

Assessment of Chronic Social Stress and
Related Psychological Distress at the Community Level¹

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Summary

This is a technical report from a research programme at the University of Bergen, on the influence of the near social environment on individuals' physical and mental health. The aim of the report is to provide background and details about the programme that are important, but too lengthy for inclusion in papers published in the scientific literature.

Three studies are reported here. Study I was a measurement study, through which the Bergen Social Relationships Scale (BSRS) was developed. The BSRS is a six-item self-report scale intended for use in community research. Its brevity is a design intention, so that the BSRS can be used in a variety of community-based studies, in which the study of chronic social stress and health is not the main focus. The goal was to produce a reliable and valid scale that could be appended easily and without additional cost to survey questionnaires on a wide range of topics. The theoretical foundation for the scale is social psychological theory, by which chronic social stress is conceptualised as a special instance of unresolved cognitive dissonance.

Study II was a qualitative investigation in which the response validity of the BSRS was examined. The purpose was to assess the degree to which respondents interpreted wording, phrasing and meaning of the six BSRS items and the response scales in a manner consistent with the theoretical underpinnings of the scale.

Study III tested the feasibility and utility of using the BSRS in community-based research. The BSRS was appended to a survey questionnaire used in a population-based study Western Norway, the main purpose of which was to study the prevalences and correlates of a wide range of chronic disease risk factors.

In Study I, BSRS inter-item correlations ranged from 0.22 to 0.60, and item-total correlations ranged from 0.39 to 0.58. Cronbach's alpha for the BSRS was 0.76. Confirmatory factor analysis revealed a single factor and only marginal differences between the factor loadings of women and men. A formal test of these differences using the Lagrange multiplier test, revealed statistically significant gender differences for 2 of the six items, suggesting the factor structure of the BSRS is not gender-sensitive and that the BSRS reflects the same underlying construct for women as for men.

The construct validity of the BSRS was assessed using the data from Study III. Inter-correlations were examined among the BSRS and scales measuring loneliness, anxiety and depression. These ranged from 0.40 to 0.32, all statistically significant at $p < 0.001$. In a principal components factor analysis with varimax rotation, the BSRS items loaded on the same component with loadings ranging from 0.57 to 0.73. The other scales (loneliness, anxiety and depression) were also uni-factorial and distinct from one another as hypothesised.

The results of Study II showed the respondents' comprehension of the BSRS items to be mostly homogeneous, indicating that the BSRS item wording is relatively unambiguous and not open to too-wide interpretation. The phenomenology of the stressful relationships described by participants during the in-depth interviews was consistent with respondents' prior responses to the BSRS. That is, affirmative responses to the BSRS items were stimulated usually by chronic and troubling stressful relationships revealed during the interviews.

In Study III, prevalences of positive responses to the six BSRS items ranged from 12 to 34 percent among women and from 11 to 35 percent among men. Women reported significantly higher prevalences than did men on four of the six items, while the rank order of items by prevalence was nearly identical for women and men. Half the men and sixty percent of the women reported at least one of the six BSRS stressors. Among women, 24 percent reported three or more stressors, while among men the corresponding prevalence was 16 percent.

A series of regression models were generated using the data of Study III, in which models including only social support/network variables and distress measures were compared with models that included also the BSRS. These comparisons were made for three distress measures, loneliness, anxiety and depression. In the model in which loneliness was the predicted variable, r^2 increased from 0.31 to 0.40 when the BSRS was added to the social support/network variables. In the model in which anxiety was the predicted variable, the proportion of variance in anxiety accounted for by the BSRS was greater than that for all the social support/network variables combined, as indicated by the r^2 . In the model in which depression was the predicted variable, the combined social support/network variables and the BSRS had approximately equal explanatory power, accounting for a fifth of the variability in depression symptoms. Examining the results across the analyses of the three distress variables, the most potent predictor among the support/network variables was consistently 'satisfaction with good friends'. This variable

and the BSRS had equal explanatory power in the model on loneliness, while in the models on anxiety and depression, the BSRS explained more variability.

These results suggest that the BSRS has good reliability, validity and utility in population based studies of chronic social stress.

Background

A key strategy for community mental health promotion is the strengthening of positive social ties, the anticipated benefits of which are better functioning individuals, families, neighbourhoods and work groups, and improved mental and physical health (Mittelmark, 1999). This strategy is supported by abundant research showing that strong social ties are associated with enhanced physical and mental functioning, and that a lack of social ties is a risk factor for poorer health (Seeman, 2000; Uchino, 1996; Vandervoort, 1999).

A defining feature of most of the epidemiological research in this arena has been the (apparent) assumption that the social ties/health relationship is dominated almost entirely by the positive effects of social ties (Rook, 1984; KS Rook & Pietromonaco, 1987). As a result, the published epidemiological literature is focused mostly on health's associations with social network size, received social support, perceived availability of social support, participation in social groups, and similar social ties variables (L. Berkman, 1987; L. F. Berkman, 1986; Cohen, 1994; Schwarzer, 1990).

Social stress However in some other fields, gerontology and community psychology, as examples, there has been a balance of interests, with attention paid to the health effects of positive, but also of negative, social ties (J Finch, Okun, Pool, & Ruehlman, 1999; Kessler, 1997; Mazure, 1998; Seeman, 2000; Wisman & Bruce, 1999). Most of this research has been stimulated by the problems that special groups in society face. Examples include bullying problems in schools (Olweus, 1997), older adults' coping with arduous caregiving responsibility (Schultz, 1997), students struggling with the pressures of study and examinations (Supe, 1998), patients coping with posttraumatic stress after serious injury (Ehde, 2000) and chronically ill persons' coping with medical treatments (Tell et al., 1995).

There is convincing evidence from much of this work that stressful personal relationships are not merely uncomfortable, they can be seriously damaging to functioning and health, including mental health. A few examples illustrate the scope of this evidence:

Among married couples, daily stressors have been observed to account for up to 20 percent of variance in mood (Bolger, 1989). Hostile behaviour during marital conflict has been associated with enduring, altered endocrine function and with immunological

decrements, and similar effects have been observed among Alzheimer's sufferer's spouses (Kiecolt-Glaser, 1996).

Symptoms of depression have been observed to be most severe among rheumatoid arthritis sufferers who report receiving inept support attempts from significant others (Revenson, 1991). Among community-dwelling older adults, negative social ties have been associated with psychological distress, not buffered by social support (Finch, Okun, Barrera, Zautra, & Reich, 1989; Okun, 1990). At the other end of the life span, chronic life stress experienced by adolescents have been observed to be at least modestly related to drug use (Allison, 1997), and at school, being the target of a bully seriously reduces quality of life (Olweus, 1997).

Comprehensive reviews and scholarly commentaries on the topic of chronic social stress in vulnerable groups are available (Aneshensel, 1992; Billings & Moos, 1985; Kessler, 1997; Mazure, 1998; Pearlin & Skaff, 1996; Rook, 1997; Wheaton, 1994). Data from a few population-based studies are also available. Recently published analyses from Statistics Canada's 1994 National Population Health Survey suggest that among younger cohorts at least, social stress is related to depression (Wade, 2000). The National Comorbidity Study in the United States observed that people with depressive disorder reported not only significantly fewer positive interactions, but also more negative interactions, compared with others in the study (Zlotnick, 2000). The New Haven (USA) Epidemiologic Catchment Area Program has observed that people who expressed marital dissatisfaction experienced major depressive episodes at a rate three times greater than others, and moreover that marital dissatisfaction was a risk factor for new occurrences of major depressive disorder (Wisman & Bruce, 1999). Researchers in Germany observed that depressive symptoms were related to social stressors at work under low social support conditions, while paradoxically, social stress at work was associated prospectively with fewer depressive symptoms among those with good social support (Dormann & Zapf, 1999).

Perhaps the most elaborate population-based data yet available on social stress and health are those of the Midlife in the United States Survey, or MIDUS (Walen, 2000). From MIDUS' national probability sample, data from all married or cohabiting participants ($n = 2,348$) were examined to study the relationship between self-reported well-being and physical health, and self-reported social support and social stress related to family, friend and partner. Among both

women and men, partner support and stress was related inversely to well being, and partner stress was positively correlated with health problems. Among women, family stress was associated with both lower levels of well-being and physical health.

The data from these few specialised, population-based studies on social stress and mental health suggest that social stress may be a significant risk factor for poorer mental health at the population level, and not only among the special groups that have been studied more intensively. This encourages more population-based research, to develop our understanding of both the protective and the risk mechanisms and processes that link the social environment and mental health. One strategy to generate the needed data is to take advantage of existing epidemiological programmes of research on the major chronic and infectious diseases. Epidemiological investigations in arenas other than mental health provide valuable opportunities to collect data on social stress and its correlates, if brief measures are proposed that add little cost to a study and that do not overly burden participants. This approach has been used with good results in the study of social networks and health in the context of research on cardiovascular disease epidemiology. In a number of such studies, it was feasible to insert very brief questionnaires on social network and social support, from which important observations about the protective effects of social support have been made (Berkman, 1987).

Critical to this 'piggyback' approach is the availability of well-founded, yet very brief measures of social stress, and this is a challenge. There do exist reasonably good approaches to the assessment of chronic stressors, but they are far too complex and time- and resource demanding for the purpose cited here (DeLongis, Folkman, & Lazarus, 1988; Eckenrode, 1984). Another issue is that, because stress research has been pursued in a number of disciplines and from a number of perspectives, there are many conceptualisations of stress and virtually all measures are open to the critique that they miss something important (O'keeffe, 1990). Perhaps most important, the construct validity of almost all existing measures of social stress is open to debate, because theory about social stress processes has not played a central role in the development of the measures (Schafer, 1991). The last two points are intertwined, as the main defence of a focused (and therefore not inclusive) measure of stress should be that it is theory-based and operationalised accordingly.

Addressing these points, a research group at the University of Bergen has for the past five years conducted a series of studies aimed at developing a very brief measure of social stress. It is

grounded in social psychological theory on the dynamics of interpersonal relationships, and is suitable for use in large-scale epidemiological studies on a range of subjects. Using this instrument, the prevalence of social stress has been estimated in a population-based study. Also at the population level, indicators of psychological distress have been measured, and their associations with social stress and social support have been investigated. Results from these studies are the subject of this report.

Theoretical foundations

Our approach to the social stress construct has three reference points. First, our broad conceptualization of social stress follows Rook (1992), and refers to processes through which actions by people in one's social network, intended and unintended, cause a person to experience adverse psychological or physiological reactions. Examples of these actions include making excessive demands, criticism, invading privacy, provoking conflict, meddling, social conflict, giving trite, ineffective or inappropriate support, and aversive contact and social control (Rook, 1992).²

Second, we make explicit that which is implicit in Rook's definition, that it is one's perceptions of others' actions, not their objective actions per se, that are critical in defining social stressors. This is consistent with a transactional perspective on stress, in which environment-person interactions are mediated by psychological processes, most notably appraisal and coping processes (Billings & Moos, 1985; Lazarus, 1977). This emphasis does not dismiss the classical stimulus-response understanding of stress in which objective stressors are linked to distress through basic physiological processes. Psychological and physiological processes clearly are inextricably linked, as an earlier reference to stress and immunological functioning illustrates. We do, however, reject the notion that objective measures of stress are preferred over subjective measures (Lepore, 1995). Quite the contrary, in our view social stress cannot be measured objectively. It follows from a transactional perspective, in which the mediating processes are psychological, that the social stress construct is accessible to the researcher only via a person's reflection over, and report of, their own experiences.

² Rook does not use the term social stress, but rather, social strain. Without getting into the thorny discussion about terminology in the stress research arena, there is much confusion about the terms stress and strain, both of which have been used to describe causes, effects and processes. This is the inevitable consequence, perhaps, of early stress researchers' reliance on physical and mechanical models to describe stress in humans. Given the state of confusion, the best one can do is to be explicit about one's terminology, as we do here.

The third reference point for the present work is theory and associated literature on the social psychology of cognition (referring both to (a) the mental process of knowing, including aspects such as awareness, perception, reasoning, judgement and intuition, and (b) that which comes to be known. Within this arena, there is a very large body of work on the problem of cognitive dissonance (Festinger, 1957), which has been defined succinctly by Jones (Jones, 1985):

Two cognitions can either be relevant or irrelevant. If they are relevant then they must be consistent or dissonant. To say that two cognitions are dissonant is to say that one does not follow from the other or that one follows from the converse of the other. Dissonant cognitions produce an aversive state, which the individual will try to reduce by changing one or both of the cognitions (Pp. 70).

A few additional comments are offered here. First, the number of cognitions involved may be more than two, and dissonance may involve cognitions about behaviour. Thus we have the classical example of cognitive dissonance: the cigarette smoker who is highly aware that her smoking is harming her health, is quite anxious about the situation, and therefore tries to either diminish the health issue, quit smoking, rationalise her behaviour, or in some other manner resolve the cognitive dissonance.

Critical to our conceptualisation of social stress, not all attempts to reduce dissonance succeed, and people may have to live with dissonance over extended periods, in other words they must exist in an aversive state. This describes a special case of the transactional model of stress: chronic dissonance and the attendant living in a chronic aversive state. When the dissonance is about others with which one has meaningful (relevant) social relationships, chronic social stress is defined.

Summarising, we define chronic social stress as a transactional, cognitive process involving appraisal and not completely satisfactory coping attempts, to resolve dissonance among cognitions about a significant others(s). Unrequited love is perhaps the most poignant example one can offer.

The examples of chronic stressors cited a few paragraphs above could be thought of as being sampled from a universe of indicators of an underlying construct termed chronic social stress. In developing our brief instrument assessing social stress, we desired to develop indicators that

would be broadly representative of the universe of indicators, and that would be meaningful for people of all backgrounds and situations. Our work produced six classes of indicators thought on theoretical grounds to describe situations that could be seriously distressful to average people, not otherwise especially vulnerable because of frailty, acute stress, serious physical illness and the like. These situations are labeled ‘helpless bystander’, ‘inept support’, ‘performance demand’, role conflict’, ‘social conflict’ and ‘criticism’. Detailed descriptions of these situations are provided by Mittelmark in a paper appended to this report (Mittelmark, 1999). We do not conceive of these six situations as separate constructs, but rather as a typology of indicators of the common construct, chronic social stress.

Present studies

Three roughly sequential studies were conducted. Study I was aimed at developing a very brief self-report measure of chronic social stress and ascertaining the validity and reliability of the measure using standard psychometric techniques (referred to hereafter as the Bergen Social Relationships Scale, or BSRS).

Study II examined the ‘respondent’ validity of the BSRS, that is, the extent to which respondents interpret the BSRS’ wording and phrases as we intended. The term respondent validity as used here refers also to the degree to which responses to the BSRS are associated with life experiences that reflect the theoretical underpinnings of the BSRS. This qualitative validity study was undertaken in the context of a phenomenological study of chronic social stress that is the subject of a companion report (Henriksen, 2001).

Study III examined the prevalence and mental health correlates of chronic social stress in a large scale, population-based investigation. This study focused on the prevalence of chronic social stress in the general population, and the development of statistical models comparing the importance of social support/network variables and chronic social stress variables in the prediction of loneliness, anxiety and depression. Additional validity and reliability analyses were conducted on data from Study III.

The methods of the three studies are presented below.

Study I

Samples

Two samples were involved, both recruited from among the community-dwelling adult population of Bergen, Norway. A convenience sample of 35 college students completed a preliminary version of the BSRS. Subsequently, an age- and gender-stratified, population-based sample of 400 adults was invited to participate in a two wave panel study with identical measurement made approximately 30 days apart. The sample frame was all residents of Bergen, Norway registered in the national (obligatory) identity register, in three age groups: 25-29, 40-44, 75-79. From the sample frame, random samples of approximately equal size were drawn from the three age pools, with a total sample of 400 being drawn.

Methods

With the sample of college students, a 24-item paper-and-pencil version of the BSRS was administered, with four indicators for each of the six chronic social stress constructs, and a dichotomous (yes/no) response format. Additional questions probed the response sets with which respondents approached the task of completing the scale (add some of the details). Based on this part of the study, the indicator of each sub-construct with the highest prevalence was chosen, consistent with our desire to development an instrument that was more sensitive than specific. Also, feedback from respondents indicated that the dichotomous response format was too high in contrast, so the format was changed to a four-point scale. In its final format, the BSRS was revised to include six items, one for each sub-construct, with a four-point response scale. Each item is structured in a manner consistent with the theoretical foundation of the BSRS, expressing two cognitions that are dissonant as is:

There is a person in my life that needs my help, but whom I don't know how to help.

With the population-based sample, contact was taken by letter followed by a home visit, where a packet of questionnaires was completed and returned to the researcher (S.G.H.). A packet containing the same questionnaires was mailed to participants one month later, with instructions to complete and return the questionnaires in a pre-paid envelope. The packets included the following questionnaires:

1. The Bergen Social Relationships Scale (mean = 4.5; s.d. = 3.7; Cronbach's alpha = 0.76). The six items are prefaced by the written instruction 'think about everyone (children, parents, siblings, spouse or significant other, neighbours, friends, colleagues and others you know) while you answer the following: there are people in my life that I care about, but who dislike one another; there is a person in my life that needs my help, but whom I don't know how to help; there is an

important person in my life that wants to support me, but who often hurts my feelings instead; there is a person I have to be around almost daily that often henpecks me; there are people that make my life difficult because they expect too much care and support from me; there is someone I care about that expects more of me than I can manage. Response alternatives: describes me very well; describes me quite well; does not describe me very well; does not describe me at all.

2. A six-item scale assessing loneliness (mean = 4.3; s.d. = 3.8; Cronbach's alpha = 0.77), modified slightly from a scale developed for use in population-based studies in Western Norway (Kraft & Loeb, 1997). The items are: I feel I have enough contact with people that care about me; I often feel lonesome; I feel it is difficult to talk with people I have not met before; I feel lonely even when I am around other people; I often feel that others do not understand me or my situation; I feel that others care about me. The response alternatives are: very much; quite a bit; somewhat; not much; only a little; not at all.

3. The seven-item anxiety sub-scale of a Norwegian version of the Hospital Anxiety and Depression Scale, abbreviated the HADS-A (mean = 4.7; s.d. = 3.3; Cronbach's alpha = 0.81). The HADS-A has a Cronbach's alpha of between 0.78 and 0.93 in a range of studies correlates well with other widely used scales having similar measurement purposes (Bjelland et al, 2000; Herrmann, 1997). The distinct advantage of the HADS-A is its brevity. Items are (response frame 'feelings during the past week'): I feel nervous and restless; I have an anxious feeling, as if something dreadful could happen; my head is full of worries; I can sit in peace and quite and feel relaxed; I feel anxious, as if I had butterflies in my stomach; I am restless and feel I have to stay active constantly; I can suddenly get a feeling of panic. Response alternatives: four, variable in wording depending on the item.

4. The seven-item depression sub-scale of a Norwegian version of the Hospital Anxiety and Depression Scale, abbreviated the HAD-D (mean = 3.1; s.d. = 3.9; Cronbach's alpha = 0.78). The HADS-D has a Cronbach's alpha of between 0.82 and 0.90 in a range of studies and correlates well with other widely used scales having similar measurement purposes (Bjelland et al., 2000). The distinct advantage of the HADS-D, like the HADS-A, is its brevity. Items are (response frame 'feelings during the past week'): I take joy in things, as I have before; I can laugh and see the amusement in situations; I am in good humour; I feel as if everything is going sluggishly; I don't care anymore about my appearance; I look happily to the future; I can take joy in good books, radio and television. Response alternatives: four, variable in wording depending on the item.

Study II

Sample A convenience sample of 22 adults was recruited from among parents of children attending two public schools in Bergen. They received a pilot version of the BSRS by post³, then were contacted to schedule an interview. Nine did not participate for various reasons, of which the nature of the BSRS was the reason two refused the interview. This resulted in a study sample of seven women and six men ages 34 to 53.

Methods Interviews were scheduled either at university facilities or offices in Bergen. No interviews took place in the home. A structured guide was used in audiotaped interviews lasting from 45 minutes to two hours. Respondents were asked to provide insight about why they chose to answer the BSRS items as they did. The interviews sought insight also about how the respondents interpreted the specific words and phrases of the BSRS. The interview data were in addition analysed to illuminate aspects of respondents' experiences with social strain that could not be revealed in a brief self-report questionnaire, and this is the focus of the companion article in this volume.

Study III

A community-based study was conducted to study the prevalence of chronic social stress and its relationship to several indicators of psychological distress. This was done in the context of a much larger study, the Hordaland Health Study '97-'99 (HUSK), conducted during 1997-1999 as a collaboration between the National Health Screening Service, the University of Bergen and local health services (Norwegian Institute of Public Health, 2000). The study protocol was approved by the Western Norwegian Regional Ethics Committee and by the national Norwegian Data Inspectorate.

Sample The study population included all individuals in Hordaland county born in the period 1953-1957 (n = 29,400). A total of 9,983 women and 8,597 men participated, yielding a participation rate of 70 percent among women and 57 percent among men. Among these, a random sample of 3,496 women and 3,779 men were invited to participate in the sub-study reported here. Among these, 3,443 women (98 percent) and 3,378 men (89 percent)

participated. The numbers in the various analyses presented later in this paper vary from these due to differences in the ways missing data were handled.

Methods Using information from the national identity register, all eligible residents were invited by letter to attend a health screening service that focused on the assessment of cardiovascular disease risk factors. This happened, either in a screening centre in Bergen, or in the outer areas of the county, in a specially equipped screening bus that travelled around the municipalities. At the screening centre, participants received a six-page questionnaire that could complete immediately, or return later in a pre-paid envelope. The questionnaire included that already described BSRS and the loneliness, HADS-A and HADS-D scales.

Among other measures in the questionnaire were the following, which are included in the present analyses (hereafter referred to collectively as support/network variables):

(1) Marital status, a dichotomous variable distinguishing respondents who report being married or living as in marriage, versus all others; (2) satisfaction with number of good friend, a dichotomous variable distinguishing respondents who answered yes or no to the question 'do you feel you have enough good friends?'; (3) participation in social activities, a dichotomous variable distinguishing respondents who report that they participate in social groups (sports, political, religious, etc) several times a month or more often, versus all others; (4) availability of a confidant, a dichotomous variable distinguishing respondents who respond 'describes me very well; describes me quite well' to the statement 'I have someone I care about, with whom I can talk about my personal problems', versus all others; (5) availability of instrumental support, a dichotomous variable distinguishing respondents who respond 'describes me very well; describes me quite well' to the statement 'There is a least one person who would loan me money for a short period', versus all others.

Analysis methods

The quantitative data of Studies I and III were analysed using SPSS 10.0.

In Study II, tape-recorded interviews were transcribed and the transcripts were analysed using the analysis method of grounded theory. This is a method by which patterns, themes and

³ This version of the BSRS differed from the final version only in that the response alternatives were dichotomous

categories of the analyses emerge from the data through a process of asking questions about data and making comparisons for similarities and differences between each incident, event, and other instances of phenomena that are present.

Results

Bergen Social Relationships Scale – psychometric properties Inter-item correlations, item-total correlations and Cronbach’s alphas for the BSRS as a whole, and with each item deleted, were examined in the data from Study III. Summarising the results displayed in Table 1, inter-item correlations ranged from 0.22 to 0.60, and item-total correlations ranged from 0.39 to 0.58. Cronbach’s alpha for the BSRS was 0.76. This was diminished with the removal of single items, with the exception of the first item.

Confirmatory factor analysis on the data from Study III was used to investigate the hypothesised uni-dimensionality and factorial invariance of the BSRS across gender. The generalised least squares estimation method was used, as has been recommended for categorical response formats such as that used in the BSRS. In the test for factorial invariance, a model with unconstrained factor loadings was compared to a model in which factor loadings were constrained to be equal across gender. The results, shown in Table 2, show that four of the six items display factorial invariance across gender.

The test-retest reliability and classification stability of the BSRS was examined in the data from Study I. The test-retest correlation was 0.75. The data from the first wave and the data from the second wave were categorised into tertiles and examined to test what proportion of respondents were classified in the same tertile on both occasions. The results were 0.72, 0.60, and 0.70, for the lowest, middle and highest tertiles, respectively.

The construct validity of the BSRS was assessed using the data from Study III, by examining: (1) the degree to which it was correlated with measures of other constructs that it should be associated with on theoretical and empirical grounds (loneliness, anxiety and depression symptoms) and, (2) the degree to which the scale’s items bear an orthogonal relationship to the

instead of a four-point scale.

items of scales measuring the other constructs in (1), above. Regarding the first issue, inter-correlations were examined among the BSRS, the loneliness scale and the two HAD sub-scales measuring anxiety and depression. As shown in Table 3, these ranged from 0.40 to 0.32, all statistically significant at $p < 0.001$. Factor analysis was used to study the second issue, and the results are shown in Table 4. In this principal components analysis with varimax rotation, the BSRS items loaded on the same component with loadings ranging from 0.57 to 0.73. The other scales were also uni-factorial and distinct from one another as hypothesised.

The respondent validity of the BRSR was examined using the data from Study II. The social stress experiences recounted by study participants were characterised by diversity with regard to the specific events and actions that they described as having been stressful. There was also diversity in the degree to which various social stress experiences caused distress; some experiences were very distressing and others were not. Stressful relationships most often involved members of the close social network, that is, family, close relatives and friends. In some instances, colleagues from work were also mentioned.

The phenomenology of the stressful relationships described by participants during the in-depth interviews was consistent with respondents' prior responses to the BSRS. That is, affirmative responses to the BSRS items were stimulated usually by chronic and troubling stressful relationships revealed during the interviews. There was one exception, for the item 'there are people in my life that I care about, but who dislike one another'. Affirmative responses to this item on the BSRS did not on the whole reflect relationships that respondents' were particularly troubled over.

Finally, the respondents' comprehension of the BSRS items was relatively homogeneous, indicating that the BSRS item wording is relatively unambiguous and not open to wide interpretation. However, this study confirmed the finding from Study I that the dichotomous response format of the pilot version of the BSRS was troublesome.

Prevalence of chronic social stress Using the data of Study III, the prevalence of chronic social stress was examined. Responses were dichotomised with 'describes me very well' and 'describes me quite well' recoded together and 'does not describe me very well' and 'does not describe me at all' recoded together. Table 5 shows the results for each scale item, separately for women and men. Prevalence ranged from 12 to 34 percent among women and

from 11 to 35 percent among men. Women reported significantly higher prevalence than did men on four of the six items, while the rank order of items by prevalence was nearly identical for women and men.

Figure 1 shows the cumulative prevalence for number of chronic social stressors, ranging from one to all six of the stressors. Half the men and sixty percent of the women reported at least one stressor. Among women, 24 percent reported three or more stressors, while among men the corresponding prevalence was 16 percent.

Association with psychological distress

As reviewed earlier in this paper, there is a well-known, inverse relationship between social support/network and psychological distress, yet the large majority of variability in markers of distress, such as anxiety and depression, is not explained by level of social support. As also described earlier, it is hypothesised that chronic social stress has a significant and independent relationship with psychological distress and perhaps modifies the social support/distress relationship.

To examine this, a series of regression models were generated using the data of study III, in which models including only social support/network variables and distress variables were compared with models that included also the BSRS. These comparisons were made for three distress measures, the loneliness scale and the HAD anxiety and depression sub-scales. The following social support/network variables were included: predictors marital status; satisfaction with number of good friends; participation in social activities; perceived availability of a confidant; perceived availability of instrumental support.

The results are shown in Tables 6a-c. All social support/network variables were entered in the first model and the BSRS was added in the second model. In the models in which loneliness was the predicted variable (Table 6a), r^2 increased from 0.31 to 0.40 when the BSRS was added to the social support/network variables.

In the models in which anxiety was the predicted variable (Table 6b), the proportion of variance in anxiety accounted for by the BSRS was greater than that for all the social support/network variables combined, as indicated by the r^2 data.

In the model in which depression was the predicted variable (Table 6c), the combined social support/network variables and the BSRS had approximately equal explanatory power, accounting for a fifth of the variability in depression.

A more detailed examination of these analyses was undertaken by comparing the magnitudes of the standardised Beta coefficients in the models with only the support/network variables to the coefficient magnitudes on the models including also the BSRS (Tables 7a-c).

In the analysis in which loneliness was the predicted variable (Table 7a), the addition of the BSRS modified somewhat the predictive importance of the variables ‘satisfaction with number of good friends’ (Beta altered from -0.37 to -0.31) and ‘perceived availability of a confidant’ (Beta altered from -0.24 to -0.21). The BSRS exerted primarily a main effect on the prediction of loneliness.

In the analysis in which anxiety was the predicted variable (Table 7b), the addition of the BSRS modified only the predictive power of ‘perceived availability of a confidant’ (Beta altered from -0.13 to -0.10). In this analysis, too, the BSRS exerted primarily a main effect on the prediction of anxiety.

In the analysis in which depression was the predicted variable (Table 7c), the addition of the BSRS resulted in minor alterations of the support/network variables’ Beta’s, and again, the main contribution of the BSRS was to exert a main effect on the prediction of depression.

Examining the results across the analyses of the three distress variables, the most potent predictor among the support/network variables was consistently ‘satisfaction with good friends’. This variable and the BSRS had equal explanatory power in the model on loneliness, while in the models on anxiety and depression, the BSRS explained more variability.

Summarising, the BSRS was a less potent, but still significant, predictor of loneliness and of depression than were the combined support/network variables. Conversely, the BSRS added more explanatory power to the model on anxiety than did all the support/network variables combined.

Table 1. Inter-item correlations and Cronbach's alphas, chronic social stress scale items.

Chronic social stress item	2	3	4	5	6	Item-total correlation	Cronbach's alpha if item is deleted**
1. There are people in my life that I care about, but who dislike one another.	.34	.30	.22	.24	.27	.39	.76
2. There is a person in my life that needs my help, but whom I don't know how to help.		.36	.24	.34	.35	.47	.73
3. There is an important person in my life that wants to support me, but who often hurts my feelings instead.			.42	.40	.42	.55	.71
4. There is a person I have to be around almost daily that often henpecks me.				.37	.38	.46	.73
5. There are people that make my life difficult because they expect too much care and support from me.					.60	.56	.71
6. There is someone I care about that expects more of me than I can manage.						.58	.68

* All correlations are significant at $p < 0.001$. ** Cronbach's alpha for the chronic social stress scale = 0.76.

Table 2. Factor loadings for unconstrained one factor model of chronic social stress, standardised solution, General Least Square estimation.

Chronic social stress item	Women	Men
There are people in my life that I care about, but who dislike one another.	.52*	.45
There is a person in my life that needs my help, but whom I don't know how to help.	.62*	.57
There is an important person in my life that wants to support me, but who often hurts my feelings instead.	.75	.75
There is a person I have to be around almost daily that often henpecks me.	.66	.68
There are people that make my life difficult because they expect too much care and support from me.	.75	.77
There is someone I care about that expects more of me than I can manage.	.77	.75

* $p < 0.001$ for rejecting $H_0 =$ factor loading equal across gender.

Table 3. Correlation matrix.

	Loneliness	Anxiety	Depression
Loneliness	--	--	--
Anxiety	.50	--	--
Depression	.55	.60	--
Social stress	.40	.39	.32

Table 4. Factor analysis including the items of the loneliness, HAD anxiety and depression sub-scales and the Bergen Social Relationships Scale. Rotated component matrix.¹

Scales and items	Component ²			
	1	2	3	4
Loneliness scale				
I feel I have enough contact with people that care about me	.66			
I often feel lonesome	.70			
I feel its difficult to talk with people I have not met before	.56			
I feel lonely even when I am around other people	.72			
I feel often that others don't understand me and my situation	.50			
I feel that others care about me	.58			
HADS anxiety sub-scale				
I feel nervous and restless		.73		
I have an anxious feeling, as though something dreadful could happen		.69		
My head is full of worries		.61		
I can sit in peace and quiet, and feel relaxed		.49		
I feel anxious, as if I had butterflies in my stomach		.72		
I am restless, and feel I have to stay active constantly		--		
I can suddenly get a feeling of panic		.69		
HADS depression sub-scale				
I take joy in things, as I have before			.73	
I can laugh and see the amusement in situations			.66	
I am in good humour			.52	
I feel as if everything is going sluggishly			--	
I don't care anymore about my appearance			.50	
I look happily to the future			.72	
I can take joy in good books, radio and television			.62	
Bergen Social Relationships Scale				
There are people in my life that I care about, but who dislike one another				.57
There is a person in my life that needs my help, but whom I don't know how to help				.62
There is an important person in my life that wants to support me, but who often hurts my feelings instead				.67
There is a person I have to be around almost daily that often henpecks me				.60
There are people that make my life difficult because they expect too much care and support from me				.72
There is someone I care about that expects more of me than I can manage				.73

¹ Extraction method is principal component analysis and rotation method is varimax with Kaiser normalisation.

² Factor loadings less than 0.40 are not shown.

Table 5. Prevalences, chronic social stress items, comparing women and men.

Chronic social stress item	Women	Men
There are people in my life that I care about, but who dislike one another.	34.3	34.7
There is a person in my life that needs my help, but whom I don't know how to help.	31.8*	25.8
There is an important person in my life that wants to support me, but who often hurts my feelings instead.	21.8*	11.8
There is a person I have to be around almost daily that often henpecks me.	12.4	11.8
There are people that make my life difficult because they expect too much care and support from me.	20.3*	11.0
There is someone I care about that expects more of me than I can manage.	28.0*	22.8

* $p < 0.000$ on the comparison between women and men

Table 6a. Regression models with loneliness as the predicted variable.

Model	R Square	Change Statistics				
		R Square Change	F Change	df1	df2	Sig. F Change
1	.31	.31	446,507	5	5063	p < 0.000
2	.40	.10	828,885	1	5062	p < 0.000

Table 6b. Regression models with anxiety as the predicted variable.

Model	R Square	Change Statistics				
		R Square Change	F Change	df1	df2	Sig. F Change
1	.08	.08	80,256	5	4974	p < 0.000
2	.19	.12	706,784	1	4973	p < 0.000

Table 6c. Regression models with depression as the predicted variable.

Model	R Square	Change Statistics				
		R Square Change	F Change	df1	df2	Sig. F Change
1	.14	.14	146,203	5	4528	p < 0.000
2	.21	.07	375,211	1	4527	p < 0.000

Model 1 includes the predictors marital status, satisfaction with number of good friends, participation in social activities, perceived availability of a confidant, perceived availability of instrumental support.

Model 2 includes chronic social stress.

Table 7a. Standardised Beta coefficients, regression models with loneliness as the predicted variable.

Variables	Model 1	Model 2
Marital status (not married = 0, married = 1)	-.16	-.16
Satisfaction with number of good friends	-.37	-.33
Participation in social activities	-.05	-.06
Perceived availability of a confidant	-.24	-.21
Perceived availability of instrumental support	-.11	-.10
Chronic social stress		.32

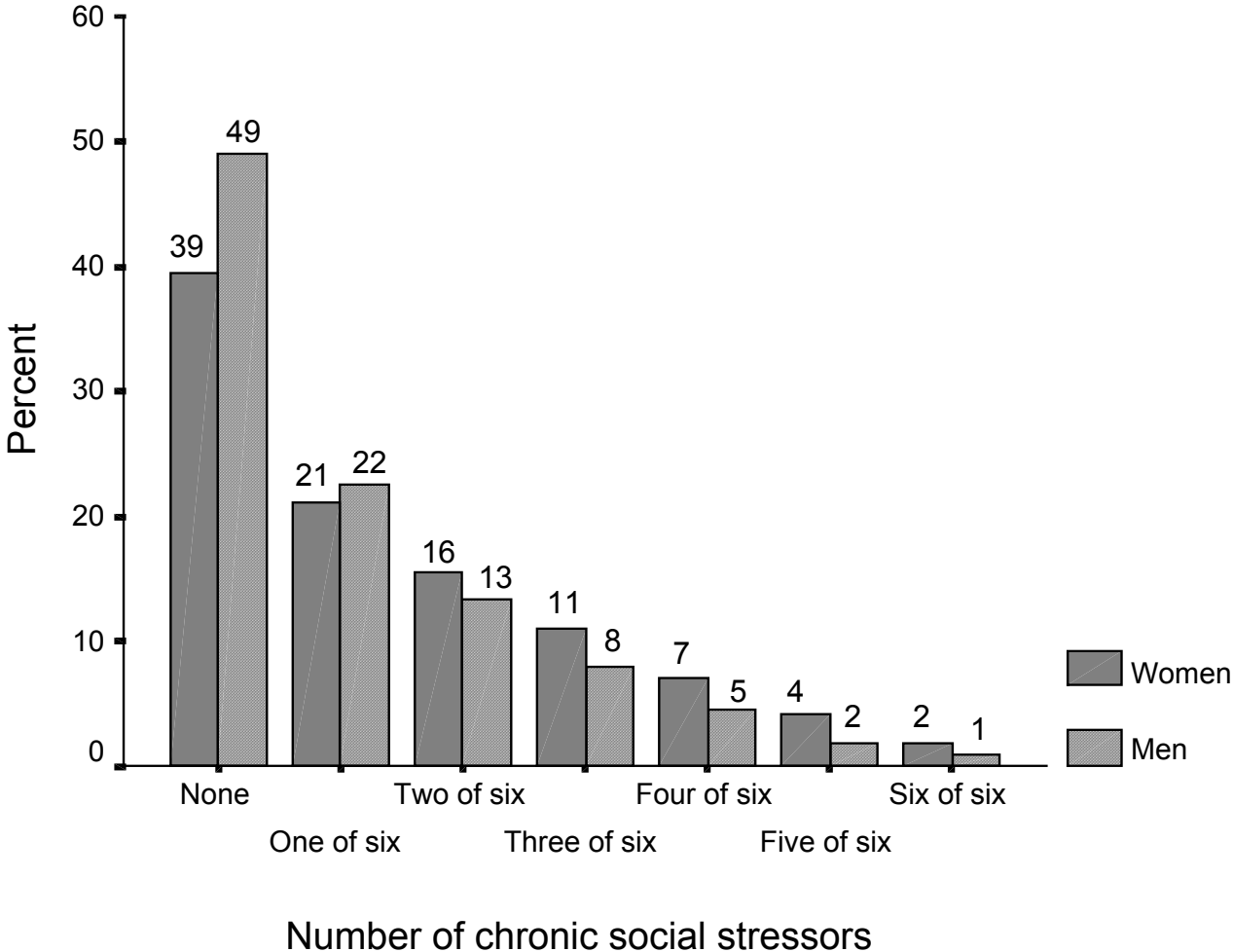
Table 7a. Standardised Beta coefficients, regression models with anxiety as the predicted variable.

Variables	Model 1	Model 2
Marital status (not married = 0, married = 1)	-.04	-.04
Satisfaction with number of good friends	-.16	-.17
Participation in social activities	-.08	-.08
Perceived availability of a confidant	-.13	-.10
Perceived availability of instrumental support	-.07	-.06
Chronic social stress		.34

Table 7a. Standardised Beta coefficients, regression models with depression as the predicted variable.

Variables	Model 1	Model 2
Marital status (not married = 0, married = 1)	-.03	-.03
Satisfaction with number of good friends	-.21	-.18
Participation in social activities	-.04	-.04
Perceived availability of a confidant	-.22	-.20
Perceived availability of instrumental support	-.09	-.08
Chronic social stress		.26

Figure 1. Number of chronic social stressors reported. women and men.



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Social ties and health promotion: suggestions for population-based research

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Our interactions with family, friends, neighbours and co-workers have pervasive effects on how we feel and function. Accordingly, a priority for health promotion is the strengthening of positive social ties. The anticipated benefits are better functioning individuals, families, neighbourhoods and work groups, and improved mental and physical health. Yet, there is a large gap between this ideal and knowledge about how to achieve it. Too little is known at present about the processes involved in the social ties/health connection, though research is proceeding on diverse fronts (Henderson, 1992; Rook, 1994; Okun and Keith, 1998). If disconnected research efforts could become more complementary and reinforcing, knowledge development might move forward at a faster pace.

Two research streams hold particular promise in this regard. One of these has its locus in epidemiology and focuses on supportive social ties as positive influences on health. The other has its locus in fields such as gerontology and psychology, and focuses on social strain as a negative influence on health and functioning. The case for better connecting these two is merely illustrative of the possibilities that may arise from better collaboration across fields. The integration of theory and knowledge bases from epidemiology, gerontology, physiology, psychology and psychiatry (among many other fields) figures prominently in efforts to construct theory about the basic nature of and motivation for attachment with others [see, e.g. (Baumeister and Leary, 1995)].

A large literature has now developed from epidemiological research on the negative relationship between social integration and perceived availability of social support, on the one hand, and morbidity and mortality, on the other (Berkman, 1985; Schwartzer and Leppin, 1992; Cohen et al., 1994). The general pattern of findings, captured well in Schwartzer and Leppin's meta analysis of 80 studies with a total sample size of 60 939 and 110 effect sizes, is that there exists a meaningful negative statistical relationship between social integration/social support and morbidity/mortality. This observation is compelling given the remarkable heterogeneity in the ways that social integration and support have been conceptualized and measured, and the broad range of health status indicators that have been investigated.

Various pathways have been proposed to explain how supportive social ties exert influence on the physical and psychological health of individuals (Cassel, 1976; Wills, 1985; Cohen et al., 1994). Members of one's social network can be sources of information to help one avoid stressful or high-risk situations. They can serve as positive behavioural role models. Social integration may increase feelings of self-esteem, self-identity and control over one's environment, leading to better health outcomes. Social ties can also subject an individual to social regulation and social controls, and define normative behaviour. Social ties can be sources both of tangible support (e.g. financial assistance) and emotional support (e.g. a confidant in a time of need). The perceived availability and adequacy of such support may be more important for one's psychological well-being than the amounts of support actually received. In times of acute stress (e.g. the death of a loved one), the resulting stress responses

may be buffered to a degree by the actions of others, such as the providing of emotional support, companionship, sympathetic listening and practical support.

The terms 'may' and 'can' pepper the summary of possibilities just listed, with good reason. Cross-sectional studies are still predominant in the literature and longitudinal studies are extremely rare. Epidemiological studies almost never provide a level of detail needed to tease apart the sub-dimensions of social ties and illnesses that are of interest. Quantitative surveys are not often complemented by qualitative research to illuminate the human dynamics underlying the statistical associations. Social network theory, social exchange theory, equity theory and other theory formulations that could aid in the study of underlying processes are not very influential in epidemiology.

These shortcomings are of course not breaking news, the field is moving apace to address many of these issues and progress is gratifying. There is, however, one additional limiting feature in the epidemiological research arena that is receiving almost no attention. Much of the existing epidemiological research has been conducted under the assumption that the social ties/health relationship is dominated almost entirely by the positive effects of social ties (Rook, 1992). However, there is emerging evidence that chronic social strain emanating from one's social network may play a vital role in the social ties/health link, by causing distress that under unfavourable circumstances can cascade to serious disorder and illness. Fundamental to this hypothesis is the notion that social support and social strain are not merely two ends of the same continuum. Indeed, just as illness and wellness are now understood to be related yet distinct constructs, perceived social support and perceived social strain are distinct in the human experience. It is perfectly possible to experience strain caused by one element of a social network at the same time that support is received from another element. All other combinations are also plausible: low support/low strain, low support/high strain, etc.

Social strain as the term is used here follows Rook (Rook, 1990) and refers to processes through which actions by people in one's social network, intended and unintended, cause a person to experience adverse psychological or physiological reactions. Examples of these actions include making excessive demands, criticism, invading privacy, provoking conflict, meddling, social conflict, giving trite, ineffective or inappropriate support, and aversive contact and social control (Rook, 1990). Lazarus and Folkman's (Lazarus and Folkman, 1984) very influential transactional model of stress and coping includes an emphasis on how such social demands (daily hassles) can be a source of serious stress when associated levels of conflict, ambiguity or overload overtax the individual's resources. They draw on research on stress, conflict and ambiguity, both within and between family and work roles, to illustrate how daily hassles may be of more importance as sources of stress than acute major life events such as divorce or retirement (Lazarus and Folkman, 1984). This is of more than passing interest in the present context. The few epidemiological studies that have included a focus on social stressors have been preoccupied with acute stressors only.

The sole focus on acute stressors is perhaps justified if the social strain phenomenon is trivial, with modest and quickly passing negative effects. That is indeed the likely scenario for people who experience the occasional, modest social strain that is an inevitable aspect of living among others (Rook, 1992). There are reasonable grounds, however, to hypothesize that social strain is not trivial when marked by high frequency of occurrence, long duration, high intensity, poor coping or the simultaneous presence of several straining relationships. A number of pathways have been suggested through which serious social stress may produce psychological disorder (Billings and Moos, 1985; Cohen, 1992), and the plausibility of a path from clinically significant disorder (e.g. depression) to somatic illness and mortality has at least some empirical support (Schwartz and Leppin, 1992).

Predictably perhaps, the loci of research on social strain and health are to be found in fields concerned primarily with the needs of people in vulnerable states. Prime among these is gerontology, naturally concerned with social stress associated with role shifts, changing network size and composition, dependency and care-giving in relationships, and dealing with serious illness, among other challenges (Stephens et al., 1987; Rook, 1994; Pearlin and Skaff, 1996; Okun and Keith, 1998). Compared to the body of research on social support, however, little emphasis has been placed on social strain phenomena, even in arenas such as gerontology. What does seem apparent from the modest literature now available from research with highly select samples is that negative social exchanges are predictably associated with distress and poorer emotional health (Rook, 1992; Stephens et al., 1987). There appear to be no population-based studies, however, to illuminate patterns and prevalences of social strain in communities at large, and associations, if any, with negative affect, depressive symptoms, psychosomatic/somatic complaints and diseases, among other public health concerns.

The present purpose, then, is to urge public health, and epidemiology in particular, to include social strain along side social support (and their interactions) in future investigations of the social ties/health link. The relevance of social strain to community health is suggested on a broad theoretical and empirical basis, several aspects of which have been touched on above. To move forward briskly and productively, the research called for must be theory-grounded. This presents a serious challenge. Highly practical fields such as epidemiology and gerontology are not especially preoccupied with basic theory building and testing. However, good starting points exist in theory readily accessible from sociology and psychology.

Social psychology (both the sociological and the psychological variants) has been long concerned with the nature of interpersonal relationships and how they affect individuals' functioning. Other arenas in psychology, sociology and other disciplines undoubtedly have contributions to make. Concluding here, a few illustrations are offered of how existing theory could guide the development of social strain constructs, that in turn could guide the development of social strain measures suitable for epidemiological studies. Six theory-derived social strain situations (constructs) are described that could be seriously distressful to average people, not otherwise especially vulnerable because of frailty, acute stress, serious physical illness and the like. These situations are labeled 'helpless bystander', 'inept support', 'performance demand', 'role conflict', 'social conflict' and 'criticism'.

The Helpless Bystander situation describes the plight of a person (P) that is aware of a serious problem in the life of a significant other (O). P desires to assist O but is unable to do so, does not know how to assist or feels unwelcome to assist. In other words, P wishes to engage in prosocial (helping) behaviour, but cannot. There are divergent views on why people are motivated to help others that are in trouble. Social exchange theory (Thibaut and Kelley, 1959; Homans, 1961) reasons that helping others is rewarding because it relieves the personal distress of an observer, a view that rejects explicitly altruism (Dovidio et al., 1991; Eisenberg and Fabes, 1991). Altruism is, nevertheless, also advanced as an explanation for prosocial behaviour, based on the idea that the human emotion of empathy causes observers to feel others' suffering and thus motivates the observer to help even at cost to themselves, i.e. no reward (Batson, 1991). Yet a third viewpoint, that of sociobiology, holds that helping behaviours among members of a group is adaptive to group survival and thus favoured by natural selection (Rushton, 1989). Common to all three understandings of prosocial behaviour is this: for most people, it is stressful to be in the presence of suffering and not be able to assist, all the more so when there is a significant bond between the observer and the sufferer.

In the Inept Support situation, O makes genuine support attempts that fail P, as can happen, for example, when friends or family of a seriously ill person minimize the seriousness of the medical situation (Wortman and Lehman, 1985). At the other extreme, supporters are

sometimes over-protective (Lehman and Hemphill, 1990). Inept support can also result out of good-willed support attempts that unintentionally create a stressful obligation for reciprocity, or expose people to disappointments, conflicts, tensions or unpleasantness (Rook, 1984; Sandler and Berrera, 1984; Schuster et al., 1990). The social psychological foundations of many such situations are addressed in theories of social exchange and of equity (Thibaut and Kelley, 1959; Homans, 1961; Molm and Cook, 1995). Social exchange models emphasize that how people feel about a relationship depends on the costs and rewards involved, while equity models add that people strive for fairness in the distribution of costs and rewards. It is consistent with these models that people expect support attempts to be appropriate to the situations they find themselves in and react negatively when they perceive that they receive too much help, too little help or the wrong help, even when O's motivations are the best.

The Performance Demand situation has its focus on the strain of achievement striving experienced by P when O sets seemingly too-high demands. Lazarus and Folkman's (Lazarus and Folkman, 1985) theory of stress emphasizes that social demands are stressful when they overload P's (perceived) resources. Karasek and Theorall's (Karasek and Theorall, 1990) theory emphasizes that when psychological demands are high and decision latitude is low, accumulated strain is to be expected.

The Role Conflict situation is that in which multiple roles (wife, mother, daughter, employee) are perceived to demand too much time and attention from P. This corresponds to the social demands construct in Lazarus and Folkman's (Lazarus and Folkman, 1984) stress and coping model, but differs from the performance demand dimension, above, in its emphasis on multiple roles as the stress factor, not on too low capacity to perform as expected (although P may nevertheless take blame for not being able to manage somehow). Other common terms that have approximately the same meaning are 'role overload' and 'role strain' (Lee, 1998). Although role conflict can affect anyone, it has been noted as one of the issues of central importance to women's health, as women tend to be carers at the same time they juggle paid and unpaid employment among other obligations.

The Social Conflict situation is suggested by balance theory (Heider, 1958) and theories of social exchange (Thibaut and Kelley, 1959; Homans, 1961; Alessio, 1990; Molm and Cook, 1995). Relationships in which personal regard between P and O's is not balanced, and relationships in which giving and taking is perceived as too uneven and favouring O's over P, may produce psychological strain when change in the base relationship is not a realistic option. An example of imbalance in personal regard is the situation of P who remarries, and whose teenage son and new husband cannot get along.

Finally, the Criticism situation includes a class of problematic social interactions in which specific actions of O's are perceived as misdeeds that cause P psychological distress such as resentment, shame or sadness (Rook; 1992). This can range from the extreme of physical violence to actions and words that induce degradation, double binding, exploitation, isolation and punishment (Marshall, 1994). These acts are often performed by people in very close relationships, but such negative feelings and actions can be found also on the job, at school, in the neighbourhood, etc. (Wiseman and Duck, 1995).

It is of course normal that we find ourselves in these situations from time to time and we mostly cope adequately. However, as argued here, it stands to reason that if we must grapple with several such situations at once, or if the frequency, intensity or duration of social strain situations is severe, coping attempts may be inadequate and serious distress may result. If such distress leads to depression-like symptoms, psychosomatic complaints, withdrawal, chronic absenteeism, illness and other untoward outcomes, the consequences for the individual, the family and the community are obvious. It seems plausible also that social support might buffer people from the most serious effects of social strain, but all this is

speculative because the population-based studies needed to simultaneously investigate social support, social strain and health have not been undertaken, or at least completed and reported in the literature. Modest research of the kind called for here is now underway in Norway. Given the potential importance of this research direction, it is to be hoped that others are stimulated to join the effort.

Finally, this is my first opportunity, and I take it gladly, to publicly thank Karen Rook of the University of California for her vision, intellectual leadership and determination to bring to the fore many of the issues addressed here.

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