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RESIDENTIAL DENSITY, NOISE SENSITIVITY, GENDER AND PERCEIVED STRESS

STRESS has become a major feature of modern living, caused particularly by changes in the type of work that we do, by the breakdown of traditional family structures and by many features of the contemporary urban environment. It is considered to be a major cause of psychological distress and physical illness and the ability to cope successfully with it is frequently believed to be the key to human happiness. There remains no single accepted usage of the term "stress" (Brown & Campbell, 1993; Lazarus & Folkman, 1984). Three common usages refer to stimulus variables analogous to the physical usage of stress as a force exerted on materials, to reactions or response variables and to the perceived relationship between stimuli and outcomes, for example, "felt stress or perceived stress". Baron and Byrne (2004) define stress as any physical or psychological event that is perceived as a potential threat to physical or emotional well-being.

Models of Stress

Theoretical models of stress center around four different viewpoints. The first is the stimulus model of stress that looks upon stress as some external force impinging on the organism in a disruptive way. When the organism's tolerance level is exceeded, temporary or permanent damage occurs. The aphorism, "The straw that breaks the camel's back" encapsulates the essence of stimulus-based definitions of stress. In other words, the individual is
bombarded with potential sources of stress (or stressors), but just one more apparently innocuous event can alter the delicate balance between coping and the total breakdown of coping behaviour. As such, early research started with the endeavour to identify sources of stress in the environment such as heat, cold, noise and social density. However, it was soon realized that focusing solely on objective measures of environmental conditions is inadequate. Individual differences such as variability in tolerance levels and expectations, can account for the fact that two individuals exposed to exactly the same situation might react in completely different ways. This was the major weakness of the stimulus model. Nevertheless, although the stimulus model had limitations, it was useful in identifying common stressor themes or patterns that affect people.

The second position i.e., the response model views stress as a dependent variable that is a response to disturbing or threatening stimuli (Selye, 1956). This model focuses not so much on the nature of stress itself but on its outcomes or consequences. The work of Hans Selye in the 1930s and 1940s marks the beginning of the approach to the study of stress viewing stress as a nonspecific response of the body to any demand made upon it (Selye, 1956). Responses were considered invariant to the nature of the stressor and therefore, to follow a universal pattern. However, the model is too simplistic since responses to stimuli do not always follow the same pattern and can be stimulus specific.

The third position to defining stress focuses on the interaction between the stimulus and the response. According to this view, stress occurs when there is an imbalance between the perceived demand placed on the individual and the ability to meet those demands, described as coping resources (Lazarus, 1990). This model overcomes a problem inherent in stimulus and response models that individuals differ as to what events or demands they find stressful and
in the way they respond to these events and demands. However, this approach is limited in its ability to expose the causal pathways inherent in the relationship between the stimulus and the response (for instance, between the environment and the individual). It focuses more on the structural features of the individual's interaction with his or her environment and is less concerned with the overall dynamics of the psychological mechanisms of cognitive appraisal and coping that underpin a stressful encounter.

The transactional model of stress attempts to explore the essential nature of stressor-response-outcome relationships and to encapsulate an understanding of the dynamic stress process itself. Transaction implies that stress is neither in the person nor in the environment but in the relationship between the two (Lazarus, 1990). Stress arises when the demands of a particular encounter are appraised by the individual as about to tax or exceed the resources available, thereby threatening well-being (Lazarus, 1991) and necessitating a change in individual functioning to "manage" the encounter. The transactional definition points to three important themes—a dynamic cognitive state, a disruption or imbalance in normal functioning, and the resolution of that disruption or imbalance (Dewe et al., 1993; Holroyd & Lazarus, 1982). The core postulate in this model, therefore, is that stress is not a factor that resides in the individual or the environment rather, it is embedded in an ongoing process that involves individuals transacting with their environments, making appraisals of those encounters and attempting to cope with the issues that arise.

Research on the role of psychological and environmental stressors as risk factors in both physical and psychological disturbances have typically employed relatively objective stressor measures. These include studies of the effects of exposure to air pollution (Ruback, Pandey, & Begum, 1997), intense levels of noise...
(Ruback, Pandey, & Begum, 1997; Cohen & Weinstein, 1981), high levels of population density (Sundstrom, 1978), unemployment (Dooley & Catalano, 1980) etc.

Since all psychosocial stress involves a transaction between an individual and his environment, it first involves the individual's perception or detection of a stimulus and his appraisal of the situation at hand (Klein, 1996). In Anshel's conceptual model for coping with stress (Anshel, 2000), the first step in the response to the stressor is the perception of an event or detection of a stimulus. This process involves selective attention, attending to those factors providing useful information while filtering input that is predetermined as meaningless (Anshel, 2000). Differences in perception and cognitive appraisal are often seen in threatening, alarming or emotional situations leading to differences in stress reactivity (Anshel, 2000; Anshel et al., 1997; Violanti & Aron, 1995). If an event is not processed or the stimulus is ignored, it cannot cause stress reactivity. Involvement of perceived annoyance, for instance, is implicated in the significant relationship observed between noise levels and cardiovascular and neuroendocrine processes especially cortisol. Thus, although the impact of the objective environment as a health risk cannot be doubted, the subjective appraisal of environmental stressors along with the available coping resources largely determine how environmental conditions affect human well-being (Siddiqui & Pandey, 2003).

Residential Density and Perceived Stress

Lundberg (1976) investigated what role crowding on passenger trains might have in influencing the stressfulness of the commute experience. The higher the level of density on the train, the greater the levels of both perceived stress and neuroendocrine indicators. Singer et al. (1978), Baum and Paulus (1987) replicated these effects. Kulkarni (1984) conducted a survey in Ahmedabad city and found that
the densely populated walled city had a high incidence of crime. In the same way Tripathi (1986) conducted a survey in Varanasi and noted the adverse effects of high density on feelings in terms of experienced stress. A positive correlation was found between high density and maladjustment, anxiety and neuroticism. Bagley (1989) observed that the murder rate was associated with urban crowding in Bombay. Pandey (1998) also reported in his review of the environment in the Indian context that perception of high density becomes a source of stress and arouses feelings of crowding.

Ethnic differences with respect to perception of residential density have also been investigated. Gillis et al. (1986) examined differences in tolerance of population density across three ethnic categories viz. Asians, the British and Southern Europeans. Using room density and design density as predictors and psychological strain as an indicator of crowding, the data show that Asians are most tolerant of high density. Respondents of British origin seem least adaptable and Southern Europeans are somewhere in between. The findings hold when gender and socioeconomic status were included as controls. The gregariousness of Asians and their long history of high density living are salient features cited as reasons for this finding. However, this finding has not been supported in other studies. Loo and Ong (1984) examined crowding in San Francisco’s Chinatown to investigate the attitudes and perceptions of the Chinese residents to crowding. It was found that Chinatown residents evaluated crowding as undesirable and harmful. Personal effects of crowding included environmental health problems, social conflict and psychological stress. Evans et al. (2000) conducted in-depth interviews with 464 U.S. residents of Anglo, African, Vietnamese and Mexican ethnic backgrounds. They measured the individuals' perceptions of crowding (based on a given number of people per room) and their degree of acculturation into U.S. society. It has been reported that Asian
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Americans and Latin Americans are just as uncomfortable in crowded homes as are Anglo Americans and African Americans. Mexican and Vietnamese Americans do tend to perceive their homes as less crowded as compared to African and Anglo American individuals but the point to be noted is that crowding perceptions do not translate into greater resilience to psychological distress in response to high residential density. People in some cultures do seem to have smaller personal space zones (i.e. the interpersonal distance that people choose) but this is not the same as crowding tolerance. Thus, the study concluded that residential crowding is stressful to people regardless of their culture.

Siddiqui and Pandey (2003) carried out a study to assess the extent to which slum residents of Delhi and Allahabad perceived six environmental stressors viz. air and water pollution, noise, garbage, crowding and traffic as stressful. The purpose was to see how the severity of the environmental stressors affects the residents’ perception of these stressors and their coping strategies. Results showed that slum dwellers of Delhi reported greater stress in respect of all the six environmental stressors as compared to the respondents of Allahabad. These results were consistent with the basic premise of the study since the environmental scenario was the grimmest in New Delhi, slightly less critical in Old Delhi and the least grim in Allahabad.

Noise Sensitivity and Perceived Stress

Noise sensitivity has been found to influence the level of stress experienced by individuals. Smith and Stansfeld (1986) reported that high noise sensitive subjects reported significantly greater frequencies of occurrence of everyday errors including errors of perception, memory and motor action than subjects low on noise sensitivity.
Gender and Perceived Stress

Recent studies have described gender in transaction with the environment. In other words, it is no longer assumed that just being a male or a female determines exposure to stress, or the extent to which a stressor affects coping; rather, it is how the individual perceives and experiences the stressor and his or her options that count. Some researchers have argued that it is the way men and women make sense of the stress, how they think about the stress, and how they give meaning to the event(s) that influences the coping response. In this light, gender is considered to be a moderator of stress that serves to either enhance or amplify the negative effects of stress on the individual. Graham - Bermann et al. (2001) report gender differences in how men and women exposed to the same everyday stressful events perceive or evaluate those events. It has been found that women had a greater propensity to think about or to ruminate over stressful events than did men. Men either did not perceive the same events as stressful or did not spend as much time thinking about the stressful nature of the event. These findings support the gender-role perspectives theory of stress, where men and women have different expectations for their roles that, in turn, prescribe how they should evaluate and manage stress. It has also been found that men tended to rely on alcohol to cope with negative situations while women tended to ruminate. These coping responses were, in part, dictated by social norms that allowed men to drink in response to stress (whereas such activity would be frowned upon for women) and women to ruminate (whereas men who ruminate may be met with negative social sanctions from other men).

The relationship between gender and the ability of single parents to manage work outside the home and family responsibilities also has been examined. Here, both men and women often report equivalent perceptions of success at managing family and work responsibilities.
However, gender differences can be found in the use of supportive, financial and organizational resources and how each parent adapts to the demands of completing occupational and care-giving roles (Graham-Bermann, 2001). Studies of married heterosexual couples have shown that wives have more daily stressors and may be more emotionally reactive to those stressors than are husbands. A sizeable body of evidence shows that women rate their family roles to be more stressful than do men. Women consistently have been found to have primary responsibility for housework, child care and for maintaining the social and emotional health of the family. Whether they also work outside of the home or not, women are disproportionately burdened with child care and home responsibilities. Working women with partners, apart from experiencing work related stress, have been found to be disproportionately responsible for and therefore, stressed by the demands of caring for sick children and having to make arrangements for school vacations, children’s days off and family vacations. In the end, conditions seem to be changing over the past few decades, such that in more recent studies men are found to spend more of their time at home engaged in housework and caring for their children than was the case in the past, yet the disparities between men and women’s domestic contributions remain considerable (Graham-Bermann, 2001).

When men and women are put in a stressful situation that is more aligned with traditional sex roles like in case of taking a child to the hospital, women showed greater physiological reactivity (Lundberg et al., 1981). Nolen-Hoeksema (1990) reported that girls have greater experience of and are more vulnerable to the effects of stressors than are boys. Warren (1995) found that women experience higher levels of stress and perceived social support in the medium range for self-esteem. However, Shifren and Bauserman (1996) found no gender differences in reporting stress symptoms. In a study on cigarette smoking and cessation, Maini (2001) also found females to be higher
Psychophysiological reactivity to acute stressors generally shows that men respond with greater levels but careful analysis of this consistent pattern indicates that it is limited to achievement situations (Frankenhaeuser, 1991). Novaco et al. (1991) in a preliminary investigation found some evidence for greater commuting stress in employed women compared to employed men. Women in more congested commutes perceived their commute as more stressful than men on similarly congested routes. Overall, women also felt much rushed to get to work on time, were less satisfied with their commuting experiences, perceived less choice in route selection and felt they had more traffic to contend with vis a vis men. Several studies of noise and crowding have shown that effort expenditure during exposure to these stressors potentiates the adverse effects of the stressor, particularly on psychophysiological outcomes (Evans, 2000). In a study on train commuting, Evans (2000) found that women were not significantly different from men on any of the stress measures. This finding does not support results of previous research. Those previous studies, however, largely looked at automobile commuting. It may be that train commuting is a different experience, and that automobile commuting is more stressful to women, as compared to train commuting. However, because of the sample size for the data as broken down by gender (10 men, 16 women) it may be unwise to generalize this null finding. Finally, research on stress and gender, in general, and with commuting stress, specifically, suggests the potential for women to experience more psychological stress than men on comparable commutes. Psychophysiological stress in reaction to commuting, however, may be greater in men than women during the commute, given the tendency of men to respond to acute, achievement-related challenges more dramatically than women.

It is argued that gender role demarcation, requiring women to
stay home for domestic chores, will be reflected in the perception of stressors. Siddiqui and Pandey (2003) carried out a study to assess the extent to which slum residents of Delhi and Allahabad perceived six environmental stressors viz. air and water pollution, noise, garbage, crowding and traffic as stressful. Besides the fact that slum dwellers of Delhi perceived greater stress as compared to those of Allahabad, gender differences were also seen in the perception of some of the environmental stressors. Females perceived more stress due to water pollution than males while males felt more stressed by traffic than females. This reflects the impact of clear role demarcations of men and women in perception of stressors. In India, women are generally confined to their house and neighbourhood with infrequent opportunities to commute. Therefore, they do not have much experience with stressful traffic conditions leading to less perception of stress on its account. However, regarding the poor quality of water, females reported greater perception of stress, as they are the ones who are frequently exposed to it while handling their daily household chores.

RESIDENTIAL DENSITY, NOISE SENSITIVITY, GENDER AND EVERYDAY ERRORS

Psychologists have shown considerable amount of interest in the assessment of minor everyday slips or errors. Broadbent et al. (1982) have argued that everyday errors involve perceptual failures or failures of memory or actions which are misdirected. According to them, in everyday errors, there is a departure from the normal smooth flow of function and events do not proceed in accordance with intention.

Studies have suggested that environmental stressors like noise lead to a greater frequency of everyday errors. Broadbent (1971) suggested that one of the effects of noise is to increase momentary inefficiency. Common examples of momentary failures of memory,
attention and action are the everyday errors we all make from time to time. It has often been suggested that stress increases everyday errors; and Broadbent & Gath (1979) report a study that showed a higher reported incidence of these minor errors in individuals whose jobs had a large number of stressful components, such as time pressure or social isolation. Smith & Stansfeld (1986) compared self-reports of everyday errors given by subjects who lived in an area of a high level of aircraft noise with those of a similar group who lived in an area with a low level of aircraft noise. The subjects were further subdivided into those who considered themselves to be highly sensitive to noise and those who had a lower level of noise sensitivity. The high aircraft noise group reported a higher frequency of occurrence of everyday errors and so did the noise sensitive subjects. However, there was no interaction between noise sensitivity and the level of aircraft noise.

A careful review of literature has not revealed any definite researches that have been conducted to study the impact of residential density and gender on everyday errors. Reason (1977) has argued that everyday errors may be systematically investigated using questionnaires such as the Cognitive Failures Questionnaire (CFQ) developed by Broadbent et al. (1982). Therefore, in the present investigation, it is planned to identify the impact of residential density, noise sensitivity, and gender on everyday errors using the above-mentioned scale.

RESIDENTIAL DENSITY, NOISE SENSITIVITY, GENDER AND HEALTH

Health as a concept has begun to be increasingly viewed on a continuum ranging from illness to wellness. For example, at the lower end of the continuum are variables such as disability, symptoms of mental and physical illness. The middle of the continuum represents the absence of illness which is considered a neutral point and has
been the focus of traditional health care practices. At the upper end of the continuum are variables such as physical fitness, vitality, high self-esteem, positive well-being and coping ability. The Indian conceptualization of health is defined by Sushrut, the ancient proponent of the traditional system of medicine and surgery as “prasannanmendriyamanah swastha” i.e. health is a state of delight or a feeling of spiritual, physical and mental well-being (Sinha, 1990). In consonance with this viewpoint is the definition of health offered by the World Health Organization (1996) that states that, “health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”. A majority of the Indian medical practitioners (50.18%) also conceive of health in terms of well-being, fitness and healthy conditions and only 20% as the absence of disease. Allopathic and homeopathic practitioners emphasize the absence of disease to a greater extent than Ayurvedic and Unani practitioners whose efforts are directed more towards enhancing the general well-being of the individual. (Singh et al., 1999).

The role of environment in creating chronic and acute health disorders cannot be overemphasized. It has been documented since the time of Hippocrates when with the discovery that infectious agents produce disease, attention was directed to the environmental conditions that give rise to these agents and permit them to breed. As a result of breakthroughs in water treatment, sewage control and food storage, the incidence of infectious diseases declined substantially to be replaced by the slower-developing chronic illnesses of heart disease, cancer and diabetes. Since individual Behavioural risk factors are clearly involved in the etiology and progression of these diseases, attention has been diverted away from the role of the environment in producing disease in favour of an emphasis on individual behaviour. However, the role of the environment in producing chronic as well as acute disease merits renewed attention in
the context of the current concerns addressed by health psychology, concerns that clearly delineate the deleterious consequences of an unhealthy environment on health and well-being. This is particularly true in the Indian context where 40-50% of the population lives below the poverty line and a large majority lives in slums and chronic strains including environmental conditions such as substandard housing and inadequate access to water not only have adverse effects on health, independent of income but also threaten survival (Lepore, Evans, & Palsane, 1991).

Broadly, an unhealthy environment is one that threatens safety, undermines the creation of social ties and is conflictual, unpredictable, uncontrollable and abusive. Conversely, a healthy environment provides safety, opportunities for social integration and the ability to predict and control aspects of that environment (Taylor et al., 1997). As such, certain environmental conditions are more capable than others of not only interfering with optimal human functioning but actually straining the adaptive resources of human beings. However, this aspect of the transactional process between environment and human Behaviour has been largely overshadowed by psychological and sociological investigations of personal, organizational and societal factors that influence stress. Some research studies have tried to examine the linkage between environmental stressors on one hand and health on the other.

**Residential Density and Health**

Pernicious environments exact adverse health effects. Properties that characterize such environments include high levels of air and water pollutants, hazardous wastes, pesticides and industrial chemicals (Calnan & Johnson, 1985) and high residential density and noise (Evans, 1997). High residential density has been defined as 1.5 persons or more per room (Taylor et al., 1997).
Several studies in animal literature have linked high density living environments with heightened susceptibility to infectious diseases as well as to cardiovascular disease (Dubos, 1965; Thiessen, 1964; Christian, 1961). Human high-density studies on cardiovascular data are too few in number to draw any conclusions but high density has been found to be associated with higher rates of tuberculosis and venereal disease (Schmitt, 1966), various measures of pathology including crime rate, health and social disorganization (McCarthy, Galle, & Zimmon, 1975; Galle et al., 1972), higher rates of mortality due to cancer and stroke (Levy & Herzog, 1974; Montano & Myers, 1977). Stokols and Ohlig (1975) found a relationship between reported crowding in college dormitories and visits to the student health center. Dean et al. (1979, 1975) have also reported associations between crowding and illness complaints. McCain, Cox, and Paulus (1976) reported that prison inmates living under low density conditions made fewer illness complaints than those who lived in high densities and reported high crowding. High density living is also associated with death due to homicide but negatively with death due to suicide, which appears to be tied to isolation and loss of family ties (Levy & Herzog, 1974). It has also been related to increased likelihood of infections and respiratory disorders (Levy & Herzog, 1974) and increases in blood pressure, heart rate and skin conductance (Baum & Paulus, 1987; Evans, 1978b). Several other studies have reported associations between high density and poor physical health (Baum & Paulus, 1987; Cox et al., 1978; Sundstrom, 1978).

Gove et al. (1979) conducted a study known as the Chicago study to examine the relationship between residential density and health. The results revealed a strong association between crowding and poor mental health and poor social relationships in the home. One measure of objective crowding viz. persons per room and two measures of subjective experience of crowding - felt demands (e.g.
never any peace and quiet) and lack of privacy (can never be by oneself) - were utilized. The correlations of the two subjective scales with the objective scale were .30 and .33 respectively. Crowding accounted for moderate amounts of variance (5 to 8%) in several scales: psychiatric symptoms, manifest irritation, marital relations balance and getting along with others. An overall self-rating of physical health was obtained. The overall rating of physical health was not related to crowding although another variable which the authors considered a physical health indicator, "cannot get good rest" was reasonably well correlated (6.7% of the variance).

There is a large number of studies that have not found residential density to be related to physical/mental health. For instance, the Toronto study (Booth et al., 1979, 1978, 1976) included approximately 560 families living in high density census tracts; 522 wives and 333 husbands were interviewed while physical examinations were done on approximately 58% of the wives and 64% of the husbands. Initial analyses with two independent variables – people per room and households per block-- revealed no significant associations with numerous biological health and mental health variables. The study of crowding in work settings by Dean, Pugh, and Gunderson (1978) found that in a Navy study of men on 78 ships total illness rates were unrelated to either an objective index (amount of volume per man) or a subjective measure of crowding. Similarly, Rohe (1982) examined the response to density in residential settings and found no link between density and health. It has been suggested that impact of residential density on physical health is probably rarely going to be observed and may require a combination of very high levels of crowding and suitable specific disease etiologic dynamics.

A large scale field survey was conducted by Jain (1991a), employing four types of densities, i.e. low outside-low inside, low outside-high inside, high outside-low inside and high outside-high
inside. High inside density enhanced competition tolerance and expectation of social support for economic gain, feeling of crowding, life stress, withdrawal and ill-health (both physical and psychological). The context effect of outside density was obtained for the feeling of crowding. Williams (1994) also found a strong positive correlation between the rate of impatient treatment in the National Institute of Mental Health and population density of each of the fifty states of USA and the District of Columbia \( (r = .74) \).

Possible explanations for the relationship between residential density and health center around the increased vulnerability to disease produced by residential density. Dubos (1968) reports that “physiological tests have revealed that crowding commonly results in an increased secretion of various hormones which affect the whole human physiology. An adequate hormonal activity is essential for well-being, but any excess has a variety of harmful effects”. Cassel (1970) has also discussed the relationship between hormonal disequilibrium and the incidence of disease. He contends that crowding increases the risk of disease by heightening social and emotional strain, rather than by increasing the opportunity for spread of infection. Cassel proposes that the role of social factors is to increase the susceptibility of the organism to disease through “the activation of inappropriate neuroendocrine arousal mechanisms”.

**Noise Sensitivity and Health**

Studies have reported that those individuals who are more sensitive to noise experience more serious effects on their health from noise than those who are less sensitive to noise (Iwata, 1984; Tarnopolsky et al., 1978; Weinstein, 1978). Rovekamp (1983) found that subjects who described themselves as sensitive to noise showed significantly greater noise-induced increases in peripheral vasoconstriction than their “normal” counterparts. It has also been
reported that individuals who are more sensitive to noise (as assessed by different questionnaires) report worse sleep quality both in field studies (Ohrstrom, 1989) and laboratory studies (Ohrstrom & Bjorkman 1988). There is some evidence of long-term effects of noise disturbed sleep on psychosocial health and well-being (Ohrstrom, 1991). A recent study of road traffic and aircraft noise failed to show a significant increase in blood pressure resulting from noise, but did show a correlation between the presence of noise and subjective health complaints (Pulles et al., 1990). In a study conducted by Nivison (1992), it was found that the effects of noise on physiological changes viz., autonomic responses, subjective health and sleep complaints were strongly and consistently mediated by the subjective experience of noise. A strong correlation was reported between noise sensitivity and health complaints such as cardiac health complaints, nervous, muscular, intestinal and allergic complaints, trait anxiety, poor sleep quality and nocturnal awakenings. On the basis of this study Nivison (1992) suggested that people who report being sensitive to noise may be at risk for increased health complaints and these effects may be exacerbated by high noise levels. In a study by Ruback et al. (1997), respondents who reported being more upset by noise also reported more symptoms, more anomie (i.e., being more lost in the city), less positive affect and less control.

A large scale field study of aircraft noise and sleep disturbance around major UK airports was carried out by a consortium led by the CAA for the Department of Transport (Ollerhead et al., 1992). This study found a low incidence of objectively measurable sleep disturbance (both minor arousals and brief awakenings from persistent sleep) attributable to individual aircraft events.

In another study on aircraft noise and sleep carried out by Flindell et al. (2000) no major differences were observed between sleep variables from participants in the high noise and lower noise
areas. There were some minor differences in general noise sensitivity ratings and in some detailed EEG measures. However, it should be noted that in the study design, there were no significant differences between the average indoor aircraft event noise levels as measured in the high noise and lower noise areas. If there had been a significant difference in indoor aircraft noise event levels then significant differences in sleep outcome measures might well have occurred. There were increases in the number of awakenings, total durations of stage 1 sleep, number of rapid eye movement (REM) sleep periods and changes in the frequency content of the EEG associated with higher numbers of aircraft noise events occurring during the 'lights out' period. Alternatively, some subjects who stayed in bed longer in the mornings would have been exposed to much higher numbers of aircraft noise events and this could also have influenced the quality of sleep.

The sixth report on the state of environment in Austria (2002) reported that since the degree of noise nuisance depends on subjective perception, it cannot be measured accurately. However, epidemiological studies with measurements of A-weighted energy-equivalent continuous sound levels in residential buildings and surveys among inhabitants to determine their subjective satisfaction with living conditions and possible noise disturbances do reveal a statistical correlation between the physical sound level and the population's subjectively felt level of disturbance.

Gender and Health

Studies have attempted to put together gender differences in health profiles and complaints. Aiello, Epstein, and Karlin (1975) reported that women in higher density dormitory rooms reported higher health problems and showed a higher incidence of moving out. The strongest evidence of gender differentials in health status and the use
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of health services has been documented for both children and adults in South Asia. A study in India found that protein-energy malnutrition was four to five times more prevalent among girls, and yet boys were fifty times more likely to be hospitalized for treatment (Das Gupta, 1987). Studies in other countries have also found that even when there is no apparent gender difference in the prevalence of infectious disease, women may be less likely than men to seek care. In Colombia and Thailand, for example, about six times as many adult men as women attend malaria clinics for treatment (Vlassoff & Bonilla, 1994).

Nivison (1992) reported that women, especially those who have not lived long in an area of high noise, may be at higher risk for the ill-effects of noise. In a large survey in three villages near Allahabad, Ruback and Pandey (1993) found consistent gender differences. Men as compared to women showed fewer physical symptoms, more perceived control, more internal control and positive rating of homes. Shifren and Bauserman (1996) found men to be reporting better physical health than women. They suggested that differences in perception of stress, appraisal and coping behaviour between genders may be responsible for finding differences in health related behaviour. Maini (2001) reported that females were higher than males on health complaints in a study of psychological factors in cigarette smoking and cessation.

Given the preponderance of research citing women to be higher on health complaints than men, attempts have been made to understand the reasons behind this phenomenon. Research carried out by the World Bank (1992) and World Health Organization (1986) revealed that the cultural and socioeconomic environment affects women's exposure to disease and injury, their diet, their access to and use of health services, and the manifestations and consequences of disease. Indoor cooking, for example, is one of the most serious
occupational, health and environmental hazards in the developing world because of the acute and chronic – and sometimes fatal – consequences of inhalation of smoke and toxic gases, as well as accidental burnings. Women's disadvantaged social position helps perpetuate poor health. From infancy, females in many parts of the world receive less and lower quality food and are treated less often when sick, and then only at a more advanced stage of disease. In countries where women are less educated, receive less information than men and have less control over decision-making and family resources, they are less apt to recognize health problems or to seek care. Cultural factors such as restrictions in some Middle Eastern countries on women's travelling alone or being treated by male health care providers inhibit their use of health services.

The Encyclopaedia of Women and Gender states that the patterned, structured social inequality by sex that constitutes gender contributes to women's morbidity (frequency of disease) and mortality (frequency of death). Around the globe and across numerous cultures, women are viewed and treated as inferior to men (social inequality). Women live longer than men but simultaneously, across the world, women are sicker than men: women have both greater longevity and greater (i.e., "excess") morbidity. Recent reports on the use of health care system suggest that men are less likely than women to visit physicians and participate in preventive measures (Commonwealth Fund, 2000). Women make more visits to physicians, more visits to hospitals, more visits to emergency rooms and have more surgical procedures than men, even after controlling for pregnancy.

Self-assessment of health status has been found to correlate reasonably well with objective (i.e., biological) measures of health. Similarly, it has been reported that women are more willing than men to admit that they are unwell and distressed (Neitzeri et al., 1997; Henderson et al., 1981). As such, self-ratings of health are collected
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by the National Institutes of Health as an indicator of the health of the American population. More women than men rate their health as poor and more minority women (compared to White women and men) rate their health as poor. Specifically, about 1 in 10 women assess their health as fair or poor. One frequently used health indicator is the percentage of the population with limitations in major activity due to a chronic condition. About 13% of women, ages 18 to 64 report such limitations (Landrine & Klonoff, 2001).

It is held that gender inequality (social inequality based on sex) causes needless deaths (mortality) and excess disease and suffering (morbidity) in women worldwide. Inequality in the allocation of food and medical care, coupled with male violence, inequality in financial power and in the control of sexuality, cause women to be sick much of the time, to be far sicker than men, and to die needlessly. People who utilize health care services most often are women and those women do so because they are underfed, overworked, exhausted, battered, raped, depressed, sick from sexually transmitted diseases or sick from a disease not readily diagnosed or cured (Landrine & Klonoff, 2001).

RESIDENTIAL DENSITY, NOISE SENSITIVITY, GENDER AND SUBJECTIVE WELL-BEING

The concept of well-being refers to optimal psychological functioning and experience. Just as positive affect is not the opposite of negative affect (Cacioppo & Bernston, 1999), well-being is not the absence of mental illness. In fact, Cowen (1991) suggested that wellness should be defined not simply as the absence of psychopathology but instead as an array of positive aspects of functioning that are promoted by attainment of strong attachment relationships, acquisition of age appropriate cognitive, interpersonal and coping skills and exposure to environments that empower the person. Wallace and Caruso (2002) give five components of well-
being viz. zest versus apathy; resolution and fortitude; congruence between desired and achieved goals; self-concept; and positive mood tone. Broadly, the field has witnessed the formation of two relatively distinct paradigms for empirical inquiry into well-being that revolve around two distinct philosophies. The first view, labeled hedonism (Kahneman et al., 1999) is based on the proposition that well-being consists of pleasure or happiness. The second view is that well-being consists of more than just happiness; it lies in the actualization of human potentials. This view has been called eudaimonism (Waterman, 1993) conveying the belief that well-being consists of fulfilling or realizing one's daimon or true nature.

By defining well-being in terms of pleasure versus pain, hedonic psychology poses for itself a clear and unambiguous target of research and intervention, namely maximizing human happiness. The focus is thus on how people calculate utilities, maximize the density of reward and optimize inputs associated with pleasure versus displeasure. Whereas happiness is hedonically defined, the eudaimonic conception of well-being calls upon people to live in accordance with their daimon or true self. Well-being is not simply the attaining of pleasure but the striving for perfection that represents the realization of one's true potential (Ryff, 1995). The absence of well-being creates conditions of vulnerability to possible future adversities and the route of recovery lies not exclusively in alleviating the negative but engendering the positive (Ryff & Singer, 1996).

Subjective well-being (SWB) refers to the overall evaluation that people make about the quality of their life, generally by summing up their essential life experiences along a positive-negative continuum (Shmotkin, 1998). Though SWB is widely considered indicative of mental health (Bryant & Veroff, 1984), the exact relationship between the two constructs is not yet settled. The definition of the DSM-IV (American Psychiatric Association, 1994) for mental disorder does not
allude to SWB, but rather to “present distress”. In its definitions since the 1940s, the World Health Organization (1996) emphasizes that health is not merely the absence of disease or infirmity but a state of complete physical, mental and social well-being. Notably, this definition does not separate physical from mental health and regards “well-being” in its broadest sense as an essential constituent of health. Thus, mental health can be conceptualized as composed of two inclusive elements, psychological distress and psychological well-being (Veit & Ware, 1983), which are not mutually reducible but rather complementarily indicate the variations in a person’s mental status (Lewinsohn, Redner & Seeley, 1991).

Two components of subjective well-being have been identified – affective i.e. emotional and cognitive i.e. judgemental (Diener et al., 1999). The affective component consists of how frequently an individual reports experiencing positive and negative affect. Affect refers to an individual’s emotional state – feelings and moods. The two most important characteristics of affect are intensity – the strength of the emotion and direction – whether the emotion is positive or negative (Baron & Byrne, 2004). It is often assumed that all emotions fall along a single dimension – positive at one end and negative at the other. A great deal of research suggests, however, that positive and negative emotions represent two separate and independent dimensions that are reflected in self-ratings (Drake & Myers, 2000; Tellegen, Watson, & Clark, 1999; Yik, Russell, & Barrett, 1999) and in the different brain structures that are activated by positive versus negative emotions (George et al., 1995).

A conception that has gained prominence among sociologists is the emphasis on life satisfaction as the key indicator of well-being (Ryff & Keyes, 1995). Life satisfaction is considered to be the cognitive component of subjective well-being and refers to an individual’s personal judgement of well-being and quality of life based on his or her
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own chosen criteria (Diener, 1984). It is seen to complement happiness, the more affective dimension of positive functioning. Research has shown that objective measures of quality of life (i.e. income, education) are often weakly related to people's subjective self-reports of the extent to which they are satisfied with their lives. A one-to-one relationship between observable life circumstances and subjective judgements of life satisfaction does not always exist (Sousa & Lyubomirsky, 2001).

Subjective well-being is increasingly important in a democratic world in which we want people to live fulfilling lives as evaluated by themselves, not simply as judged by policy makers, autocrats or experts. As people in the world come to meet their basic biological needs, they become increasingly concerned with happiness and fulfilment. In an international survey of college students it was found that life satisfaction and happiness were rated as extremely important (Diener, 2000). For example, on a 7-point importance scale, on which 1 was not at all important and 7 was extraordinarily important, respondents in India on an average rated life satisfaction 5.75 and happiness 5.97. In comparison, money was rated only 4.81, indicating that the Indian respondents believe that happiness and satisfaction are more important than money.

In a review of several studies, Diener and Biswas–Diener (2000) reported that among demographic variables, youth and education are no longer seen as prerequisites for SWB. It appears that on an average men and women do not differ strongly in levels of SWB and the same can be said of adults in different age groups. In most studies married people report being happier and people with higher incomes are also reliably higher in SWB (although this advantage is often small). In the western nations, unemployed people are often quite unhappy. One of the broad conclusions is that demographic variables are not very powerful in explaining the variance in SWB. For example, Campbell, Converse, and Rodgers (1976) discovered that demographic factors
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(e.g., age, sex, education, marital status) accounted for less than 20% of the variance in SWB. Andrews and Withey (1976) could only predict 8% of the variance and Argyle (1999) concluded that demographic variables could account for only 15% of the variance in SWB. Thus, efforts began for development and testing of theories of well-being, which could shed greater light on who has high SWB and offer deeper insights than the demographic categories were able to afford.

One theoretical approach emphasized temperament and personality as important underpinnings of whether people are happy. For example, Costa and McCrae (1988) proposed that two major personality traits, extraversion and neuroticism underlie people's propensity to react positively or negatively, respectively, to events. Confirming this hypothesis, Lucas, Diener, Grob, Suh, and Shao (in press) found that across cultures there is a tendency for extraverts to report more positive emotions. Similarly, Tellegen, Lykken, Bouchard, Wilcox, Segal, and Rich (1988) concluded that genes account for 40% of the variance in positive emotionality and 55% of the variance in negative emotionality, whereas shared family environment accounts for 22% and 2% of the variance in positive emotionality and negative emotionality respectively. Thus, a number of investigators have concluded that inborn temperament is a very important influence on people's long-term level of SWB, although immediate events will move respondents up or down from their baseline. However, Inglehart and Klingemann (2000) demonstrated that there are very large differences between nations in SWB and therefore, heritability is not the only influence on happiness. Similarly, longitudinal studies on events such as unemployment show that some circumstances can have long-lasting effects on SWB.

Another line of theorizing about SWB stressed the importance of goals and values. The idea was that people have different goals and desires and therefore, what makes them happy will differ. If people
make progress toward their particular goals and act in accordance with their values, they are likely to be happy, according to goal theory. Oishi, Diener, Suh, and Lucas (1999) found that for students who highly valued achievement, getting good grades was predictive of their satisfaction, whereas for those who valued conformity, family harmony was more important to their life satisfaction. Oishi, Schimmack, and Diener (2000) found that sensation-seekers were more influenced by hedonism; their satisfaction was more dependent on the degree of physical pleasures they experienced than was the satisfaction of low sensation-seeking respondents. Csikszentmihalyi’s (1997) theory of flow suggests that engagement in interesting activities is seen as a key to a happy life. According to this model, a person should be happy if he or she is usually involved in interesting activities that present challenges that the person can meet.

Some scholars have attempted to define global progress by measuring subjective well-being (SWB) i.e by indicating the change over time of average scores of SWB of different countries (Heylighen & Bernheim, 2001). It has been pointed out that SWB is typically evaluated relative to proximate points such as peers or expectations based on recent experience. Heylighen and Bernheim, however, propose the development of a measuring instrument that is less subject to such “relativistic” distortions and uses the best and worst period of one’s life as standards. Another approach derives more sensitive indications from the objective variables that correlate with average SWB when different countries are compared. The average SWB scores for up to 48 different countries were correlated with a number of objective variables that describe various socio-economic characteristics of these countries, such as wealth, health, security, knowledge, freedom and equality (Veenhoven, 1995, 1994). The underlying assumption behind this idea is that SWB scores to some degree reflect the degree of satisfaction of stable, objective needs; hence, significant differences between
populations will point to differences in need satisfaction, which
themselves can be measured by indicators such as standard of living,
life expectancy, etc (Veenhoven, 1996b, 1991).

Similarly, stress theories used in psychiatric epidemiology reflect 
the view that mental health is promoted by social situations in which 
there are "adequate" resources for needs such as creature comforts, 
affiliation with others, coherence in values, social role framing, self-
expression and recognition of the individual as a unique and valued 
person. Life satisfaction was found to have strong positive correlations 
with most of the factors which we would intuitively consider "good". For 
example, correlation of SWB with purchasing power was + 0.64, with 
number of lethal accidents −0.67, with corruption −0.73 and with 
absence of prejudice +0.58 (Veenhoven, 1997).

Personal characteristics also influence SWB. They interact with 
social conditions in determining overall SWB, making correlations more 
difficult to interpret in terms of controllable factors. For example, 
intrinsically greedy people are likely to have amassed more wealth than 
their less materialistic compatriots, without therefore, being happier. 
External factors can explain up to 81 % of the variance in SWB between 
countries (Veenhoven, 1996b), but a much smaller part of the variance 
in SWB between individuals.

The most obvious objective factor correlated with SWB is physical 
well-being or health. There seems to be a two-way relation between 
health and happiness: on the one hand, healthy people will suffer less 
physical discomfort and therefore be able to enjoy life more; on the other 
hand, there are indications that people who have many pleasant feelings 
are more likely to live a long and healthy life than people who feel bad 
(Grossarth-Maticek & Eysenck, 1995), possibly because chronic stress, 
through mechanisms such as the raising of cortisol levels, has a 
negative effect on health. Health can be measured on the national level
by indicators such as life expectancy and child mortality. All these have strong correlations with life satisfaction (Veenhoven, 1996a, b). The higher the life expectancy, the higher the life satisfaction. Decline in mortality rates means an immense decrease in the emotional suffering caused by the loss of loved ones.

Adequate nutrition and health care, and thus health, require a certain level of wealth. Veenhoven (1996 a, b) found that real income per inhabitant is strongly correlated with life satisfaction. Yet, he noted that the correlation diminishes once a certain level of wealth (about the level of Mexico) is reached. It seems that once people have sufficient money, further earnings contribute little to their SWB, implying that wealth is a need that reaches a saturation level (Ryan & Deci, 2001). Similarly, Diener and Biswas-Diener (2000) held that people whose incomes are increasing are not invariably more satisfied, although there is a greater tendency for people whose incomes are decreasing to be dissatisfied. Whether increases or decreases cause satisfaction or dissatisfaction probably depends on a person's goals. If he decides that money is no longer important, then a decrease in income may have no effect.

Peacefulness, safety and political stability seem to be important requirements for a society to have a high SWB. Available data indeed show significantly lower life satisfaction in countries with high murder rates or high accident rates (Veenhoven, 1996, 1997). Veenhoven also found a negative, albeit weaker, correlation between happiness and the importance of the military in a nation.

Perhaps the most important variables contributing to SWB are those that determine the general level of knowledge. Veenhoven (1996, 1997) found that the factor of education (as measured by literacy and school enrolment) has a strong positive correlation with SWB when different countries are compared. Media attendance, the number of
people getting information through radio, TV or newspapers, too shows a strong correlation. Veenhoven found clear correlations of SWB with personal and economic freedom, freedom of the press and political democracy. Unlike wealth, freedom does not reach a saturation level, where further increases do not increase SWB, implying that it would be a growth need rather than a deficiency need (Heylighen & Bernheim, 2000). Veenhoven (1996 a, b) noted a clear correlation between average happiness in a country, and social equality, which is measured by equality between sexes, and equality between classes.

One of the areas of recent progress in SWB is understanding the cultural dimensions that moderate the variables influencing SWB. Much of the cultural research has contrasted individualistic societies (in which the individual and his or her unique attributes are seen as paramount) with collectivistic societies (in which people are viewed as embedded in a social matrix that defines who they are) (Oishi, 2000). For example, Diener and Diener (1995) found that self-esteem was a much stronger predictor of life satisfaction for women in the U.S.A. than it was for women in India. Suh, Diener, Oishi, and Triandis (1998) discovered that individualists use their affect balance, the degree to which they experience pleasant emotions more than unpleasant ones, as important information in judging their life satisfaction, whereas collectivists tend to give heavier weight to norms saying how good it is to be satisfied. Finally, Oishi, Diener, Lucas, and Suh (1999) found that satisfaction with the self, freedom and recreation were more important in predicting the life satisfaction of individualists than of collectivists. Thus, it appears that people who are socialized within an individualistic culture are more likely to think of their own worth, their own feelings and their own autonomy when judging their life satisfaction. In contrast, people in a collectivistic culture are more likely to consider whether it is appropriate for them to be satisfied and might consider the well-being of their family more when deciding if they are satisfied.
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Individualism versus collectivism is not the sole societal distinction that has received research attention in relation to satisfaction. It has also been found that in Latin countries versus Pacific Rim Asian nations, both of which are collectivistic, there is a distinct difference in norms about pleasant and unpleasant emotions. In the Pacific Rim Confucian cultures, positive and negative emotions are seen as almost equal in desirability, whereas in Latin cultures (e.g. Spain, Puerto Rico and South America) the positive emotions are viewed as being very desirable and the unpleasant emotions are perceived as being very undesirable. Thus, it is not surprising that Latin nations report higher levels of happiness, controlling for wealth. It appears that in some cultures there is a positivity disposition; people are socialized to look on the bright side of things which can lead them to weight good things in their lives and give relatively little weight to bad things when making life satisfaction judgements (Diener & Biswas-Diener, 2000).

The extensive data from the world database of happiness have allowed the determination of which objective social, economic and psychological variables have a significant correlation with SWB. The results confirm the values that most people intuitively hold, which are also the values underlying the Universal Declaration of Human Rights: health, wealth, security, knowledge, freedom and equality all seem to contribute to our feelings of well-being.

Residential Density and Subjective Well-Being

Evans et al. (2001) provide data on mental health sequelae of residential crowding among children, demonstrating significant associations between the number of persons per room and psychological health. These relations are shown in two independent samples of urban and rural children living in poverty. The density-mental health link among the rural, low-income sample is qualified by a gender interaction indicating that boys are more vulnerable to negative
outcomes. This interaction was not found among the smaller, urban sample. In both samples, children from higher density homes are less likely to persist in an achievement, problem-solving context. This trend is consistent with several other studies that have found positive relations between household density and poorer psychological health among adults (Lepore, Evans, & Schneider, 1991; Edwards et al., 1990; Lakey, 1989; Gove & Hughes, 1983) as well as with elevated psychological symptoms among adults indicative of mild depression and anxiety (Lepore, Evans, & Schneider, 1991; Edwards, Fuller, Sermsri, & Vorakitphokatorn, 1990).

Research studies have examined the relations between person-environment fit and perceived life satisfaction. Person-environment fit refers to a person's possibilities to get environmental support for his or her goals. Both models of person-environment fit and models of goal systems emphasize the importance of the possibilities to attain central goals to psychological well-being. According to the results, high life satisfaction was found to be significantly associated both with some dimensions of personal project system (especially with social support) and with measures on environmental support. In a study by Wong and Peacock (1994), it was investigated how stress and environment affect well-being. Each of the three measures of well-being (happiness, psychological well-being, and physical well-being) were considered as criterion measures and were regressed on the environmental and stress variables among them density and noise level. For both happiness and psychological well-being, atmosphere emerged as a significant predictor, accounting for 23% of the variance in happiness and 21% of the variance in psychological well-being. No other environmental variable independently contributed to variance in happiness and psychological well-being. The authors derived the conclusion that when there is a high level of environmental press (e.g., low satisfaction with physical environment) because of noise and crowding, one is more likely
Williams (1994) found a strong positive correlation between the rate of in-patient treatment in the National Institute of Mental Health and population density of each of the fifty states of USA and the District of Columbia \((r=.74)\). Similarly, Ruback et al. (1997) reported that respondents who reported being more upset by crowding also reported having more symptoms and having less control. Mitchell (1971) found that among low but not high income Hong Kong families, square feet per person was related to superficial signs of psychological stress (i.e. self reports of 'worry' and 'unhappiness') but not to self reports of psychosomatic symptoms and withdrawal from family and work roles. Studies have examined crowding (persons in household per number of rooms) in relation to depression and psychophysiological symptoms. The study revealed poorer mental health in the more crowded residential conditions after adjustments for age and income. Household density was negatively correlated with relative economic well-being and psychological health (Tripathi, 1988).

Several studies have demonstrated the effect of residential density on positive and negative affect. One such study determined that low economic status individuals elicited more negative affective responses in a high dense locality as compared to high economic status individuals (Jain & Preet, 1983). Pandey and Nagar (1988) reported that respondents living in high density dwellings as compared to those in low density dwellings experienced more adjustment related problems, perceived the interpersonal climate in the dwelling as less supportive and exhibited less positive affect. These authors have argued that individuals exposed to high crowding exhibited heightened arousal, which adversely affected their social and emotional reactivity. Jain (1988) analysed contents of responses to open ended questions asked to residents of high density areas to assess their feelings in various day-to-day crowding situations. Analysis of responses revealed three
aspects of feeling: arousal, negative affect and loss of control. Arousal was expressed as 'increased heart beating', 'tension' and 'feeling aggravated'. Negative affect was expressed as 'feeling unhappy', 'sad' and 'congested'. Similarly, loss of control was expressed as 'feeling lost', 'helpless', 'out of place'. Jain (1991) applied factor analysis on the scores of the feeling of crowding measure, and noted four factors, namely, feeling of congestion, arousal, loss of control, and disturbed mood with a total variance of 59.5%. (Similarly, chronic exposure to residential crowding was found to be associated with increased levels of psychological distress). Corroborating these results Ruback et al., (1997) found that high levels of crowding make people feel physically uncomfortable. People feel aroused, are more likely to dislike others around them, want to leave the place and view their surroundings more negatively.

High-rise, high-density residence halls have frequently been found to be less than ideal living arrangements for students. They are "impersonal, institutional, and boxlike". In addition, students in these residence halls report more psychological distress, perceive less social support and poorer social relationships, are less involved in campus activities, and make more visits to their student health centers than students in low-rise, lower-density residence halls (Wells et al., 2001; Lakey, 1989; Heilweil, 1973; Valins & Baum, 1973; Sommer, 1968).

Noise Sensitivity and Subjective Well-being

Noise has a significant impact on the quality of life, and in that sense, it is a health problem in accordance with the World Health Organization’s (WHO) definition of health. WHO’s definition of health includes total physical and mental well-being, as well as the absence of disease. Along these lines, a 1971 WHO working group stated: "Noise must be recognized as a major threat to human well-being." (Suess, 1973).
Since the degree of noise nuisance depends on subjective perception, it cannot be measured accurately. However, epidemiological studies with measurements of A-weighted energy-equivalent continuous sound levels in residential buildings and surveys among inhabitants to determine their subjective satisfaction with living conditions and possible noise disturbances do reveal a realistic correlation between the physical sound level and the population’s subjectively felt level of disturbance. Stansfeld et al. (1985) reported that psychiatric symptoms increased with noise sensitivity but this effect was only significant for subjects living in areas of high noise exposure. The relationships among noise sensitivity, noise annoyance and mental morbidity have been found to be complex and not yet well differentiated (Stansfeld, 1992, 1988; Stansfeld et al., 1985; Tarnopolsky et al., 1980). Noise sensitivity was shown to be a relatively stable trait and was demonstrated to be a powerful predictor of noise annoyance. It was found to be associated with current psychiatric problems only. Evidence from these studies further suggest that noise sensitivity may be a self-perceived indicator of vulnerability to stressors in general and may also be indirectly measuring sub-clinical level of psychological morbidity. Preliminary results from a prospective traffic study in the United Kingdom showed a strong association between noise sensitivity and psychiatric symptoms but no association between noise level at baseline and later development of psychiatric disorder (Stansfeld et al., 1993).

The sources of noise producing community annoyance are primarily aircraft, road traffic and railroad noise, although noise from industry construction and within buildings can also be problematical. Recent research indicates that despite equivalent noise levels, some sources of community noise are more annoying than others. De Jong (1990a) reports that an analysis of Dutch studies showed that aircraft and highway noise produced considerably more annoyance than
equivalent levels of train, tramway, and urban road noise (Miedema, 1988). The explanation for these source-related differences is not necessarily that aircraft noise is inherently more annoying than surface transportation noise. It may be related to differences in people's criteria for responding to various noise sources (Green & Fidell, 1991; de Jong, 1990b). Or it may be caused by differences in noise sensitivity which are actually biologically based. Psychosocial well-being was found to be significantly related to sleep quality as well as to annoyance reports to noise (Berglund & Lindvall, 1995).

**Gender and Subjective Well-being**

A report of the National Institute of Mental Health (U.S.A) on Women's Mental Health and Gender Differences states that of all demographic variables in epidemiological research, gender is the single strongest correlate of risk for different types of mental disorders. Depressive disorders and most anxiety disorders are, on an average, two to three times more common in females. Males are more likely to be affected by developmental disorders such as autism and attention deficit disorder, by substance and alcohol abuse and conduct disorders. For all disorders, including those more common in males than females and those in which gender prevalence is equal (e.g. schizophrenia; bipolar disorder), gender-related differences may occur in etiological risk factors or in clinical aspects.

Studies have examined crowding (persons in household per number of rooms) in relation to depression and psychophysiological symptoms. The study revealed poorer mental health in female respondents and those in a broad middle-age category (23-59). In a study on commuting stress by Novaco et al. (1991), it was revealed that commuting had more negative impacts on women than on men. Greater congestion had a stronger impact on women's psychological distress levels, their desires to change residential location and
marginally impacted negative mood after work and residential satisfaction. Studies by Ruback and Pandey (1996, 1994, 1991) to investigate the effect of crowding and social density and perceived control on physical and mental health in the Indian context clearly revealed gender differences between husbands and wives. Wives reported significantly more mental distress, more physical symptoms, acceptance and self control. Shifren and Bauserman (1996) reported that differences in perception of stress, appraisal and coping behaviour between genders may be responsible for finding differences in health-related behaviour. They found men to be reporting better physical health than women. Ruback et al. (1997) found in their study conducted in India and Bangladesh that women were more upset than men by environmental stressors (noise, air pollution and crowding). In India, females compared to males are more accepting and more helpless but not more likely to move away from stressors. On the other hand, studies in Bangkok have suggested that there is no interaction between gender and objective environmental conditions (Fuller, Edwards, Sermsri, & Vorakitphokatron, 1993; Fuller, Edwards, Vorakitphokatron, & Sermsri, 1993).

Gender differences in life satisfaction have also been investigated. Hoeksema, Larson and Grayson (1991) studied gender differences in reactions to stressful life events and satisfaction with life. They found that women are more vulnerable to depressive symptoms than men because they are more likely to experience chronic negative circumstances. But no significant difference was found between males and females in terms of life satisfaction. Sheldon and Elliot (1999) studied goal-striving, life satisfaction and longitudinal well-being and found that women were higher than men in relatedness but men and women did not differ on life satisfaction. Costa Jr., Terracciano and McCrae (2001) studied gender differences in personality traits across cultures. They reported that irrespective of cultural differences, men
and women exhibited no significant differences in their satisfaction with life. Rajput (2001) studied gender differences in the life satisfaction of elderly males and females and found no significant differences.

Extensive research on gender differences in positive and negative affect has been carried out. Nolen-Hoeksema (1987) reported higher levels of depression in women than in men. Wood, Rhodes and Whelan (1989) in a meta-analytic review of 93 studies on gender differences in positive well-being found that women reported higher levels of happiness and satisfaction, especially in the domain of marital satisfaction. Together, these findings suggest that women experience greater emotionality (both positive and negative) than men (Feist et al., 1995). According to Borrelli et al. (1996) depression, negative affect and stress exert a more pronounced effect among women than among men.

Prakash (1988) found that rural aging women were lower on measures of psychological well-being when compared to urban women in the Indian sample. Studies on Indian women reveal that subjective health and satisfaction variables are the major determinants of psychological well-being of women in different age groups (Prakash, 1992; Shirolkar, 1992).

Almeida and Kessler (1998) examined gender differences in psychological distress by assessing men's and women's experience of daily stressors and psychological distress in a sample of 166 married couples. Respondents completed a structured daily diary each day over the course of 42 days. Results showed that women reported a higher prevalence of high distress days and a lower prevalence of distress-free days than men. Gender differences in daily distress were attributable largely to women experiencing more onsets of distress episodes rather than being more likely to continue in a distress state from one day to subsequent days. Women consistently report more
extreme levels of distress (Marks & Lambert, 1996; Conger, Lorenz, Elder, Simons, & Ge, 1993; Kessler et al., 1992; Wittchen, Essau, von Zerssen, Krieg, & Zaudig, 1992). Maini (2001) reported that females scored higher than males on negative affect in a study of psychological factors in cigarette smoking and cessation.

Efforts to understand gender-distress relationship come from cognitive-behavioural and gender-role perspectives. Rumination theory (rooted in cognitive behavioural perspective) posits that gender differences in psychological distress are due to differences in how men and women respond to being in a dysphoric state (Kuhl, 1992, 1981; Nolen-Hoeksema, 1987). According to this theory, females are more likely to ruminate on their negative emotions and thus, prolong them. Gender role perspectives, however, contend that females are more distressed than males because women’s roles expose them to more stressors (Mirowsky & Ross, 1989; Gove & Tudor, 1989).

Anger has been described as a primary emotion arising when an organism is blocked in the attainment of a goal or in the fulfilment of a need. It is likely to depend on the organism’s appraisal of events and assignment of meaning to them. It is an emotional state that consists of feelings of irritation, annoyance, fury, rage and heightened activation or arousal of the autonomic nervous system. Hostility also involves angry feelings. But this concept is much broader usually having the connotation of negative, destructive attitudes such as hatred, animosity and resentment as well as chronic anger. Aggression generally refers to destructive, punitive behaviour directed towards other persons or objects in the environment. Substantial overlap in the prevailing conceptual definitions of anger, hostility and aggression led to refer them collectively as the "AHA" syndrome by Spielberger et al. (1983) who proposed the following definition of the syndrome, “The concept of
anger refers to an emotional state that consists of feelings that vary in intensity from mild irritation and annoyance to intense fury and rage. Although hostility usually involves angry feelings, this concept has the connotation of a complex set of attitudes that motivate aggressive behaviours directed towards destroying objects or injuring other people. While anger and hostility refer to feelings and attitudes, the concept of aggression generally implies destructive or punitive behaviours directed towards other persons or objects. Kassinove and Sukhodolsky (1995a) view anger “as a negative, phenomenological (or internal) feeling state associated with cognitive and perceptual distortion and deficiencies for example, misappraisals, errors and attributions of blame, injustice, preventability and/or intentionality, subjective labelling, physiological changes and action tendencies to engage in socially constructed and reinforced behavioural scripts”.

It is assumed that a certain type of cause perception or blameworthiness is a necessary feature of anger. Johnson-Laird and Oatley (1989) however, argued that anger can occur for no known reason. There is much disagreement on another aspect as well viz. whether anger includes only negative (unpleasant) feelings (Biaggio, 1987), both negative and positive feelings (Schimmel, 1979) or neither (Alschuler & Alschuler, 1984). The emotional vital signs that are most critical to an individual’s well-being are anger, anxiety and depression (Spielberger et al., 1999, 1995). Out of these three, anger and anxiety are the ones most often implicated as being associated with hypertension (Sharma, 2003). However, there is more agreement on the outcomes of anger. Ellis (1977) found that anger is associated with disruptive intrapersonal and interpersonal consequences. According to Deffenbacher (1995, 1992), moderate to intense overt anger may lead to a variety of negative outcomes such as poor evaluation by others, lowered self esteem, interpersonal conflicts and occupational maladjustment. Angry ruminations can lead to a variety
of medical problems (Harburg et al., 1991; Spielberger et al., 1991). Evidence suggests that both the expression and suppression of anger are linked to increased pulse rate (Funkenstein, King & Drolette, 1954), hypertension (Julius, Schneider, & Egan, 1985) and coronary heart disease (Siegman, 1994).

Spielberger et al. (1983) define anger as a personality trait (T-anger) in terms of individual differences in the frequency of experiencing state anger over time. Individuals high in trait anger were more likely to perceive a wider range of situations as anger provoking (that is annoying, frustrating, irritating) and also to respond to such situations with elevations in state anger than individuals low in trait anger. State anger (S-Anger) has been defined as an emotional state or condition that consists of subjective feelings of tension, annoyance, irritation, fury and rage with concomitant arousal of the autonomic nervous system.

The expression of anger may be outward (anger-out) or inward (anger-in). "Anger–out" generally involves an increase in state anger and the manifestation of aggressive behaviour. Anger directed outward may be expressed in physical acts such as assaulting other persons, destroying objects and slamming doors, or expressed in criticism, insults, verbal threats and the extreme use of profanity. Both physical and verbal manifestations of anger may be expressed directly toward the source of provocation or frustration or indirectly toward persons or objects symbolic of the provoking agent. Persons who direct their anger inward toward the ego or self or who hold in (suppress) their anger are classified as "anger-in" (Averill, 1982; Tavris, 1982; Funkenstein et al., 1954). The psychoanalytic conception of anger turned inward implies that feelings of guilt and depression rather than anger, will be experienced and that thoughts and memories relating to the anger provoking situation and even the feelings of anger themselves may be repressed or denied. In contrast,
suppressed anger is consciously experienced as an emotional state, which may vary in intensity and fluctuate over time as a function of the provoking circumstances. High anger-in scores indicate that an individual frequently experiencing intense angry feelings tends to suppress rather than express them (Spielberger, 1988). Anger-in may then be seen as an emotion-focused coping strategy as it tends to be used to regulate one’s emotional reactions or make one feel better without solving the problem. Sharma and Acharya (1989) found that suppressed anger was associated with avoidance coping.

Studies have revealed significant differences in pulse rate between anger-in and anger-out subjects. Pulse rate for the anger-in group was three times greater than for the anger-out group (Funkenstein et al., 1954). Individuals residing in high stress areas who used the anger-in coping style which has been labeled “suppressed hostility” had significantly higher blood pressure than those who “expressed hostility” (Harburg et al., 1980, 1979, 1973, 1970). It is argued that persons with high T-anger by virtue of their propensity toward anger and their long-term exposure to its pathophysiological sequelae might be particularly susceptible to hypertension. However, the findings in this regard are equivocal (Sharma, 2003). Several studies, however, have shown that anger suppression (anger-in) rather than anger proneness (T-anger) is the critical factor in the development of hypertension (Sharma 2003; Helmers et al., 2000; Ghosh & Sharma, 1998; Sharma et al., 1996; Samova et al., 1995). Another set of studies indicate that outward expression of anger (anger-out) is associated with hypertension/greater blood pressure than suppressed anger (Ohira et al., 2002; Schwenkmezger and Hank, 1996; Vogele et al., 1997; Sharma et al., 1996). Still other studies have shown that extreme expressions of anger (anger-in or anger-out) in either direction have adverse cardiovascular consequences (Everson et al., 1997). With respect to
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anger control, hypertension patients tend to be lower on control of anger expression than the normotensives (Ghosh & Sharma, 1998; Sharma et al., 1996).

Residential Density and Anger

Several studies have reported evidence of increased aggression among people exposed to crowding in small spaces (Aiello et al., 1979; Ginsburg et al., 1977; Hutt & Vaizey, 1966). Similarly, Nagar and Pandey (1987), reported that subjects in high density experimental conditions rated the experimental room as significantly more crowded and annoying than subjects of the low density condition, in a study to examine the effects of density and noise on cognitive task performance and affect.

Noise Sensitivity and Anger

Surveys have reported a positive relationship between noise intensity, the respondents' attitudes and beliefs about noise and noise source and the average level of felt annoyance. Annoyance is the measured outcome of a community's response to survey questions on various environmental and other factors, such as noise exposure. It is the term used to describe the community's collective feelings about noise although it has been suggested that this term tends to minimize the impact and "aversion" or "distress" might be more appropriate descriptors. It is clear, however, that annoyance connotes more than a slight irritation; it can mean a significant degradation in the quality of life. This represents a degradation of health in accordance with the WHO's definition of health, delineating total physical and mental well-being, as well as the absence of disease. Although annoyance in individuals is sometimes measured in the laboratory, field evaluations of community annoyance are most useful for predicting the consequences of planned actions involving highways, airports, road
Factors directly affecting annoyance from noise include interference with communication and sleep disturbance. Other factors are disruption of one's peace of mind, the enjoyment of one's property, and the enjoyment of solitude. The consequences of noise-induced annoyance are privately felt dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects. Although it is clear that community annoyance is positively correlated with noise exposure level, other variables also appear to be important, such as ambient noise level, time of day and year, location, and socioeconomic status. None of these other variables, however, is as powerful as the attitude of the residents surveyed. In an analysis of 280 social surveys, Fields (1990) examined 17 hypotheses as they relate to community annoyance from noise. Besides noise exposure level, the only variables Field identified as strongly correlated with noise-annoyance were the attitudinal hypotheses: (a) fear that the noise source might be a danger to the neighbourhood, (b) belief that the noise is preventable, (c) awareness that non-noise source might be a danger to the noise source, (d) stated sensitivity to noise, and (e) belief that the economic activity represented by the source is not important for the community. An analysis of Dutch studies carried out by de Jong (1990a) showed that aircraft and highway noise produced considerably more annoyance than equivalent levels of train, tramway and urban road noise (Miedema, 1988). The explanation for these source-related differences is not necessarily that aircraft noise is inherently more annoying than surface transportation noise. It may be related to differences in people's criteria for responding to various noise sources (Green and Fidell, 1991; de Jong, 1990b). Or it may be caused by differences in sensitivity which are actually biologically based. Review of literature (Cohen & Weinstein, 1982; Borsky, 1980, 1969) suggests that annoyance is heightened when a.) noise is traffic, railroads, or other noise sources.
perceived as unnecessary; b.) those responsible for the noise are perceived as unconcerned about the exposed populations’ welfare; c.) the respondent dislikes other aspects of the environment; d.) the respondent believes that noise is harmful to health; e.) the noise is associated with fear and f.) noise interferes with activities deemed important by the individual (e.g., interference with sleep or speech). As such psychological factors are consistently more significant than the sound level itself. Viewing annoyance as a mild form of anger, Cohen et al. (1986) argue that anger is produced when people believe that they have been harmed and believe that harm was both avoidable and undeserved (Crosby, 1976; Brown & Herrnstein, 1975).

Boman and Enmarker (2004) carried out a study on 207 school children to develop and assess conceptual models of how different factors mediate and moderate the annoyance reaction in school environments. They found that general sensitivity to noise and adaptation led to a higher degree of annoyance causing stress symptoms. Several other studies have also reported noise sensitivity to be a strong determinant of the noise annoyance reaction (Smith et al., 2002; Job, 1999; Kjellberg et al., 1996). Several investigators have suggested that aversion to noise may be more highly correlated with health problems than the noise itself. For example, Bhatia et al. (1991) reported that subjects high on noise sensitivity found noisy experimental conditions to be irritating, annoying and disturbing besides reporting headache, nausea and tension. A study by Rehm (1983) found a significant correlation between noise annoyance and cardiovascular disorders. Her data also suggest that those with existing health problems are more annoyed by environmental factors, such as noise. Iwata (1981c) also reported that those who are sensitive to noise tend to be disturbed by or annoyed with noise from the environment in greater degree than those who are less sensitive to it. Although many noise effects decrease rapidly in the laboratory
(Glass & Singer, 1972b; Kryter, 1970), community noise research provides little evidence that noise annoyance habituates in residential settings. Surveys also report that long-time neighbourhood residents are as bothered by noise as more recent arrivals (Cohen et al., 1986).

**Gender Differences in Anger**

Research has called attention to the different ways men and women experience and express anger (Thomas, 1993, 1989). In a study on married couples, Ruback and Pandey (1991) found in case of wives, that household density was associated with more quarrels with other adults in the house as well as with neighbours and greater punishment for their children. Johnson (1984) found that systolic blood pressure was substantially and consistently, higher for males than females at every level of the anger-in variable. For the anger-out variable, females were consistently higher than males in diastolic blood pressure (Spielberger et al., 1985; Johnson, 1984). Contrary to previous research with the Framingham Anger Scales (Haynes et al., 1978) in which women were more likely to suppress anger than men, Thomas (1989) did not find any gender differences in either anger-in or anger-out. However, women were found to discuss their anger, had more anger-related physical symptoms and trait anger as measured by the State Trait Anger Scale (STAS) strongly related to perceived stress, especially vicarious stressors arising from women’s concern about others and their drive to care for them. Correlations between the Framingham anger-in and anger-out measures were essentially zero for both men and women. This finding was consistent with that reported by Spielberger et al. (1985). It has also been reported that men exhibit more aggressive responses to crowding characterized by spatial restriction than do women (Borden et al., 1976; Stokols et al., 1973; Freedman et al., 1972).
Commenting on the sociocultural context of anger, Jack (2001) explained that within cultures, social rules dictate who gets to be overtly angry, in what situations and at whom. These rules allow those with more social power and dominance to more openly display their anger than those who are less powerful. Following the hierarchy of gender in our society, men have much more permission than women to show anger, both publicly and privately; women have less freedom to overtly express anger and more often fear reprisal after showing their anger than do men. Several studies reveal the classic “silent treatment” and various passive-aggressive modes of anger expression such as engaging in destructive gossip, raising their eyebrows, sighing pointedly or shaking their heads. Jack (1999) found that women most often resort to indirect anger expression because of unequal power, socialization and cultural expectations and that respondents in her study easily described the forms of indirect anger they use and for what reasons and purposes.

Similarly, in a survey of 1300 people ages 18 to 90, Di Giuseppe (in press), investigated 18 subscales of anger, including how individuals experience their anger, how long the anger lasts and what they get angry about. While he found that differences in men’s and women’s total anger scores were not significant, he did find differences in the way they experience anger. Specifically, men scored higher on physical aggression, passive aggression and experiences of impulsively dealing with their anger. They also more often had a revenge motive to their anger and scored higher on coercing other people. Women, on the other hand, were found to be angry longer, more resentful and less likely to express their anger, compared with men. DiGiuseppe (in press) found that women used indirect aggression by “writing off” a higher number of people - intending to never speak to them again because of their anger. Thus, anger and its expression never exist in a social vacuum; culture and class affect
who keeps quiet about their anger, who releases it indirectly, who feels their anger is righteous and should be expressed and who uses anger for self-protection.

Women are more interpersonally focused than are men and researchers find that women's anger is more likely to result from another's actions within a close relationship, whereas men are more likely to be angered by the actions of strangers. Thomas (1993) conducted the Women's Anger Study, a large-scale investigation involving 535 women between the ages of 25 and 66. The study revealed three common roots to women's anger: powerlessness, injustice and the irresponsibility of other people. Thomas (1993) reports that women describe their anger primarily in relational terms, placing their anger squarely in stories about relationships and focusing on the interpersonal effects of their anger, while men's stories are more impersonal and self-focused.

Studies have linked the construct of self-silencing (what is often called anger suppression) to a number of specific illnesses in women, such as irritable bowel syndrome, eating disorders and depression. Jack defined "silencing the self" as keeping vital aspects of self (thoughts, feelings, goals) hidden out of fear that exhibiting them would threaten one's relationships or one's safety. Self-silencing includes suppressing one's anger that is not expressing anger directly but keeping it out of relationships; however, doing so means that the situation that causes the anger remains unaddressed. Ali et al. (2000), found that women with IBS scored higher on self-silencing (as measured by Jack's Silencing the Self Scale), self-blame and emotional abuse from others. Suppressed anger can affect health when the stressful situation continues; expressed anger can affect health when it results in even worse interpersonal consequences.

Racial and gender contexts affect whether or not people choose
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to reveal their anger. Research suggests a relationship between racial discrimination and higher blood pressure in African American women due to the arousal of anger and its suppression. For example, Krieger (1996) conducted a study with 51 African American women and 50 White women, ages 20 to 80 years, who described how they dealt with unfair treatment from others. Among Black women, those who stated they usually accepted and kept quiet about unfair treatment were 4.4 times more likely to report hypertension than those who said they took action and talked to others. No clear association between anger expression and hypertension was found among White respondents. Additionally, in a study of 1323 African Americans examining the prevalence of hypertension and the frequency that anger is expressed outwardly toward people and objects in the environment, Johnson and Gant (1996) found that a significantly greater number of women with high blood pressure scored low on anger expression, while there was no significant difference between anger expression styles and hypertension for Black men.