, no. 11: 1161-1166.

Johnson, Eric J., and David A. Schkade (1989), "Bias in Utility Assessments: Further Evidence and Explanations," *Management Science* 35.4: 406-.

Kahneman, Daniel, Jack L. Knetsch, and V. K. Smith (1992), "Valuing Public Goods: The Purchase of Moral Satisfaction; Comment; Reply." *Journal of Environmental Economics and Management* 22.1: 57-.

Krishna, Aradhna, Mary Wagner, Carolyn Yoon, and Rashmi Adaval (2006), "Effects of extreme-priced products on consumer reservation prices." *Journal of Consumer Psychology* 16, no. 2: 176-190.

Levav, Jonathan, and Rui (Juliet) Zhu. "Seeking Freedom through Variety." *Journal of Consumer Research* 36.4.

Lichtenstein, Donald R., and William O. Bearden (1989), "Contextual influences on perceptions of merchant-supplied reference prices." *Journal of Consumer Research* 16, no. 1: 55-66.

Meyers-Levy, Joan and Rui (Juliet) Zhu (2007a), "The Influence of Ceiling Height: The Effect of Priming on the Type of Processing People Use," *Journal of Consumer Research*,34 (August), 174–86.

Mussweiler, Thomas, and Fritz Strack (1999), "Hypothesis-consistent testing and semantic priming in the anchoring paradigm: A selective accessibility model." *Journal of Experimental Social Psychology* 35, no. 2: 136-164.

Mussweiler, Thomas, and Fritz Strack (2001), "The semantics of anchoring." *Organizational Behavior and Human Decision Processes* 86, no. 2: 234-255.

Nunes, Joseph C., and Peter Boatwright (2004), "Incidental Prices and Their Effect on Willingness to Pay." *Journal of Marketing Research* 41, no. 4: 457-466.

Nicole Ridgway and Mark M. Meinero (2012), "Black Friday: Foot traffic increases, but sales dip," CNNMoney, November 24.

Schkade, David A., and Eric J. Johnson (1989), "Cognitive processes in preference reversals." *Organizational Behavior and Human Decision Processes* 44, no. 2: 203-231.

Shriver, Edwin R., Steven G. Young, Kurt Hugenberg, Michael J. Bernstein, and Jason R. Lanter (2008), "Class, Race, and the Face: Social Context Modulates the Cross-Race Effect in Face Recognition," *Personality and Social Psychology Bulletin*, 34 (2), 260-74.

Simonson, Itamar, and Aimee Drolet (2004), "Anchoring Effects on Consumers' Willingness-to-Pay and Willingness-to-Accept." *Journal of Consumer Research* 31, no. 3: 681-690.

Strack, Fritz, and Thomas Mussweiler (1997), "Explaining the enigmatic anchoring effect: Mechanisms of selective accessibility." *Journal of Personality And Social Psychology* 73, no. 3: 437-446.

Thaler, Richard H. (2008), "Mental accounting and consumer choice." *Marketing Science* 27, no. 1: 15-25.

Tversky, Amos, and Daniel Kahneman (1974), "Judgment under uncertainty: Heuristics and biases." *Science* 185, no. 4157: 1124-1131.

Underhill, Paco (1999), *Why We Buy: The Science of Shopping*, New York: Simon & Schuster.

Upshaw, Harry S. (1969), "Stimulus range and the judgmental unit," *Journal of Experimental Social Psychology* 5, no. 1: 1-11.

Urbany, Joel E., William O. Bearden, and Dan C. Weilbaker (1988), "The effect of plausible and exaggerated reference prices on consumer perceptions and price search." *Journal of Consumer Research* 15, no. 1: 95-110.

Walters, Rockney G. and Scott B. MacKenzie (1988), “A Structural Equations Analysis of the Impact of Price Promotions on Store Performance,” *Journal of Marketing Research*, Vol. 25, No. 1 (Feb., 1988), pp. 51-63.

Wertenbroch, Klaus, and Bernd Skiera (2002), "Measuring consumers' willingness to pay at the point of purchase," *Journal of Marketing Research* 39, no. 2: 228-242.

Wittenbrink, Bernd, Charles M. Judd, and Bernadette Park (2001), "Spontaneous Prejudice in Context: Variability in Automatically Activated Attitudes," *Journal of Personality and Social Psychology,* 81(5), 815-27.

Xu, Jing, Hao Shen, and Robert S. Jr. Wyer. 2012. "Does the distance between us matter? Influences of physical proximity to others on consumer choice." *Journal of Consumer Psychology* 22, no. 3: 418-423.

Appendix A

Behavioral Identification Form

Actions	High-construal Identifications	Low-construal Identifications
Making a list	Getting organized	Writing things down
Reading	Gaining knowledge	Following lines of print
Washing clothes	Removing odors from cloths	Putting clothes into the machine
Measuring a room for carpeting	Getting ready to remodel	Using a yardstick
Cleaning the house	Showing one's cleanliness	Vacuuming the floor
Painting the room	Making the room look fresh	Applying brush strokes
Paying the rent	Maintaining a place to live	Writing a check
Caring for houseplants	Making the room look nice	Watering plants
Locking a door	Securing the house	Putting a key in the lock
Filling out a personality test	Revealing what you're like	Answering questions
Tooth brushing	Preventing tooth decay	Moving a brush around one's mouth
Taking a test	Showing one's knowledge	Answering questions
Greeting someone	Showing friendliness	Saying hello
Resisting temptation	Showing moral courage	Saying "no"
Eating	Getting nutrition	Chewing and swallowing
Traveling by car	Seeing countryside	Following a map
Having cavity filled	Protecting your teeth	Going to the dentist
Talking to a child	Teaching a child something	Using simple words
Pushing a doorbell	Seeing if someone's home	Moving a finger

Note. – Identification items were presented in random order.

Appendix B

Picture Priming Manipulation

This study concerns picture perception.

Please spend a few moments looking at the image below and consider how you would feel to be in the scene.

Please briefly describe how you would feel if you were in this scene.

uncrowded prime[1] crowded prime[1] clutter prime[2]

Note. –[1] used in Experiment 2, 4, and 7; [2] used in Experiment 2.

Appendix C

Cartesian coordinate Plane Manipulation A

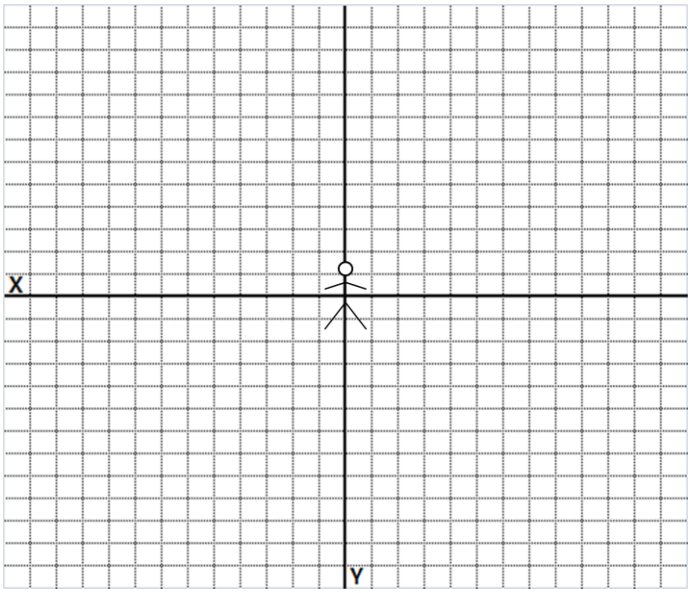
This study is a small part of an effort to develop a new type of cognitive and attitude measure. This is a pilot study to assess the validity of the measures. Please follow the instructions.

Control manipulation

Please locate and mark the following points on the grid: (12, 10), (-11, -8).

Crowding manipulation

Please locate and mark the following points on the grid: (1, 1), (-2, -2), (2, -1), (-1, 2), (1, 3), (-2, 1), (1, -2), and (-1, -1).

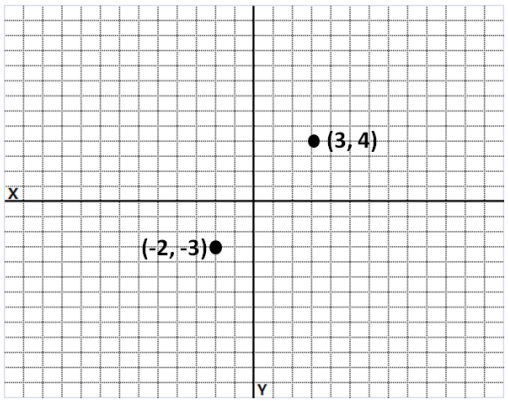


Appendix D

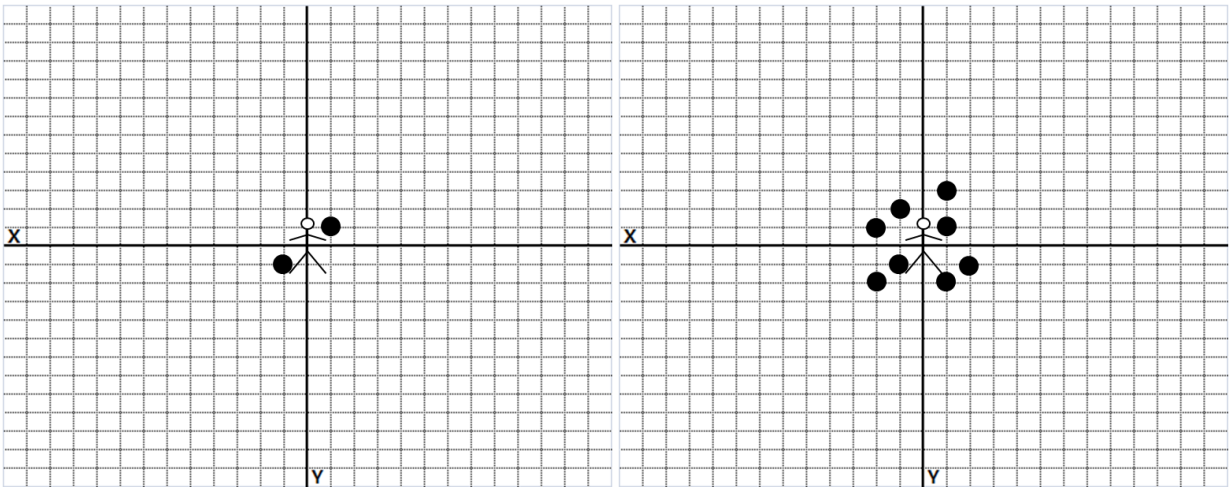
Cartesian coordinate Plane Manipulation B

Spatial Study

On the next page you will be shown a piece of graph paper with points plotted on it. Your task is to pick any two points and write down their coordinates in an (x,y) form. If you have forgotten how this works, x measures the horizontal axis (positive to the right, negative to the left), and y is the vertical axis (positive up, negative down). In the example, below the first point is 3 to the right and 4 up = (3,4). The second point is 2 to the left and 3 down = (-2, -3).



Tasks.



Please write down the coordinates of the two points above.

Appendix E

DVD Player Measures (Feasibility vs. Desirability)

This study concerns impression formation

Imagine you are considering purchasing the following DVD player in a store. The DVD player has the following features.

DVD Player Stimuli for Desirability Condition

- DVD player is made of environmentally-friendly materials
- High-quality digital sound system
- Two-year warranty
- Special student discounts
- Two free DVDs
- User-friendly and easy to operate
- DVDs can be viewed directly through a television without distortion

DVD Player Stimuli for Feasibility Condition

- Manual is easy to use
- High-quality digital sound system
- Two-year warranty
- Special student discounts
- Two free DVDs
- User-friendly and easy to operate
- DVDs can be viewed directly through a television without distortion

Please record your overall impressions of the DVD player based on the information that you have seen so far by marking the scale below.

7 points Likert-scale (1=bad product, 7=good product)

Appendix F

Category Breadth Task (camping trip)

Imagine that you are planning to go with friends on a camping trip.

Take a look at the following items and place them into groups by writing the items that belong together next to each other on the space below, and then circling the items that belong in the same group. Please make sure to include every item, even if you would not use it in reality. Additionally, please do not overlap, that is, place each item in only one group.

brush, tent, matches, camera, soap, gloves, bathing suit, shovel, fishing pole, hat, snorkel, shirts, sweater, sneakers, coat, raft, dog, boots, marshmallows, socks, blankets, flashlights, pants, sunglasses, rifle, shoes, cigarettes, rope, hot dogs, canteen, toothbrush, underwear, beer, sleeping bag, pillow, insect repellant, potato chips, and ax.

Appendix G

Category Inclusion Tasks

Consumer research study

The purpose of this study is to investigate the manner in which people think about and evaluate different categories of consumer products. Please evaluate to what extent you think each of the products listed below belongs to the given category.

Categories	Typical Exemplars	Atypical Exemplars
Furniture	Chair, Sofa	Radio, Clock
Clothing	Shirts, Pants	Purse, Ring
Vegetables	Pea, Carrot	Pumpkin, Seaweed

10 points Likert-scale (1= Definitely does not belong to the category, 10= Definitely does belong to the category)

Appendix H

Anagram Tasks

This study concerns how many anagrams you can solve in a given time. You will be given a list of anagrams to solve. In each case, the first one or two letters are underlined.

For example, OLME<u></u>DY (a scrambled word) can be solved into MELODY (a real word).

Please solve the anagrams on the next page. There is no right amount of words you need to solve. Do not spend more than 5 seconds on each word. If you don't see the solution in 5 seconds, please move on to the next word.

Neutral Words		Avoidance-related Words	
Anagrams	Solutions	Anagrams	Solutions
LONIVI	Violin	TYFESA	Safety
HONPE	Phone	TEENPRV	Prevent
NIRDK	Drink	ARGUD	Guard
PUTCOMER	Compute	ECPRTIOTON	Protection
TCUON	Count	MUIMTYNI	Immunity
RCNHA	Ranch	ANTGUAREE	Guarantee

Note. – Anagrams were presented in random order.

Appendix I

In-Group Conditions

Sparse condition

Crowded condition

Out-Group Conditions

Sparse condition

Crowded condition

Appendix J

Store Density Picture Manipulation

sparse store[1] dense store[1] Medium density[2]

Tripled store space for number control[3]

Notes. – [1] used in Experiment 13, 14, 15, and 17

[2] used in Experiment 14

[3] used in Experiment 13

Appendix K

Delay Price Memory Test

Imagine you found a nice pair of dress shoes with the following features in the store. Please take a look at the features carefully and answer the following questions.

Evaluation Tasks (5- point scale)

Please answer the following questions:
This is a high quality pair of shoes
This pair of shoes seems very nice
I would like to buy this pair of shoes
This pair of shoes seems expensive
This pair of shoes is for me

Memory check after delay

Please do your best to recall the pair of dress shoes that you were presented in the online survey you participated earlier.

What was the price of the dress shoes?

$_____

Appendix L

Behavioral Measurement of WTP

In this auction, we will offer you an opportunity to buy an item. This is a real offer and you will need a small amount of money to participate in this game. However, you will not have to spend any more for it than you would like to.

If you would like to participate, please click next. If you do not want to participate in this auction, you can stop now. If you continue, we will consider that you are participating in this auction for real.

Okay, you've decided to participate. Here is the deal.

We would like to know how much money you are willing to spend for a pair of socks that we are going to offer you. The purchase price is not yet determined. Please tell us the highest price you would be willing to pay.

After you state the amount you are willing to pay, you then draw a price from a pool of potential prices. If you draw a price that is less than or equal to the price you tell me, you will have to buy the pair of socks for the price you drew, If the price you draw is greater than the price you tell me, you will not be able to buy the socks.

The best strategy would be truthfully revealing the maximum price you are willing to pay. If you tell me a price that is higher, you may actually have to pay that higher price. If you tell me a price that is lower, you may be disappointed if you can't buy if you draw a price that is higher than the price you tell me but lower than your "true" price.

If you understand the rule, let's begin.

Please spend a few moments looking at the image of a clothing store below. This image is based on a real photo that has had the actual people replaced by cartoons to protect their identity.

one of two pictures is randomly presented

##Initial price offer##

The pair of socks that we offer for the auction came from the store a picture of which you were presented.
Now, what is the maximum amount you are willing to pay for this pair of socks?

$ _____

If you now draw a price that is less than or equal to the price you just stated, we will sell you the socks at the price you drew. However, if you now draw a price that exceeds the one you just stated, we will not sell you the socks.

Option to review

If you now drew a price that is little higher than the price you just stated, would you consider buying the socks after all? If so, please tell me the true maximum price at which you would be willing to buy. (state the same price if the previous price was your true maximum price)

$ _____

Are you sure you want to maintain the price? If so, please click next.

Okay, now click next to draw a price to determine your final result.

drawing a price##

If you drew a price that is less than or equal to the price you tell us, now you have to buy the pair of socks for the price you drew. If the price you draw is greater than the price you tell us, you will not be able to buy the socks.