

The Psychological Study of Crowding

Some Historical Roots and
Conceptual Developments

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For every phenomenon there exists origins and developments. In this paper the psychological study of crowding is discussed in terms of its origins and some of its conceptual developments.

HISTORICAL ROOTS OF CROWDING RESEARCH

The major impetus for the psychological study of crowding was the ecology or environmentalist movement of the late 1960s and early 1970s. Yet while research on the effects of crowding on human behavior was most heavily stimulated by the environmentalist movement, other fields of research which predated these events had laid a background from which

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researchers of crowding then began to draw on or relate to. Both the prominent events of the ecology movement and the related fields of research are summarized briefly.

THE ENVIRONMENTALIST MOVEMENT

The historical roots of the psychological study of crowding are largely grounded in the environmentalist movement. This movement, stirred by the popular writings of Carson (1962), Ehrlich (1968), and Commoner (1963), collectively pointed to the impending problems of pollution, overpopulation, and technology. Such issues achieved their greatest public attention in 1970, as demonstrated by several events including the creation of Earth Day, the establishment of Zero Population Growth as well as governmental agencies concerned with the environment, and the inclusion of environmental concerns in public policy (Cooley and Wandersford-Smith, 1970).

1970 was also a year of increased awareness of environmental concerns on the part of the field of psychology. In that year two articles appeared in *American Psychologist* which spoke to psychology's potential role in the emerging discipline of environmental psychology (Bartz, 1970; Wohlwill, 1970). Four other notable events in the field of psychology in 1970 were indicative of psychology's interest in environmental issues: (1) the publication of Craik's chapter on "Environmental psychology" in *New Directions in Psychology*; (2) the establishment of a graduate training program in environmental psychology at the City University of New York; (3) the first volume of an interdisciplinary journal, entitled *Environment and Behavior*, was published; and (4) Fawcett's book, *Psychology and Population*, was published. With tongue in cheek, the 1970s were characterized as the "Age of W.O.E." at the annual convention of the American Psychological Association—standing for "Watergate," "Overpopulation," and Energy Crisis" (Loo, 1973b).

Psychologists have attempted to address several environmentally oriented questions such as: "What are the effects of noise on task performance and tolerance for frustration?" (Glass and Singer, 1972); "Why is there less bystander interven-

tion in emergencies in urban areas than in rural areas?" (Darley and Latane, 1968; Milgram and Hollander, 1964); "How can behavior modification be used to increase bus-riding behavior?" (Everett et al., 1974); "How can behavior modification be used to make family planning and birth control programs more successful?" (Zifferblatt and Hendricks, 1974); "What are the various motives and values for having or not having children?" (Fawcett and Arnold, 1973; Hoffman and Hoffman, 1973); "What are people's beliefs about birth control?" (Crawford, 1973); and "What are the effects of crowding on behavior?" (Dooley, 1974).

Psychologists who have addressed the problem of overpopulation have usually been applied social psychologists. Depending upon their research focus, they have tended to either identify themselves as population psychologists or as environmental psychologists. Psychologists who have been primarily interested in attitudinal survey research or interview research on birth control, family planning, or the values of childrearing have generally identified themselves as population psychologists. Psychologists who have been primarily interested in the effects of crowding and density on human behavior through the use of empirical research have tended to identify themselves as environmental psychologists.

In addition to the environmentalist movement, research on the effects of density and crowding on human behavior was stimulated by another major activity, that being animal research on the effects of population density. The two most influential studies were those of Christian and associates (1961, 1964) and Calhoun (1962). Significant physiological effects of stress due to increased population density on deer were found by Christian, and significant behavioral effects of high population density on mice were found by Calhoun. Several psychologists have sought empirically to test whether or not the behavioral effects of crowding on humans would be analogous to the effects found with mice.

RELATED FIELDS OF RESEARCH

Prior to the environmentalist movement, other fields of research laid a background to which researchers of crowding could refer. These major areas included the personality theories of Murray and Lewin, ecological psychology, and personal space.

While not addressing crowding in any specific way, the personality theories of Murray (1938) and Lewin (1936, 1946) did acknowledge the importance of the physical as well as the social environment. Both psychologists considered behavior to be a function of the interaction between the personality (or the organismic need) and the environment. Both distinguished between the physical and social aspects of the environment. Murray further distinguished between the environmental demand (or press) as it is perceived by an objective observer (alpha press) and the environmental press as perceived by the person on whom the press is directed (beta press). Lewin distinguished between the psychological environment and the objective environment. The person and the psychological environment constituted the Life Space, and characteristics of the boundaries between the Life Space and the objective environment were described. Moreover, Lewin recognized the capacity of the environment to produce changes in the person and vice versa.

The theoretical attention given to environmental variables never caught immediate "heuristic fire," partly due to the fact that the environmentalist movement was not to become a popular issue until 30-40 years later and that the focus of psychological research immediately after the 1930s was on personality traits. Nevertheless, the theories of Murray and Lewin were influential in the development of ecological psychology.

Ecological psychology refers to the naturalistic study of behavioral settings, as exemplified by the work of Barker and his Kansas colleagues. Barker has studied educational and town settings (Barker, 1963, 1968; Barker and Gump, 1964; Barker and Schoggen, 1973) and has consistently concluded that behavioral prediction is more accurate from a knowledge of the

characteristics of the setting than from a knowledge of the individual's personality make-up. Population size relative to number of ecological niches has been an important dimension in analyzing differences between behavioral settings. Wicker's present research (1973) on overmanning and undermanning has its origins in this approach of ecological psychology. Thus, although Barker and his colleagues did not address the environmental concerns of overpopulation, urban problems, or unchecked technology, they did provide research to demonstrate how human behavior is guided (and even determined) by the structure of the behavioral environment. Furthermore, Barker and his colleagues helped to legitimize naturalistic field research during a time (the 1950s) when it was extremely unpopular to do any research outside of laboratory experimentation (Altman, 1973).

More recent research developments which were influenced by ecological psychology include work concerned with human adaptation with a focus on the promotion of effective human functioning and the reduction of maladaptive responses. This thrust is found in the research of Kelly (1970) and Insel and Moos (1974). Social ecology, the term used by Insel and Moos, also concentrates on providing a systematic classification of various environments taking into account the persons, tasks, organizational structure, and physical properties. Thus, two emphases exist: that of Barker et al., who compare two settings in terms of their differential effects on everyday behavior, and that of Kelly and Insel and Moos, who compare different settings in terms of which might be more or less adaptive or psychologically healthy.

Personal space is another area of interest which predates the environmentalist movement, but which has recently attracted the attention of psychologists interested in crowding. The term "personal space" was first coined by Katz in 1937 and referred to a mixture of the concepts of territoriality, interaction distance, and density (as cited by Linder, 1974). Hall, an anthropologist, and Sommer, a psychologist, have been largely responsible for increasing the interest and research on personal space (Hall, 1959, 1966; Sommer, 1959, 1969). While there has

been much research on personal space as a function of age, sex, anxiety level, level of violence, and deviance (mental and social), research relating density and personal space has been scarce. Dooley's research (1974) is one such study that has integrated personal space, density, and crowding. More research of a similar nature would substantially advance our understanding of the differential effects of density.

CONCEPTUAL DEVELOPMENTS

Having reviewed some of the historical roots and related areas of research to the study of crowding, the remainder of this paper addresses some of the conceptual issues of crowding and density raised by psychologists. It should be noted that psychological research on crowding has developed largely out of social concern rather than from any theoretical framework. Thus, evolving conceptual models and issues have developed out of and along with the empirical findings in a somewhat post hoc fashion.

DEFINITIONS OF DENSITY

One of the major conceptual developments in the psychological study of crowding has been the increased complexity in defining the concept of crowding. Initially crowding was often empirically equated with a high-density condition, such that crowding was defined in terms of amount of space per person (Freedman et al., 1972; Loo, 1972). However, some researchers, particularly Stokols, felt a need to differentiate between density and crowding. Thus, density is now frequently treated as an objective measure of the physical environment—as “number of people relative to the amount of space” (Loo, 1973a), while crowding is considered to represent an experiential or psychological state (Stokols, 1972).

Detailed density distinctions have been made by researchers. Schmitt (1966) distinguished between “inside density”—that is, the number of people per unit of living space within a residence—and “outside density”—the number of people per unit of space in a larger environmental unit such as the street, neighborhood, and so on. Galle distinguished between density

within dwelling units, density of persons per square mile, rooms per dwelling unit, high crowding, and population size (Galle et al., 1972; Galle et al., 1973). Newman (1973), an architect and urban planner, correlated crime rate with various density conditions, including number of people per apartment, number of apartments per hallway, number of apartments per building, and number of buildings per project.

Distinguishing density from crowding implies that a high-density condition is a necessary but not a sufficient condition for crowding to occur. It has been pointed out (Loo, 1973a and 1973b) that researchers may compare two density conditions, and if they find no significant differences in the behavior of those occupying the two conditions, it may be erroneously concluded that crowding has no effect. For if there is no experienced stress for the occupants of the high-density condition, then neither condition is crowded, and the researcher is simply comparing two densities. This distinction between density and crowding has served to highlight the need for researchers to analyze both the physical measurements of the environment and the psychological aspects of the condition.

DEFINITIONS OF CROWDING

Distinguishing between density and crowding does not make the concept of crowding much simpler, for there are other conceptual differences. These differences involve the breadth of what constitutes crowding—for example, whether crowding should be defined as stimulus overload, social overload, or physical restrictiveness (or “all of the above”). Then there are differences in what the determinants of crowding are as well as what the consequences of crowding might be.

Some researchers define crowding in terms of excessive stimulation (Esser, 1972; Milgram, 1970). These models might be characterized as stimulus overload models. According to Milgram, crowding occurs when the “amount and rate of environmental inputs impinging on an organism exceeds its capacity to cope with them.” Notice that Milgram’s definition involves the interaction between an external factor (environmental inputs) and a psychological factor (the individual’s

coping ability). Esser defines crowding in terms of its neurological consequences—that is, a disturbance or a stimulus overload in the functioning of the central nervous system. Such a disturbance may be caused by overwhelming sociophysical stimuli, unfamiliar ideas, or diminished central nervous system functioning. Esser's conception defines crowding in terms of characteristics of external stimuli in relation to the individual's neurological coping capacities. Amount of space or number of people are not especially necessary factors to constitute crowding.

Several researchers have defined crowding specifically in terms of its social derivatives. These models might be referred to as social-overload or social-intrusion models. As such, crowding has been defined as "receiving excessive stimulation from social sources" (Desor, 1972), "unwanted social stimulation" (Baum and Valins, 1973), or "a response to social intrusions and interference" (Sundstrom, 1974). These definitions imply that crowding is more than a matter of space and that more than one person is needed to constitute a crowded condition.

This raises the interesting issue of whether or not physical restrictiveness of one person constitutes crowding. Stokols' model of crowding includes a nonsocial and a social component; thus, he contends that an astronaut in limited quarters is an example on nonsocial crowding. Therefore, to Stokols, one individual can feel crowded when alone, given spatial restrictiveness. In contrast to this definition, one might argue that the astronaut is "cramped" but not "crowded," should one wish to strictly adhere to the semantic derivative of the term "crowd"—implying a group or assemblage of people.

Relevant to the social definition of crowding is the factor of *who* the people are that are crowding the individual. Proshansky et al. (1970) raise this point. The sex of the persons who are crowded has been shown to affect reactions to the crowded condition (Freedman et al., 1972; Ross et al., 1973). In addition to sex, other interpersonal factors have been or should be explored, such as degree of acquaintance or degree of attitude similarity (Griffitt and Veitch, 1971).

Other researchers, while acknowledging the social determinants of crowding, include the behavioral or psychological consequences of crowding in their definition. Proshansky, Ittelson, and Rivlin (1970), for example, define crowding as "perceived restrictions in one's freedom of choice or frustration in goal attainment caused by the presence of others."

Zlutnick and Altman (1971) contend that the concept of control is relevant as both a determinant of crowding and as a consequence of crowding. In defining the interpersonal determinants of crowding, Zlutnick and Altman state that the experience of crowding will be influenced by the person's perceived inability or ability to control interactions with others. Furthermore, crowding results in a breakdown in social control. Empirical findings support the contention that perceived degree of control reduces the amount of unpleasantness felt due to noise (Glass and Singer, 1972) or to density (Sherrod, 1974). In addition (and in relation to) the dimension of control, Altman (forthcoming) adds that crowding results in a reduction in the level of privacy as well as one's level of social control.

Stress can be thought of as a consequence of crowding and thus related to its definition, which raises the issue of whether or not crowding constitutes a stressful condition. Those who contend that it does adhere to a definition of crowding similar to that of Stokols (1972), where crowding is "an experiential state where the individual perceives a spatial restriction and experiences psychological and/or physiological stress." Other psychologists contend that "crowding may be pleasurable as well as painful" (Proshansky et al., 1970), that "sometimes crowding is enjoyable and facilitates task performance" (Choi et al., 1974).

SOCIAL AND SPATIAL FACTORS

The distinction between physical and social factors of the objective environment has been made by several psychologists (Lewin, 1936, 1946; Murray, 1938), but its recent application to the study of density and crowding has increased conceptual clarity. Stokols (1972) has differentiated between nonsocial and social density, and McGrew (1970) has empirically studied

differences in the effects of social as opposed to spatial density. Social density involves the comparative study of differing numbers of persons in the same amount of space, while spatial density involves the comparative study of the same numbers of people in differing amounts of space. Such a distinction is relevant to empirical research and can be relevant to real-life situations in terms of density change. Hypothetically, the effects of increased social density may differ significantly from increased spatial density. Where density is increased due to an increase in the number of persons, the cause of stress might well be attributed to the latest "intruders," thus eliciting competition and territorial defensiveness on the part of the first occupants towards the newcomers. Such might be the case in the building of a large-scale housing project in a neighborhood or in increases in family size. On the other hand, where density is increased due to a reduction in amount of space, attribution of stress may not be toward any particular "others" and may instead result in a sense of powerlessness in relationship to the physical environment. Such might be the case of a family moving to a smaller house or tenement for economic reasons.

In the case of social density, number of people is an intervening variable and may account for density effects. Thus, number of people is a variable that should be researched in terms of its relationship to crowding (Linder, 1974; Loo, 1973a).

APPLICATION OF SOCIAL-SPATIAL DIMENSIONS TO CROWDING STRESSES

Most of the psychological research on crowding has concentrated on the effects of density on task performance (Dooley, 1974; Freedman et al., 1971; Sherrod, 1974; Stokols et al., 1973); on interpersonal attraction (Freedman et al., 1972; Griffitt and Veitch, 1971; Ross et al., 1973), on decision-making (Freedman et al., 1972), on social interaction (Hutt and Vaizey, 1966; Loo, 1972), and on after-effects (Dooley, 1974; Sherrod, 1974). Very little research has been done to explore individual differences in the perception of a given environment in terms of its perceived degree of crowdedness and in terms of

the magnitude of stress experienced. In keeping with this neglect, the social and spatial factors of the environment will be integrated with (a) a scale of perceived crowdedness and (b) the magnitude of stress experienced for each situation to provide a way of differentiating person perceptions of the environment and their consequences to the person. Clinical phobias are used to illustrate differing kinds of stress due to perceptions of various aspects of the environment. The reason for focusing on phobias as an extreme condition of stress is to point out that, contrary to the popular notion that humans have considerable adaptive and coping capacities in relation to their environment (Dubos, 1965; Sommer, 1969; Wohlwill, 1970), it should be also noted that nonadaptation or maladaptive responses may result. Harmony between the individual and the environment implies that a balanced interaction between the two exists, where the individual perceives that he/she has some control over the environment. Stress that manifests itself in environmental phobias, however, exists when the constraints of the environment vastly outweigh the individual's sense of control over his/her environment. The individual feels out of control and experiences overwhelming anxiety in certain environmental conditions. Spatial phobias are conditions where individuals experience severe anxiety as a result of how their perceptions of the social and/or spatial features of an environment affect their needs.

Assume that perceived degree of crowdedness can range on a spectrum from "crowded" to "uncrowded" to "undercrowded," and that stress is experienced in the extreme points of the scale ("crowded" and "undercrowded") while harmony is experienced at its midpoint ("uncrowded"). Such assumptions are similar to those expressed by Stokols (1972). The model that I am proposing assumes that individuals have certain social needs (which relate to number of people and amount of personal space needed) and certain spatial needs (which relate to amount of space needed and quality of the spatial boundaries).

Social crowding stress is exemplified by a fear of crowds (outmodedly defined as ochlophobia). Social crowding stress

refers to the perceived presence of either too many people or to intrusions into one's personal space.

No stress is experienced in the socially uncrowded state. In the socially uncrowded state the number of people perceived meets the individual's social needs, which may vary from a desire to be alone to a desire to be among crowds.

Social undercrowding stress is illustrated by the fear of being alone, monophobia. Monophobia represents a condition where stress is due to the perceived absence of people or a need for closer interactional distance between oneself and another. There is a need for affiliation, intimacy, and social contact that is not being met. Ochlophobia and monophobia result from an interaction between *social* variables of the environment and *interpersonal* factors.

Claustrophobia, the fear of closed spaces, is an illustration of spatial crowding stress where stress is due to a perception of spatial restrictiveness which fails to meet the need for more space or for fewer boundaries. In the spatially uncrowded state the amount of space and boundary characteristics of the space meet the individual's spatial needs, which may vary from a desire for closed space to vast space where boundaries are relevant, or may vary from a desire for a small area to a large area where boundaries are irrelevant. Agoraphobia, narrowly defined as a fear of open spaces, is a clinical example of spatial undercrowding stress. In this condition, anxiety is associated with the lack of visual boundaries and a lack of spatial enclosure. Boundaries and spatial enclosures are needed by agoraphobics to provide a sense of security. Claustrophobia and agoraphobia result from an interaction between *spatial* variables of the environment and *intrapersonal* factors.

Although these environmental phobias are by no means frequently diagnosed, the model serves to provide illustrations of various ways in which the environment and the individual interact to create states of stress and anxiety.

Differential responses to environmental conditions are a function of multiple factors. Personal space needs, needs for affiliation versus isolation, interpersonal space needs, physical space needs, past experiences, expectations, idiosyncratic associ-

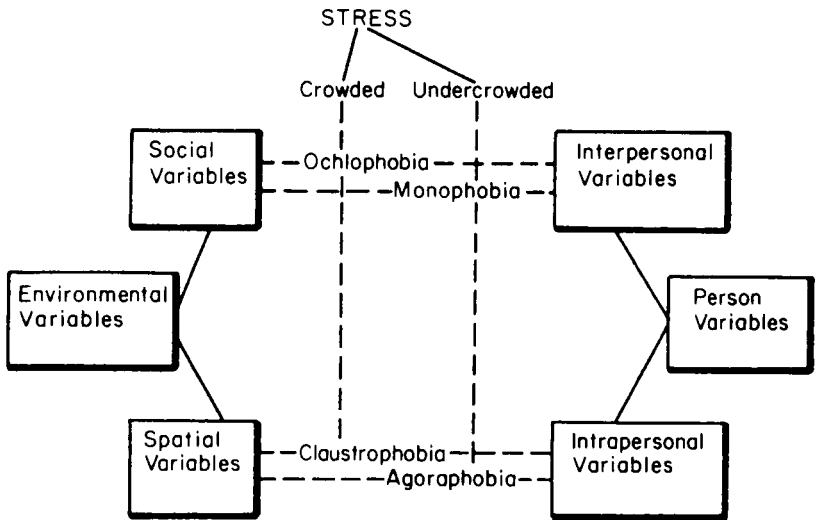


Figure 1.

ation to environmental cues or qualities, levels of anxiety, and cultural norms are just a few of these factors. The presented model is a modest integration of some of these factors.

Many other determinants of crowding have been addressed: duration of the high-density condition (Loo, 1972; Zlutnick and Altman, 1971), previous density experiences (Proshansky et al., 1970), density expectancy (Zlutnick and Altman, 1971), individual or personal attributes (Loo, 1973a; Stokols, 1972), architecture (Desor, 1972; Loo, 1973a and 1973b), ongoing activity (Desor, 1972; Loo, 1973a and 1973b) and culture.

Cultural norms about interactional distances and personal space needs are extremely crucial in any definition of crowding, since the definition is culturally relative. Psychological research on cultural differences in attitudes towards crowding, privacy, and density and responses to crowding have been sorely lacking. Hall's (1966) work on personal space differences as a function of culture is the primary reference, and it is anecdotal and anthropological.

SUMMARY AND CONCLUSION

The purpose of this article has been twofold. The first purpose has been to trace briefly some of the historical roots of the psychological study of crowding, which has taken us into the domain of environmental psychology and into other related areas. The second purpose of this paper has been to present some of the conceptual developments in defining density and crowding. In so doing, an elaboration of a model—relating perceptions of the environment in terms of degrees of crowdedness and uncrowdedness with social and spatial environmental factors—was presented in the form of environmental stresses.

In conclusion, we should ask ourselves the question, “What are the essential purposes of a conceptual model of crowding?” Such a model should provide definitions that add clarity and a common language for all researchers studying the same phenomena. It should provide categories that account for the basic conditions of, processes of, and responses to crowded conditions. It should appropriately differentiate and relate relevant variables to crowding. It should continually integrate empirical findings into its framework, using the findings to support and elaborate on conceptual relationships. It should be heuristic in suggesting future research in promising areas.

A theoretical model of crowding should be detailed in depth, but also comprehensive in scope. Comprehensiveness can best be achieved through an integration of knowledge from other disciplines. Sociology, anthropology, and environmental design have their own historical roots and conceptual models. Each provides a different perspective from psychology while still addressing similar issues. Sociological approaches tend to be global; anthropological approaches are constant reminders of the cultural definitions, values, and derivatives of crowding; and environmental design has approached the study of crowding primarily by concentrating on the applied aspects of how to plan, design, and build the man-made environment to best accommodate human and environmental needs. An argument could be made that psychology has made greater contributions to an understanding of crowding through empirical research

than through the creation of conceptual models, but it was not the purpose of this paper to present these experimental findings. It is hoped that as each discipline contributes to its own body of knowledge, it will simultaneously stimulate and relate its methodology, findings, and models to the other disciplines as well.

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