Housing and Mental Health: A Review of the Evidence and a Methodological and Conceptual Critique

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Despite the fact that people invest more financial, temporal, and psychological resources in their homes than in any other material entity, research on housing and mental health is remarkably underdeveloped. We critically review existing research on housing and mental health, considering housing type (e.g., single-family detached versus multiple dwelling), floor level, and housing quality (e.g., structural damage). We then discuss methodological and conceptual shortcomings of this literature and provide a theoretical framework for future research on housing quality and mental health.

The home environment is of tremendous significance to human beings. The residential setting is where people typically spend most of their time (Robinson & Godbey, 1997); is the venue for contact with the most important members of one's social network (Bronfenbrenner & Evans, 2000); and for most people, represents their major financial and personal investment (Freeman, 1984, 1993). Given the significance of the residential environment to human beings, it is appropriate to ask whether housing influences humans' mental health.

This article explores the relationship between housing and mental health. We first provide a review of the literature, restricting our focus to the immediate residential space and omitting neighborhood characteristics as well as research on noise and crowding that has been previously reviewed (Evans, 2001). We then address conceptual issues relevant to housing and mental health research, with a particular focus on moderators and mediators that may enhance our understanding of the processes underlying linkages between housing and mental health. Lastly, we briefly address the policy implications of this area of research.

Research on Housing and Mental Health: A Review of the Literature

Poor mental health encompasses negative affect, psychological distress, and psychiatric disorder. A variety of housing characteristics may influence mental health. Our literature review is organized by four categories: housing type (e.g., single-family detached versus multiple dwelling units, low-rise versus high-rise buildings); floor level of dwelling; housing quality, housing type, and floor level with respect to children's well-being; and overall housing quality (e.g., structural quality, maintenance, and upkeep). The research related to each of these categories is summarized within a table. The studies listed within each table are organized chronologically. For each study we briefly describe the design of the study and the sample. We characterize the housing variable under examination and describe the mental health outcome measure(s) used. We indicate whenever reliability and validity data are available for the mental health measure. Finally, we describe any main and interactive effects. In our descriptions corresponding to the tables, we briefly summarize the general findings or trends among the studies, mention possible explanatory mechanisms (mediators), and highlight the salient methodological issues.

Housing Type: Effects of Single-Family Detached Versus Multiple Dwelling Units and Low-Rise Versus High-Rise Buildings

The studies presented in Table 1 examine mental health differences among residents of various housing types. Nearly all the studies suggest that multi-dwelling housing is associated with adverse psychological health. In general, people living in high-rises seem to have more mental health problems than those living in low-rises or houses. With the exception of Ineichen and Hooper (1974), the research

Table 1. Housing Type: Effects of Single-Family Detached Versus Multiple Dwelling Units and Low-Rise Versus High-Rise Buildings on Mental Health

Author(s)	Design/Notes	Participants	Housing	Outcome	Basic Result
Fanning, 1967	Random assignment	1500 women (British & Canadian servicemen's wives) (Germany)	Detached homes & multiunit 3–4 story blgs	M.D. visits for psychological symptoms	Multiunit dwellers had higher rates of visits to M.D. for psychological symptoms
Amick & Kviz, 1974		915 adult public hsg residents (U.S.)	High-rise v. low-rise	Alienation	Significantly higher levels of alienation in highrise blgs than in low-rises
Bagley, 1974	Matched on age, class, no. of children, length of residence in city	69 women (high-rise), 43 women (houses) (England)	12-story high-rises v. 2-story semi-detached hsg (w gardens)	Neuroticism and M.D. visits	House dwellers had lower neuroticism scores and fewer M.D. visits for "nervous illness"
Ineichen & Hooper, 1974	No matching or statistical controls	262 young families (England)	High-rise v. low-rise houses	Psychological symptoms	Poor mental health among high-rise residents, but worse among house residents
Hooper & Ineichen, 1979	18 mo. later–follow-up of prior Ineichen & Hooper (1974)	262 young families (England)	High-rise v. low-rise houses	Psychological symptoms	Found an ironing-out of prior (1974) mental health differences
Richman, 1974	Controlled for SES	75 women (England)	High-rise v. low-rise v. houses	Psychological problems	Women living in high-rise or low-rise flats complained more about loneliness and depression than women living in houses
Richman, 1977	Controlled for SES	198 women (England)	Houses v. flats v. maisonettes	Depression [RV]	Women living in houses had less depression than women in flats and maisonettes
Moore, 1974	Matched on rank, age, family size, duration of tenancy	169 British & Canadian servicemen's wives (Germany)	Flat dwellers v. house dwellers	Psychiatric illness [RV], M.D. visits for psychological symptoms	No significant difference in psychiatric illness, though trends were in expected direction. Similar trends for visits to M.D. for psychiatric illness

(continued)

Table 1. (*Continued*)

Author(s)	Design/Notes	Participants	Housing	Outcome	Basic Result
Moore, 1975	Matched on rank, age, family size, duration of tenancy	688 British & Canadian servicemen's wives (Germany)	Flat dwellers v. house dwellers	Negative affect social interaction	Flat dwellers less happy, less healthy, liked area less, & complained more about isolation & loneliness
Moore, 1976	Matched on rank, age, family size, duration of tenancy	167 house dwellers, 167 flat dwellers—British & Canadian servicemen's wives (Germany)	Flat dwellers v. house dwellers	Psychiatric illness [RV], neuroticism, M.D. visits for psychiatric illness	Neurotic personalities dwelling in flats more likely to have psych. illness than stable personalities in flats. No similar difference among house dwellers
Wilcox & Holahan, 1976	Matched on gregariousness, self-esteem, size of hometown, race	110 2nd semester freshmen (U.S.)	High-rise v. low-rise dormitories	Social interaction, social support [RV]	High-rise residents found to have less social support and were less socially involved with other residents
Zalot & Webber, 1977	No matching	87 adults (Canada)	High-rise v. single-family detached homes	Social contact w neighbors & complexity of descriptions of neighbors [RV]	Residents of single-family detached hsg had more interaction with neighbors and gave more cognitively complex descriptions of neighbors
McCarthy & Saegert, 1979	Random assignment to blgs	60 adults—mostly African American & Puerto Rican American (U.S.)	3-story low-rise v. 14-story high-rise	Psychological distress, social support	High-rise residents: greater social overload, less sense of control and safety, less social support/social relations, & less attachment to community (but greater attachment to room)

Edwards, Booth, & Edwards, 1982	Statistically controlled for age, education, occupational status	560 white families w dependent children (Canada)	Single-family detached v. multifamily hsg	Psychiatric problems [RV], parenting practices, marital relations	More psychiatric problems among men in multifamily hsg. No differences among women. Fathers report more physical punishment. No difference among mothers. Both men and women report more marital problems in apartment (i.e., arguments, member threats to leave)
Churchman & Ginsberg, 1984	Matched on education, ethnicity, employment status, no. of children, duration of residence	344 women (Israel)	High-rise v. low-rise apartments (owned)	Social interaction [R]	High-rise residents encountered more people and more who were strangers; however, no differences in perceived social support
McCarthy, Byrne, Harrison, & Keithley, 1985	Matched on SES	674 adults (England)	High-rise v. flats v. houses	Psychological distress [RV]	Interaction of hsg type and area. Psychological distress was worst for residents of high-rise hsg within low SES neighborhoods. In well-off neighborhoods, hsg type n.s.
Husaini, Moore, & Castor, 1991	No matching	600 African American elderly (U.S.)	High-rise senior hsg v. detached homes in community	Depression [RV], psychiatric disorder [RV]	High-rise dwelling elderly were more depressed, had higher rates of psychiatric disorder, and were more socially isolated
Levi, Ekblad, Changhui, & Yueqin, 1991	No matching	503 adults, children, & elderly in 125 households (China)	Traditional 1-story home w courtyard v. mid-rise v. high-rise	Mental health [RV]	More social contact with neighbors in traditional (74%) v. mid-rise (69%) or high-rise (54%)

Note. blg = building; hsg = housing; R = reliability; V = validity; n.s. = not significant.

suggests that residents of single-family detached homes typically fare the best in terms of mental health.

Findings on mental health correlates of housing type raise important questions about what underlying mechanisms might explain these linkages. For example, adverse impacts of high-rise dwellings may be due to social isolation and lack of access to play spaces for young children. A potential mediating variable that might account for some of the relation between multiple dwelling units and well-being is stigmatization related to building appearance and/or fear of crime. In a later section, *Mediating Processes*, we discuss these and other possible underlying psychosocial processes that may explain how and why housing can impact psychological well-being in adults and children.

Unfortunately, many of the studies in Table 1 are marred by weak research designs, often lacking controls for confounding variables. For example, socio-economic status (SES) is correlated with both housing quality and mental health. It may relate also to housing tenure (e.g., owning versus renting) and neighborhood quality. Substandard housing occurs more often in low-income neighborhoods. Recent work on neighborhood quality and mental health (Leventhal & Brooks-Gunn, 2000) illustrates neighborhood quality effects on mental health in children. Only Fanning (1967), McCarthy and Saegert (1979), and Wilcox and Holahan (1976) employ random assignment to building types, thereby avoiding potential confounds.

A more subtle problem that plagues many studies of high-rise versus low-rise housing is that samples of high-rise apartment dwellers often include some people who live on lower floors, thus potentially diluting the impacts of building height. This issue is addressed more directly in studies that compare residents living on different floors as shown in Table 2.

Floor Level of Dwelling

Table 2 summarizes research examining mental health differences between people living on higher versus lower floors. Of the eight studies, six provide evidence of poorer mental health among residents of higher floor levels. Possible explanations for the adverse impacts of living on a higher floor include anxiety about accidents and falls and difficulties with the development and maintenance of social networks. These are discussed further below under *Mediating Processes*.

Of the studies presented in Table 2, only Fanning (1967) employs random assignment. Thus, the findings of most of the studies are threatened by a major confound—the self-selection bias. In other words, perhaps people with poor mental health tend to choose to live on higher floors.

Studies on floor level effects also ignore within-floor heterogeneity that could contribute to unexplained variance and lead to low effect estimates. For example, people may reside longer on some floors than on others. The duration of exposure to a particular housing characteristic such as floor level might contribute to the

Table 2. Effects of Floor Level of Dwelling on Mental Health

Author(s)	Design/Notes	Participants	Housing	Outcome	Basic Result
Fanning, 1967	Random assignment	1500 women (British & Canadian servicemen's wives) (Germany)	3- and 4-story hsg	M.D. consultation for psychological symptoms	Significant, positive relationship between floor level and psych. distress (Incidents 2 × greater among women who lived on 4th floor v. women on ground floor)
Mitchell, 1971	No matching	3000+ adults (Hong Kong)	Urban dwellings	Emotional illness & hostility [R]	Floor level affects emotional illness & hostility, but only for people living with nonrelated people in one dwelling
Bagley, 1974	No matching	69 women (England)	12-story building	Neuroticism [RV] & M.D. visits re: nervousness	Negative correlation between neuroticism and floor level. (Note: older childless residents lived on higher floors)
Wilcox & Holahan, 1976	Matched on gregariousness, self-esteem, size of hometown, race	55 2nd semester freshmen (U.S.)	1–5 v. 7–10 floors in high-rise dormitory	Social support, social involvement [RV]	Less social support and less social involvement were found on higher floors
Richman, 1977	Controlled for SES	198 women (England)	High-rise hsg	Depression [RV]	Women living above 3rd floor had greater incidents of depression than women on lower floors
Gillis, 1977	No matching	442 public housing residents (Canada)	Eight types of public hsg (e.g., single detached, row, high-rise)	Psychological strain [RV]	Gender x floor level interaction. For women, floor level predicts psychological strain. For men, relationship is weaker & other direction
Hannay, 1981	No matching	964 adults (Scotland)	Detached, terraced, low-rise, 1st 4 floors of high-rise, 5th floor+ of high-rise	Mental symptoms [RV]	People on 5th floor or above had twice the number of mental symptoms as those on lower floors (or in other types of hsg)
Saito, Iwata, Hosokawa, & Ohi, 1993	Controlled for age and employment status of women	444 women (Japan)	A community of 12 blgs. Floors 1–2 v. 3–4 v. 5–8 v. 9–14 v. 15–23	Psychological health [RV]	No main effect of floor level on psychological health

Note. blg = building; hsg = housing; R = reliability; V = validity.

strength of mental health sequelae. As an illustration, Marsh, Gordon, Pantazis, and Heslop (1999) found that the strength of the negative association between housing quality and children's well-being depended on years of exposure. Heterogeneity in personal characteristics with known mental health correlates such as gender or age (Caspi, 1998; Cohen, Kessler, & Gordon, 1995) are often unexamined in studies of floor level and mental health.

Housing Quality, Housing Type, and Floor Level: Children's Well-Being

The studies presented in Table 3 examine the impact of housing quality, housing type, and floor level on children. Overall, these studies suggest more behavioral problems and restricted play opportunities among high-rise-dwelling children. Richman (1974) is anomalous in her finding of no significant differences among the behavior of high-rise-, low-rise-, and house-dwelling children. In addition, Homel and Burns (1989) diverge from the other studies of floor level with their finding of no main effect. This study is unusual, however, in its operationalization of higher floor level. While most floor level studies compare the first few floors to several higher floors (e.g., see Table 2—Hannay, 1981 [1−4 v. 5+]; Richman, 1977 [1−3 v. 4+]; Wilcox & Holahan, 1976 [1−5 v. 7−10]), Homel and Burns compare the ground floor to the above-ground floors.

Several mediating processes have been discussed with respect to housing and children's psychological distress. These include parent–child interaction, child and adolescent monitoring and supervision, restricted play opportunities for younger children, lack of contact with the natural environment, and safety concerns (see *Mediating Processes*, below, for more details).

Gillis (1974) found that building type may be linked with juvenile delinquency. Since this study was conducted on the aggregate (census tract) level, caution is warranted in assuming those living in multiple dwellings are the same individuals exhibiting juvenile delinquency. Furthermore, as with most of these studies, the direction of causality is unclear. If the juvenile delinquents are living in multiunit dwellings, their families may have self-selected into housing type. Only Saegert (1982) avoids self-selection through random assignment to low-rise or high-rise buildings. Furthermore, several significant findings listed in Table 3 occur with controls for SES.

Overall Quality of the Housing Environment

Table 4 summarizes research examining the relationship between overall housing quality and mental health. Operationalizations of housing quality include structural deficiencies, cockroach and rodent infestation, dampness, and mold, as well as housing dissatisfaction, neighborhood comparisons, and comparisons of "difficult to rent" versus low-vacancy housing. All the studies summarized in Table 4 suggest that housing quality is positively correlated with psychological well-being.

Table 3. Effects of Housing Quality, Housing Type, and Floor Level on Children's Well-Being

Author(s)	Design/Notes	Participants	Housing	Outcome	Basic Result
Davie, Butler, & Goldstein, 1972	Controlled for social class	10,000+ kids from birth to age 7 (U.K.)	Basic amenities (hot water, bathroom, indoor bath)	Social adaptation at school [RV]	Housing amenities significantly correlated with social adaptation at school
Gillis, 1974	Aggregate level; controlled for ethnicity & SES	30 census tracts (Canada)	Multiple dwelling v. single detached hsg	Juvenile delinquency [V]	Less juvenile delinquency in areas of detached hsg
Ineichen & Hooper, 1974	No matching	262 married women (England)	High-rise v. non-high-rise	Behavioral problems	Twice as many children living in high-rises exhibited behavioral problems as those in non-high-rises
Gittus, 1976	No matching	346 working-class families w children < 5 years (England)	High-rises, low-rises, single dwellings	Play behavior	Children in high-rises had more restricted play; were more likely to play alone; mothers less satisfied w play facilities
Richman, 1974	Controlled for SES	75 preschool children (England)	High-rises v. low-rises v. houses	Behavioral problems [RV]	No significant differences in behavior problems among the three groups of children (residing in high-rises, low-rises, or houses)
Richman, 1977	Matched on gender & SES	705 preschool children (England)	High-rises v. other hsg types	Behavioral problems [RV]	Children residing in high-rises exhibited more behavioral problems
Saegert, 1982	Random assignment to blgs	312 elementary school children (U.S.)	3-story v. 14-story public hsg blgs	Behavioral disturbances in school [RV]	For boys, teachers' ratings of behavioral disturbance (i.e., hostility, anxiety, hyperactivity/distractibility) were higher for 14-story blg residents. For girls, no difference
Churchman & Ginsberg, 1984	Parents matched on education, ethnicity, employment status, no. of children, duration of residence	168 children age 2–13 (Israel)	High-rise v. low-rise apartments (owned)	Play behavior	The outdoor play of children in high-rises was more restricted than those in low-rises—for 4-to 5-year-olds only
Homel & Burns, 1989	No matching	321 children ages 9–11 (Australia)	Ground level v. above ground	Emotional adjustment, social adjustment	No effect of floor level on emotional or social adjustment
Oda, Taniguchi, Wen, & Higurashi, 1989	No matching	169 infants, 876 kindergartners (Japan)	Low floors (1–5) v. high floors (14–23)	Independence—"Fundamental Daily Customs" (FDCs)	Children living on high floors showed delayed independence of FDCs such as greeting, potty training, shoeing, compared to infants on low floors. Difference in independence diminished with age—n.s. difference among kindergartners

Note. blg = building; hsg = housing; R = reliability; V = validity; n.s. = not significant.

Table 4. Effects of Overall Housing Quality on Mental Health

Author(s)	Design/Notes	Participants	Independent Variable	Outcome	Basic Result
Bagley, Jacobson, & Palmer, 1973	Aggregate level/ecological study	19 wards of the city (9000 people/ward) (England)	Wards of the city	"Behavioral pathologies," e.g., psychological illness, senility, alcoholism, addiction, suicide	Behavioral pathologies especially located in central urban areas characterized by overcrowding, single-person households, in-migrants, & poor hsg conditions
Bagley, 1974	Matched on age, sex, social class	100 psychiatric inpatients v. 100 controls (England)	Hsg conditions (self-report)	Neurotic conditions [RV]	Hsg stress (furnished rented accommodations, shared toilet & bath, no piped hot water, and density > 1.5/room) was related to neuroticism even for people who received no mental health treatment
Carp, 1975	Movers and nonmovers generally equivalent pre-move	400+ low-income elderly	Movers (to new apartment building for elderly) v. nonmovers: pre-move, 1 year post-move, 8 years post-move	Happiness, worry, optimism, morale	Movers reported more happiness, less worry, greater sense of optimism, and higher morale than nonmovers, 1 year and 8 years following the move
Duvall & Booth, 1978	Trained raters assessed interior & exterior structural deficiencies. Controlled for education, age, ethnicity & husband's occupation	522 married women <45 years w at least 1 child (Canada)	Perceived adequacy of space & privacy; structural deficiencies; nonstructural deficiencies (noise, cold, pests)	Emotional well-being: (1) tranquilizer use & (2) psychological symptoms [RV]	Major structural deficiencies (sagging, cracked, or broken structural elements), lack of privacy, and space problems predicted mental health

Study	Controls	Sample	Housing measure	Mental health measure	Findings
Brown, Brolcháin, and Harris, 1975	Controlled for SES	Women age 18–65: 114 being treated for depression; 220 random sample (England)	Hsg problems (self-report)—overcrowding, physical shortcomings, noise, insecure tenure, etc.	"Psychiatric screening" developed at Institute of Psychiatry, in London [RV]	Higher rates of depression among working-class women are related to hsg problems such as overcrowding, physical shortcomings, noise, insecure tenure
Kasl, Will, White, & Marcuse, 1982	Matched on SES and other factors	337 minority, low-income women w children in public hsg (U.S.)	Hsg quality (mix of self-report & rater items)	Mental health [RV]	Hsg quality x neighborhood quality interaction: women living in poor hsg within deteriorated neighborhood had poorer mental health. Children's mental health–n.s.
Wilner, Walkley, Pinkerton, & Tayback, 1962	Matched on many factors including age, rent, occupational status, and length of residence	600 black families—half move to public hsg; half stay in slums (U.S.)	Hsg quality: based on Am. Public Health Assoc. instruments—self-report & rater items	Psychological distress [RV]; school performance (child) [RV]	Small improvements in optimism, personal life satisfaction. Less aggression towards authority. (Mood & nervousness n.s.) Children's school performance improved
Zahner, Kasl, White, & Will, 1985	Longitudinal; controlled for income, etc.	337 Black & Latino women (U.S.)	Roach & rodent infestation	Psychological symptoms [RV]	Rat infestation was consistently associated with poorest mental health
Byrne, Harrison, Keithley, & McCarthy, 1986	Matched on SES	383 households in council hsg (England)	"Difficult to let" (i.e., higher vacancy rates, longer to find tenants, more transfer requests) v. other council hsg	Psychological distress [RV]—(e.g., anxiety, depression, yes/no questions)	"Difficult to let" hsg associated with more psychological distress (except for adults over age 65)

Table 4. (*Continued*)

Author(s)	Design/Notes	Participants	Independent Variable	Outcome	Basic Result
Elton & Packer, 1986	Randomly assigned to move or stay. No significant between-groups difference in symptoms prior to move	56 requested relocation from council hsg due to mental health: 28 move 28 stay, (England)	Poor hsg v. better hsg. (Hsg quality not actually measured. Subjects attributed mental health difficulties to noise, structural problems, crowding, etc.)	Anxiety & depression [RV]	Highly significant improvement in depression and anxiety symptoms 1–3 months following move, and stable changes 1 year later
Elton & Packer, 1987	Matched on sex, age, and SES	41 who moved from council hsg due to mental health v. 11 who moved for other reasons (England)	Poor hsg v. better hsg (with different reasons for relocation)	Anxiety & depression [RV]	Improvements in symptoms of anxiety and depression for both people who moved from council hsg due to mental health and people who moved for other reasons
Birtchnell, Masters, & Deahl, 1988	No controls for SES (although more depressed women were poor)	408 women (England)	Interior hsg quality	Depression	Residential quality was significantly lower for depressed than for nondepressed people
Blackman, Evason, Melaugh, & Woods, 1989	Statistically controlled for proportion of children <age 5 and proportion of single parents (SES not controlled)	1317 adults, 874 children in two hsg areas (Northern Ireland)	Compared two areas of public hsg: poorer quality v. better	Mental health—self-report	Greater incidence of mental health problems in poor hsg for both adults and children

Study	Controls	Sample	Measure	Findings
Hunt, 1990		599 households w child under age 16—adults (80% female) and children (England & Scotland)	Hsg conditions assessed by two surveyors: dampness, mold, cold, noisy, poor repair, overcrowded	Emotional distress (Adults: bad nerves, feeling low, headaches, GHQ score. Children: irritability, temper tantrums, unhappiness, bed-wetting)	Among both adults and children, percentage of people reporting symptoms of psychological distress is positively correlated with the number of hsg problems
Hunt & McKenna, 1992	Controlled for age	752 adults in three areas of hsg (England)	Compared three areas of public hsg with varying degree of physical improvements	Anxiety & depression [RV]	For people over age 64, greater incidence of depression and anxiety among those who lived in unimproved hsg versus better hsg
Saito, Iwata, Hosokawa, & Ohi, 1993	Controlled for internal density, floor level, age, employment status	444 women (Japan)	Dissatisfaction or perceived hsg problems	Psychological health [RV]	Poorer psychological health found among those who (a) were dissatisfied with house or room arrangement, (b) perceived house as inadequate for children, etc.
Smith, Smith, Kearns, & Abbott, 1993	Statistically controlled for social class, location, ethnicity	279 households in inadequate hsg (Australia)	Two hsg stressor (self-report) scales: discomfort and physical condition [R]	Psychological distress [RV]	Perceived hsg discomfort predicts psychological distress. Social support moderates in low or medium hsg discomfort, but not in high
Halpern, 1995	No significant between-groups differences in symptoms prior to remodeling	117 low-income, female heads of household. Half remodeled to improve hsg, half did not (England)	Pre–post hsg improvements (e.g., replaced front porch & door, modernized kitchen & bath, provided central heating)	Anxiety & depression [RV]	Symptoms of both anxiety and depression decreased in intervention group. No change in control group

(continued)

Table 4. *(Continued)*

Author(s)	Design/Notes	Participants	Independent Variable	Outcome	Basic Result
Hopton & Hunt, 1996	Controlled for SES	451 households (Scotland)	Dampness (checklist of 6 problems associated w dampness)	Emotional distress [RV]	Dampness was significantly associated with poorer mental health
LeClair & Innes, 1997	Aggregate level/ ecological study	Children and adolescents (Canada)	Hsg quality (percent of dwelling units in bad repair within census tract)	Referrals to children's center for mood/conduct/stress-related disorders [V]	Hsg quality best predicts mood/conduct/stress referrals (only other significant predictor was social class)
Payne, 1997	No control for SES or income	1266 adults (U.K.)	Hsg quality (good, adequate, or poor)	Isolation, depression, worries	Those living in hsg in a "poor state of repair" are four times as likely to experience isolation, depression, & worries than those in good hsg
Weich & Lewis, 1998	Controlled for six other indices of material deprivation, sex, age, social class, marital status, education, ethnicity, number of health problems, and region of residence	9064 adults age 16–75 (U.K.)	Hsg problems (esp. dampness, leaky roof, rot in wood)	Common mental disorders [RV]	Those with structural hsg problem are (1.40 odds ratio) likely to have mental disorder
Obasanjo, 1998	Controlled for SES, race, age, gender	63 inner-city African American & Hispanic adolescents, age 15–19 (U.S.)	Hsg quality—based on 17 self-report items, emphasis on space/crowding and noise issues (only 3/17 items re: maintenance/upkeep)	Psychosomatic illness [R], cognitive control [R], cognitive failure [RV], directed attention fatigue [R]	Hsg quality was a strong predictor of all dependent variables

Study	Controls/Design	Sample	Housing measure	Outcome measure	Findings
Obasanjo, 1998	Controlled for SES, race, age, gender	680 inner-city mostly African American adolescents, age 13–19 (U.S.)	Hsg quality—based on 8 self-report items (emphasis on maintenance—4/8 items)	Perceived social support [RV], psychosomatic illness [R], directed attention fatigue [R]	Hsg quality was predictive of social support, directed attention fatigue, and psychosomatic illnesses. The effect of hsg quality on the latter two dependent variables was moderated by age.
Dunn & Hayes, 2000		528 households in two neighborhoods (Canada)	Overall satisfaction w dwelling, and response to "I can't stand to be at home sometimes."	Mental health [RV]	Those who reported poorer overall satisfaction with dwelling were (2.46 times) more likely to report poorer mental health, and those who disagreed with "I can't stand to be at home…" were (2.26 times) less likely to report poor mental health (only when "constantly under stress" removed from possible independent variables)
Evans, Wells, Chan, & Saltzman, 2000	(a) Controlled for income (b) Longitudinal design, controlled for pre-move psychological distress	(a) 207 low- & middle-income rural women (U.S.) (b) 31 low-income urban women (U.S.)	(a) Hsg quality—evaluated by trained rater using quantitative instrument (b) (Same HQ scale as above) Pre-/post-move longitudinal comparison of poor versus new hsg	(a) Psychological distress [RV] (b) (Same as above)	(a) Hsg quality predicts psychological distress (b) Changes in hsg quality were predictive of post-move psychological distress
Evans, Saltzman, & Cooperman, 2001	Controlled for SES and mothers' mental health	277 children, grades 3–5, mean age 9.12, low to high income (U.S.)	Hsg quality evaluated by trained rater	Psychological health [RV], task persistence [RV]	Hsg quality predicts children's mental health and task persistence

Note. blg = building; hsg = housing; R = reliability; V = validity; n.s. = not significant.

Various characteristics of housing quality may influence psychosocial processes that in turn can affect mental health. Some of these mediating processes are identity and self-esteem, anxiety about structural hazards, worry and lack of control over maintenance and management practices, and fear of crime. These are discussed in detail under *Mediating Processes*.

Unfortunately, a variety of factors render the majority of results on housing quality and mental health inconclusive. First, the independent variables are often subjectively defined or based on self-report. For instance, in Hopton and Hunt (1996), dampness is subjectively assessed; in Brown, Brolcháin, and Harris (1975), Duvall and Booth (1978), Smith, Smith, Kearns, and Abbott (1993), and Obasanjo (1998), housing problems are based on self-report. This is particularly problematic when the dependent variable is also based on self-report (which psychological well-being often is) because some of the covariance between housing quality and mental health may be created by the overlap in method.

In several studies, differences between housing conditions are presumed, but not explicitly measured. As an example, in Elton and Packer's (1986, 1987) studies of relocation, housing quality is not actually measured. While it seems reasonable to accept that housing quality improved following the move to new housing, measured changes in housing conditions would provide stronger evidence. A recent study employed a more detailed, quantitative measurement of housing quality completed by trained raters before and after people moved (Evans, Wells, Chan, & Saltzman, 2000).

Many housing scales consist of dichotomous items (e.g., present/absent) and/or a small number of items. Both of these features attenuate estimates of association (Ghiselli, Campbell, & Zedeck, 1981). Christenson, Carp, Cranz, and Wiley (1992), in a reanalysis of housing quality and residential satisfaction data, demonstrated significantly larger correlations when multiitem scales were employed instead of single-item indicators. Furthermore, as documented in Tables 1−4, many studies have used mental health measures of unknown reliability. This too attenuates estimates of covariation (Ghiselli et al., 1981).

Insufficient variability in housing quality underestimates covariation with mental health outcomes (Ghiselli et al., 1981). Variability in housing quality is restricted when public housing samples or institutional housing (e.g., college dormitories, military housing, prison housing) samples are relied on (cf. Marsh et al., 1999).

Conceptual Issues

Two conceptual issues permeate research on housing and mental health: moderation and mediation. Nearly all studies have examined the main effects of housing characteristics on mental health without taking into account other variables that might moderate the relation between housing and mental health. Secondly, few

studies examine what underlying psychosocial processes (i.e., mediators) might explain how and why housing can affect mental health.

Moderating/Processes

Housing researchers have generally not incorporated moderating constructs (interaction effects) that may amplify or attenuate the impacts of housing on mental health (Freeman, 1993; Gifford, in press; Lawrence, 1993). A few of the studies on high-rise living (see Tables 1 and 2) reveal that women staying at home with young children may be particularly susceptible to the ill effects of high-rise living. This subgroup may be especially vulnerable because of social isolation caused in part by their inability to let their children play outside. Research from China provides anecdotal reports of parental anxiety among high-rise dwellers due to a lack of play spaces for children that parents can easily monitor (Levi, Ekblad, Changhui, & Yueqin, 1991). In Hong Kong, high-rise housing was found to be associated with psychological distress but only among apartments shared by multiple family units (Mitchell, 1971). Boys may be more vulnerable to suboptimal housing than girls (Saegert, 1982), and the age of children may make a difference as well. Young adolescents may be more sensitive to housing quality than their older counterparts. Obasanjo (1998) attributed this to the greater opportunities available to older adolescents to escape from their immediate residence.

In addition to personal variables, the social and physical context in which housing is located may alter its impacts on human beings. Multiple-story buildings located in low-income neighborhoods might affect people differently than similarly designed houses located in a different place (Gifford, in press). Poorer quality housing is more strongly related to psychological symptoms in adults when the housing is located in more deteriorated neighborhoods (Kasl, Will, White, & Marcuse, 1982; McCarthy, Byrne, Harrison, & Keithley, 1985). Public housing families randomly relocated to scattered site public housing in middle-class suburban neighborhoods showed more improvements in mental health relative to similar families with improved housing quality who relocated to low-income neighborhoods (Katz, Kling, & Liebman, 2000; Leventhal & Brooks-Gunn, in press). Also, there is evidence that young boys in these families engaged in less antisocial behavior (Katz et al., 2000; Ludwig, Duncan, & Hirschfield, 2001). The effects of crowding on psychological distress after controlling for SES are elevated by inadequate housing (Evans, Lercher, & Kofler, 2002). The negative psychological impacts of residential crowding are amplified among families living on upper floor levels (Hassan, 1976; Mitchell, 1971). Children living in more crowded or noisier homes suffer fewer ill effects if they have a room where they can spend time alone (Evans, Kliewer, & Martin, 1991; Wachs & Gruen, 1982).

Mediating Processes

An important avenue for understanding housing and mental health is development of a preliminary taxonomy of psychosocial processes that might account for linkages between housing and psychological well-being.

Identity.   Symbolically, both structural quality and maintenance of the home provide feedback to residents about quality in their environment and are often primary factors in how others view the residents (Kearns, Hiscock, Ellaway, & Macintyre, 2000). Residents of public housing, for example, feel stigmatized by the larger community and may internalize others' negative perceptions of them (Halpern, 1995). Others such as prospective employers, the police, and school authorities may react negatively, as well, to the stigma attached to living in housing projects, bad neighborhoods, and so on (Rosenbaum, Reynolds, & Deluca, 2002). Failure to reside in a place consonant with one's ideals might influence self-esteem. The house is a symbol of self, reflecting both inwardly and outwardly who we are, what we have accomplished, and what we stand for (Becker, 1977; Cooper-Marcus, 1995; Freeman, 1984; Halpern, 1995).

Insecurity.   Poor housing quality often means more hassles with maintenance and in some cases dependence upon people in bureaucratic organizations (e.g., public housing authority) who can be quite difficult to interact with. For low-income people, not only is substandard housing more likely, but high rates of involuntary relocation frequently occur (Evans & Kantrowitz, 2002). Bartlett (1998) provides qualitative evidence for the potentially psychologically injurious impacts of high mobility among children. Mobility is also a principal component of instability, which has been linked to poorer socioemotional development in young children (Bronfenbrenner & Evans, 2000). In addition, less secure housing tenure is associated with poor health. For example, Macintyre, Ellaway, Der, Ford, and Hunt (1988) found that renters had worse physical health than owners even after statistically controlling for income.

Concerns about safety and hygiene (falls, burns, infestation, garbage, waste), especially if children are present, could reasonably engender considerable anxiety and worry (Wells & Evans, 2003b). Housing research on the elderly suggests that physical hazards related to falls in particular (step design, flooring materials, lighting) are of major concern (Wells & Evans, 1996). Several hazards are potentially more dangerous in high-rise buildings including fires, earthquakes, structural defects, and falls (especially for children) from windows/balconies (Freeman, 1993). Residences may be sited on land unsuitable for housing where landslides, flooding, fires, and major storms are more likely to occur (Bartlett, 1999).

The physical environment can affect actual rates of crime as well as fear of crime. Spaces that are hard to visually survey (low visual access), insecure

entryways, lighting, level of incivilities, or an ambiance of lack of caring (vandalism, graffiti, disrepair), plus streets and entryways that are easily and anonymously passable all contribute to crime (Newman, 1972; Taylor & Harrell, 1996).

Social support.   Fanning (1967) proposed that women staying at home and residing in high-rise buildings experienced a high degree of isolation and loneliness due to the high-rise buildings' verticality and lack of garden/play space—both characteristics that could deter social interaction. Several of the studies summarized in Tables 1 and 2 indicate that women in high-rise housing report more loneliness and less social contact with their neighbors partly due to a lack of proximity to communal gathering places. Physical proximity to other living units as well as doorway orientation to high-use pathways and interaction nodes (e.g., mailboxes) affect social interaction patterns as well (Festinger, Schacter, & Back, 1950). Porches, balconies, outdoor gardens, terraces, and patios increase visual exposure and access to neighbors and thus elevate social contact.

In a series of studies, Baum and his colleagues (Baum, Gatchel, Aiello, & Thompson, 1981; Baum & Valins, 1977; Baum & Valins, 1979) demonstrated that the design of multi-dwelling housing influenced social support. Residents of double-loaded corridors experience less social support in comparison to those in suite-designed college dormitories. Manifesting not only in questionnaires but also in actual behaviors outside the dormitory environment and at two different sites, the results are quite robust. Residents of long corridors, for example, sat farther away and interacted less with a confederate in a waiting room in comparison to students who lived in suites. They also acted less cooperatively in a group gaming situation and manifested more helplessness in their game-playing strategies. The results of these studies are particularly persuasive because the residents were randomly assigned to their dormitories.

More instrumental forms of social support may be influenced by housing conditions as well. Housing location can affect access to neighbors with more knowledge about jobs, school teachers with information about college, and associations with youth actively planning to attend college (Rosenbaum et al., 2002).

Parenting. Parenting is a key link in understanding housing quality and children's well-being (Bartlett, 1997; Freeman, 1993). Parental practices in response to inadequate housing might include more restrictive, rigid control over children's activities. Stewart (1970) documented widespread restrictions on play activities plus inadequate play spaces for children among families living in high-rise apartment complexes (see also Table 3). Bartlett (1998) uncovered qualitative evidence that inaccessibility to outdoor play was an important contributor to a preschool child's distress. Furthermore, in an intensive analysis of 20 urban families, Huttenmoser (1995) documented that 4-year-olds who could not play independently outdoors, primarily because of traffic-related safety, had more strained

relations with their parents, had fewer playmates, and manifested poorer socio-emotional development (see also Oda, Taniguchi, Wen, & Higurashi, 1989). Lack of access to green, outdoor spaces can undermine the support of both children's play and their access to adults (Taylor, Wiley, Kuo, & Sullivan, 1998). Inability to spend time in natural areas may also be associated with poor cognitive functioning (Kaplan & Kaplan, 1989; Wells, 2000) or psychological well-being (Wells & Evans, 2003a).

Parental self-esteem and confidence as well as feelings of self-efficacy might be impacted by chronic, intractable housing problems. Social withdrawal in response to uncontrollable social interaction is a typical coping strategy. Parents with inadequate privacy may be less able or willing to socially engage their children. Both crowding (Bradley & Caldwell, 1987; Evans, Maxwell, & Hart, 1999) and noise (Wachs & Camli, 1991) are negatively associated with parental responsiveness to young children.

Control. Home is a place that reflects identity and provides security and maximum control. Good housing offers protection not only from the elements but also from negative social conditions. It is a primary territory where we can regulate interpersonal contact (Altman, 1975). Poor housing quality reduces behavioral options, diminishes mastery, and contributes to a general sense of helplessness. Evans, Saltzman, and Cooperman (2001) found that housing quality was inversely related to learned helplessness among third through fifth graders, independent of income. Residents of public housing who relocated to middle-class suburban neighborhoods with federal financial assistance reported marked elevations in feelings of self-efficacy and mastery in comparison to other public housing tenants who relocated to low-income neighborhoods (Rosenbaum et al., 2002).

Size and quality of space can restrict flexibility, disallowing multiple uses of space, particularly important when amount of space is limited. Difficulties in regulating social interaction, inability to control and regulate access to space, and lack of jurisdiction over the immediate public environment might all contribute to feelings of low self-efficacy. Yancey (1971) and Newman (1972) both provide valuable insight with respect to the design of public housing complexes and crime. According to Yancey's (1971) research, the provision of transition spaces from public to private areas reduces residents' feelings of isolation and their fear of public spaces. Newman's (1972) work suggests that building height, complex size, the number of occupants sharing an entrance, and the building footprint can be influential in the incidence of crime. Larger, high-rise buildings with many people sharing entrances and designs that make it difficult to monitor entryways are associated across multiple sites with higher levels of crime.

The arrangement of rooms within a home can influence occupants' ability to control social interaction. Depth (number of interconnecting spaces) and permeability (number of interconnecting routes) influence social stimulation (Hillier & Hanson, 1984). Adults in crowded homes, for example, suffer less psychological

distress when the housing unit has greater depth (Evans, Lepore, & Schroeder, 1996).

The duration of residency as well as frequency of moves can both affect mastery (Fried, 1972; Hiscock, Macintyre, Kearns, & Ellaway, this issue; Smith, 1990). Personalization opportunities contribute to a sense of control (Vinsel, Brown, Altman, & Foss, 1980). Appropriate size and scale of the environment afford the ability to reach, maneuver, and manipulate various residential spaces and elements. Children, the elderly, and individuals with physical disabilities may be especially sensitive to size and scale. As an example, consider the height of door handles, dexterity requirements for their use, and the necessary force to operate a door once unlatched.

Policy Implications

Some preliminary policy implications can be drawn from our review of the housing and mental health literature. Foremost, sufficient evidence exists to claim that housing does matter for psychological health. This is particularly true for low-income families with young children. Second, high-rise, multiple-family dwellings are inimical to families with preschool children. This appears to occur because of two factors: (a) social isolation of mothers and (b) inadequate play opportunities for children. When economic policies require construction of such housing, efforts should be made to reduce the height and overall size of such structures. Particular attention should be paid to spaces to support neighboring and informal contact with other residents and for adequate play spaces for children. As we discussed above under *Social support*, several lines of evidence converge on characteristics of housing design that can facilitate or inhibit the formation and maintenance of social ties.

Within the home, the provision of spaces where children can escape from overcrowding and other chaotic living conditions may attenuate impacts of suboptimal housing conditions. Noise, unwanted social interaction, and constant interruption all contribute to instability and unpredictability in young children's lives (Bronfenbrenner & Evans, 2000). The role of housing and neighborhood quality in cumulative risk exposure among low-income children is not adequately appreciated (Evans & Kantrowitz, 2002). Given current demographic trends, much more attention is called for on mental health of the elderly in relation to housing and neighborhood characteristics as well (Administration on Aging, 2000; Markham & Gilderbloom, 1998).

Research funds should be focused on more rigorous evaluations of housing improvements for low-income families. Random clinical trials, prospective longitudinal designs, and consideration of multiple levels of analysis (neighborhood, building, housing unit) with hierarchical linear modeling (HLM) and other suitable analytic techniques are needed (Bryk & Raudenbush, 1992). Such research needs to incorporate better instruments to assess housing quality to measure salient,

underlying psychosocial processes (e.g., parenting) that may convey housing effects on mental health (e.g., Evans et al., 2000). Use of standardized mental health scales, appropriate for nonclinical populations, is recommended.

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