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REVIEW

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Social engagement and health outcomes among older people: introduction to a special section

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Introduction

Active social engagement has been shown to be associated with better health and health outcomes across a number of studies (Berkman and Syme 1979; House et al. 1982; Kaplan et al. 1988; Bygren et al. 1996; Glass et al. 1999; Bassuk et al. 1999; Wang et al. 2002; Mendes de Leon et al. 2003). However, the research studies over the last few decades have used different definitions and measures of social engagement, and the terminology used to define and measure social engagement has not been wholly consistent (Andersson 1998; Bennett 2002). Some studies on social engagement have considered social participation (Bygren et al. 1996; Glass et al. 1999), i.e. the involvement in actual activities which have a social element, other studies have examined social networks, i.e. the number of contacts with friends and relatives and membership of groups and organisations (Bowling and Browne 1991; Seeman et al. 1996; Unger et al. 1999), and yet others have focused on social support, i.e. the level of instrumental and emotional help available to an individual (e.g. Everard et al. 2000). Although the distinction between these different types of social engagement is apparent in the literature, there are clear overlaps between these types of social engagement across studies (e.g. Everard et al. 2000). For example, while attending church services is an activity which often has a social element, it can also stimulate contact with close friends. The overlap is also reflected in studies which have examined two or more of these types of engagement in combination—for example, Mendes de Leon et al. (2003) examined the effects of both participation in social activity and social networks on disability.

In this special section on social engagement in older people, the studies focus on social participation, and in this Introduction we review research which has examined the relationship between this aspect of social engagement and health. While this review includes studies which have examined social participation *and* the other types of social engagement, it excludes those studies focusing only on social networks and/or social support, without reference to actual participation in social activities.

The research to date has considered social engagement in relation to an increasingly varied series of health outcome measures, including mortality (Berkman and Syme 1979; House et al. 1982; Kaplan et al. 1988; Bygren et al. 1996; Glass et al. 1999), disability (Mendes de Leon et al. 2003), cognitive functioning (Aartsen et al. 2002), cognitive decline (Bassuk et al. 1999) and the risk of dementia (Fratiglioni et al. 2000; Wang et al. 2002). This special section reports new research concerning the relationship between social participation and physical health. Likewise, in this review we concentrate on research which has examined the impact of social participation on physical health outcomes.

Social engagement and mortality

The earliest studies on social engagement examined the relationship with mortality as an outcome. Berkman and Syme (1979) demonstrated that, in a community-based sample of people aged between 30 and 69 living in Alameda County, California, USA, men and women who lacked social "contacts" were more likely to die within a given period of time than men and women with the most social contacts. Social contact was measured in terms of four components comprising social participation (i.e. membership of a church and group membership) and

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social networks (i.e. marital status, contacts with friends and relatives). The two measures of social participation were each separately predictive of mortality, independent of the other three measures. The overall "social network index", based on the four measures of social contact, predicted mortality independent of physical health, health behaviours (e.g. smoking and alcohol consumption), use of preventive health services and health practice.

Seeman et al. (1987) extended these analyses in the Alameda County study to examine the relationship between the social network index and 17-year mortality in a sample of 4,174 people in different age groups (i.e. 38–49, 50–59, 60–69 and 70+) at the time of the baseline interview in 1965. The social network index was composed of marital status, social isolation (in terms of contacts with close friends and relatives), membership in church groups and membership in other groups (Seeman et al. 1987). The lowest social network index scores were associated with increased mortality between 1965 and 1982 in each of the age groups, when adjusting for age, sex, race and baseline health status. When adjusting additionally for behavioural and psychological risk factors (i.e. smoking, physical activity, relative weight, eating breakfast, depression and perceived health status), only among people aged 70 and over was the relationship still significant—people with the lowest social network index scores had 50% greater risk of mortality than people with the highest social network index scores. When the four components of the social network index were analysed separately, social isolation and non-membership in church groups were predictive of increased all-cause mortality in separate models among those aged 60–69 and among people aged 70 and over, when adjusting for age, sex, race and baseline health status. When adjusting additionally for behavioural and psychological risk factors (i.e. smoking, physical activity, relative weight, eating breakfast, depression and perceived health status), social isolation and membership of church groups were no longer significantly associated with mortality in either age group (Seeman et al. 1987).

The study by House et al. (1982) of 2,754 men and women aged 35–69 years old in theTecumseh Community Health study examined the relationship between social relationships and activities and 9- to 12-year mortality. Social relationships and social activities were assessed in four main categories: intimate social relationships (i.e. marital status, visits with friends and relatives, going on pleasure drives and picnics); formal organisational involvements outside of work (i.e. going to church and meetings of voluntary associations); active and relatively social leisure (i.e. attending classes/lectures, and attending spectator events, e.g. movies, plays, sports events); and passive and relatively solitary leisure (i.e. watching television, listening to the radio, reading). Participation in these activities was assessed in terms of how many hours per day or week were spent undertaking the activities (for watching television, listening to the radio, reading) or the number of times the person had done each thing in the previous 12 months (all other activities). House et al. (1982) found that men's involvement in certain, more active, social relationships (i.e. going on pleasure drives/ picnics), organisational involvement (i.e. attending meetings of voluntary associations) and social activities (i.e. attending spectator events and attending classes or lectures) reduced the risk of dying over the 9- to 12-year follow-up period when adjusting for age. When adjusting for other risk factors, the latter three activities were still associated with improved survival among men. However, participation in passive activities (i.e. time spent watching the television and time spent listening to the radio) was positively associated with mortality when adjusting for age among men. The results for women were similar, in that participation in passive activities (i.e. time spent watching the television) was related to an increased risk of death whereas social relationships (i.e. going on pleasure drives/picnics) as well as organisational involvement (i.e. church attendance) and social activities (i.e. attending spectator events) were negatively related to mortality. However, only church attendance (negatively) and watching the television (positively) were significantly associated with mortality when age and other risk factors were adjusted for (House et al. 1982). Following interaction analyses, House et al. (1982, p. 131) were able to conclude that "social relationships and activities are equally predictive of mortality across a wide range of age, occupational and health status groups".

In their replication of the study of Berkman and Syme (1979), Schoenbach et al. (1986) examined the relationship between a modified version of the Berkman social network index and 13-year mortality among 2,059 participants aged 15 and over in the Evans County Cardiovascular Epidemiologic study in Georgia, USA. The modified Berkman social network index contained items relating to marital status, numbers of relatives, close friends living nearby, number of close neighbours, number of relatives seen often, church attendance and membership of a church group. In the overall model, controlling for sex, race, race×sex, age and age-squared, the social network variable was predictive of survival. When the social network index was broken down into its major components, spending spare time in church activities was beneficial for white males and black females. The increased mortality associated with these predictors was very similar to the 50% reported in the Seeman et al. (1987) study described above. When people aged 60 and over were analysed separately, the strongest association between the social network index and mortality was among white men. Furthermore, separate analyses of people aged 60–69 years and people aged 70–80 years showed a strong association between lowest social network class among white males aged 60–69 and among 70–80 year old white males and black females, when controlling for age, age-squared, chronic disease, systolic blood pressure, Quetelet index and major electrocardiographic abnormality. The analyses for the older age groups, however, revealed much

stronger increases in mortality associated with these predictors, with hazard ratios varying from 3.1 to 6.7.

A later study by Kaplan et al. (1988) examined the relationship between social engagement and all-cause and disease-specific mortality among 13,301 men and women under the age of 60 in the Kuopio and North Karelia provinces of eastern Finland. Kaplan et al.'s index of what they termed ''social connections'' (Kaplan et al. 1988, p. 373) included social participation, i.e. frequency of attendance at clubs, associations and societies, as well as social networks (i.e. marital status, frequency of contact with friends and relatives). Kaplan et al. (1988) showed that men in the two lowest quintiles for the social connections index were at increased risk of all-cause mortality (Odds ratio (OR) = 1.54; 95% CI = 1.21–1.95) and cardiovascular mortality (OR = 1.54; 95% CI = 1.11–2.13), compared to men in the highest quintile, when adjusting for age, smoking, serum cholesterol, blood pressure, illness and other potential confounders. However, no strong or consistent association was found between the social contacts index and all-cause or disease-specific mortality for women. Kaplan et al. (1988) further reported a strong interaction between the social connections index and blood pressure for all-cause, cardiovascular and ischaemic heart disease mortality among men—the association between the dichotomised social connections score and all-cause, cardiovascular and ischaemic heart disease mortality was higher among those with higher blood pressure, and this was most strongly related to the diastolic blood pressure.

Bygren et al. (1996) examined the relationship between social participation and survival in a study of a random sample of 15,198 Swedish adults aged 16–74 years. The study showed that attendance at cultural events was associated with improved survival—people who attended cultural events occasionally or rarely had increased risk of mortality, compared with people who attended cultural events often, when adjusting for age and gender. When controlling for other confounding variables, i.e. education, disposable income, social networks, long-term disease, smoking, exercise and reading books or periodicals, there was still significantly increased risk of mortality among people who attended cultural events rarely.

A more recent study by Glass et al. (1999) examined the association between social, productive and physical activity and 13-year survival in a sample of 2,761 people aged 65 and over living in New Haven, Connecticut, USA. Glass et al.'s index of social participation included church attendance, visits to the cinema, restaurants and sporting events, day or overnight trips, playing cards, games and bingo, and participation in social groups. Glass et al. (1999) showed that increased participation in each of social, productive and fitness activities was independently associated with increased survival among older people—people in the highest quartile for social activities had reduced mortality compared with people in the lowest quartile. When controlling for socio-demographic variables, body mass index, current smoking status, income, functional status and history of smoking, cancer, stroke, diabetes and myocardial infarction, people in the highest quartile for social activities had relatively lower risk of mortality (adjusted HR = 0.81; 95% CI = 0.74–0.89). The study concluded that activities which required little or no physical exertion significantly improved survival even when controlling for socio-demographic and health-related variables, functional disability and other confounding variables.

Lennartsson and Silverstein (2001) examined the relationship between social, leisure and productive activities and 4-year mortality among 537 people aged 77 and over in Sweden. The study used data from the Swedish Panel Study of Living Conditions of the Oldest Old (SWEOLD), a nationally representative sample of older people, extracted from the Swedish Level of Living Survey (SLLS). Data were obtained on frequency of engagement in 17 activities. Following principal components analysis, the activities were divided into four factors: social-friendship, i.e. visits to and from friends; social-cultural, i.e. going to films or cultural events, eating at restaurants, participating in study groups; solitary-sedentary, i.e. reading books and newspapers, solving crossword puzzles; and solitary-active, i.e. participating in hobbies and working in the garden. Lennartsson and Silverstein (2001) showed that participation in social-friendship and social-cultural activities were both associated with reduced mortality in unadjusted models, as well as the solitary-sedentary and solitary-active activities. Additionally, organisational participation and attending religious services were also associated with reduced mortality. When adjusting for age, gender and education in the total sample, participation in social-friendship and solitary-active activities and attending religious services were all still associated with reduced mortality in separate models. When additionally adjusting for functional health, circulatory/heart problems and current smoking, only participation in solitary-active activities was still associated with reduced mortality. In the final models, when all the activity domains were included, and adjusting for age, gender and education, participation in social-friendship and solitary-active activities was associated with reduced mortality. When additionally adjusting for functional health, circulatory/heart problems and current smoking, only participation in solitary-active (adjusted RR = 0.81; $p < 0.05$) activities was still associated with reduced mortality. When analysing men and women separately, Lennartsson and Silverstein (2001) reported that, although participation in solitary active activities was significantly associated with survival when adjusting for age and education in both genders, it was only significantly associated with survival among men when additionally adjusting for functional health, circulatory/heart problems and current smoking (adjusted RR = 0.66; $p < 0.001$). In addition, attending religious services was significantly associated with survival when adjusting for age and education in women only (adjusted RR = 0.76; $p < 0.05$), although it was no longer significant when

further adjusting for functional health, circulatory/heart problems and current smoking.

Bennett (2002) examined the relationship between social engagement and mortality using data from a subsample of the 1,042 older people in the Nottingham Longitudinal Study of Activity and Aging (NLSAA), who were interviewed in 1985, 1989 and 1993. The study used the Brief Assessment of Social Engagement (BASE), which contains items covering activities involving actual social participation (e.g. voting, attending groups or meetings, church attendance) and activities involving limited social interaction (e.g. reading newspapers or magazines, having access to television or radio). The level of overall social engagement was found to be lower for those who had died at follow-up, compared to those who had survived, when controlling for age, sex and health.

Possible explanations for the association between social participation and mortality

In examining relationships between social participation and mortality, the studies described above have sought to control for possible confounding influences, such as socio-demographic variables, baseline physical and psychological health, and physical activity. While some studies have shown that the observed relationships between social participation and mortality can be explained by such factors, others have demonstrated a persistent relationship and have sought to suggest pathways through which the relationship might be mediated. In this section, we examine the evidence presented by the studies for possible explanations of the relationship between social participation and mortality.

While some of the studies reported a relationship between social participation and mortality, others did not find a relationship within groups or subgroups. Kaplan et al. (1988) hypothesised that the lack of relationship between social participation and mortality within certain studies and subgroups might be due to specific studies having high levels of social engagement within the sample. However, after comparing their results with those from the Alameda County (Berkman and Syme 1979) and Tecumseh (House et al. 1982) studies, in which there were higher levels of social contact *and* an association with mortality, Kaplan et al. (1988) rejected this hypothesis and concluded that in some groups the association was weak. Schoenbach et al. (1986), Kaplan et al. (1988) and Lennartsson and Silverstein (2001) demonstrated important gender differences in the association between social participation and mortality, not only in the actual activities which were associated with mortality, but also in the factors which explained the relationship (Lennartsson and Silverstein 2001). Although House et al. (1982) showed that similar *categories* of social relationships and activities predicted mortality in men and women, there were some differences in the *specific* types of social activities which reduced mortality.

The finding of Lennartsson and Silverstein (2001) that the improved survival of older people associated with social-friendship activities and attendance at religious services was explained by health suggests that people who have active social participation are healthier, and this explains the relationship with mortality. However, as we have seen, the findings of other studies suggest that the association between social activity and mortality is independent of baseline health. It may be that a higher level of social participation has subsequent benefits for health, which is manifested in reduced mortality; conversely, it has been suggested that reduced social participation may increase mortality through an association with poor health, and several authors have proposed possible pathways for this effect.

Berkman and Syme (1979) suggested that the increased mortality among people who had limited social networks and social participation in their study may be due to one or more pathways between social isolation and illness. They suggested that certain health practices associated with social isolation might have a detrimental effect on health, although they did not believe that this accounted fully for the observed relationship (Berkman and Syme 1979). Other possible pathways proposed by Berkman and Syme (1979) included the psychological effects of social isolation, e.g. predisposing individuals to suicide or risk-taking behaviour, and the physiological effects of social isolation, resulting in reduced host resistance and increased vulnerability to disease. Glass et al. (1999) also suggested that more complex physiological and psychological mechanisms may be involved in the association between activity and mortality, and that participation in social and productive activities conferred advantages beyond improved physical fitness.

Kaplan et al. (1988) suggested possible endogenous (e.g. neuroendocrine mechanisms) and exogenous (poorer detection of hypertension and lower adherence to antihypertensive medications) pathways to account for the observed interaction between social connections and blood pressure in relation to mortality. Bygren et al. (1996) suggested that participation in cultural events might act as a stimulant to the immune system, to combat infections and protect from autoimmune diseases, and other mechanisms affecting survival, e.g. combating neoplastic diseases. Whatever the precise mechanisms mediating the relationship between social participation and mortality, it seems clear that the relationship between social participation and health is important.

Social engagement and health

Building on the evidence of a relationship between social participation and mortality, recent research has examined the relationship with physical health (Everard et al. 2000; Harewood et al. 2000; Mendes de Leon et al. 2001, 2003). Everard et al. (2000) examined cross-sectional relationships between various activities and physical and mental health within a convenience sample of 244

members of an organisation for older adults in a postal survey. Using a 55-item activity checklist, Everard et al. (2000) assessed participation in instrumental activities (e.g. shopping, cooking, doing housework), social activities (e.g. travelling, entertaining, attending parties and attending church), high-demand leisure activities (e.g. swimming, walking, gardening) and low-demand leisure activities (e.g. sewing, reading, watching television). Social support and physical and mental health were also assessed. Everard et al. (2000) showed that maintenance of social activities was positively associated with physical health, independently of age, gender, marital status, income, instrumental activities, high- and low-demand leisure activities, and social support.

Mendes de Leon et al. (2001) investigated the longitudinal relationship between social participation, social networks and social support in relation to Rosow-Breslau disability, using seven yearly waves of data from a sample of 4,136 older people in the North Carolina (Piedmont) site of the Established Studies of the Elderly (EPESE) project in the US. The measure of social participation (termed social interaction) included the number of children, relatives and friends seen once a month, the number of different phone contacts per week, and membership in clubs or organisations. Social networks were measured in terms of number of family members (i.e. parents, spouse, siblings and children), and the number of friends and other relatives to whom a person felt close. Additional variables were constructed to represent the children network, relatives network and friends network. Mendes de Leon et al. (2001) showed that network size and social interaction were strongly and negatively associated with disability over the seven yearly interviews. To determine whether the observed associations arose from differences in disability present at baseline, Mendes de Leon et al. (2001) decomposed the overall effect estimates into baseline and time-varying effects for each social variable, and tested for time interactions. They showed that the interaction effects for social interaction (and network size) were not statistically significant, and that the baseline differences in disability risks remained constant over time.

Mendes de Leon et al. (2003) also investigated the relationship between social engagement and three measures of disability using nine waves of sequential data from a sample of 2,812 older people in the New Haven, Connecticut, site of the EPESE study in the US. Social engagement was assessed by summing the responses to questions about participation in 11 types of social and productive activities, i.e. visiting the theatre, attending sporting events, shopping, gardening, meal preparation, card/game playing, day/overnight trips, paid and unpaid community work, church attendance, participation in groups and paid employment. Disability was measured according to activities of daily living (ADL), mobility, and basic upper- and lower-extremity functioning. Mendes de Leon et al. (2003) demonstrated highly significant cross-sectional associations between social engagement and activities of daily living, mobility and physical functioning among older adults, when adjusting for age, gender, race and physical activity. Although longitudinal analyses "failed to provide evidence for a clear causal effect on rate of functional decline" (Mendes de Leon et al. 2003, p. 640), the authors acknowledged the potential importance of social engagement in preventing disability.

Other research has shown that socio-economic factors and health status influence social engagement in a sample of men aged 51–70 years (Harewood et al. 2000), but that socio-economic factors are responsible for much more of the variation found in social engagement score than are health factors (Harewood et al. 2000). Therefore, not only does health itself have an impact on social engagement, but this relationship may be confounded by socio-economic influences on poor health.

Possible explanations for the association between social participation and health

In trying to develop an understanding of the apparent benefits of social participation on health and functional ability, the studies by Everard et al. (2000) and Mendes de Leon et al. (2001, 2003) controlled for various potentially confounding influences, such as baseline physical health, socio-demographic variables including age, gender and socio-economic status, and physical activity. Everard et al. (2000) suggested that the positive relationship between engagement with life and better health might be mediated through the activity gains associated with the engagement, rather than through social support benefits, although the causal effects could not be tested in their cross-sectional study. Mendes de Leon et al. (2001) echoed the suggestions noted earlier that physiological and psychological mechanisms may be involved in the association between activity and mortality, and therefore overall health and functional ability. However, given the lack of evidence to support the existence of a causal relationship between social engagement and disability in their study, Mendes de Leon et al. (2001, p. S187) suggested a more complex reciprocal relationship over time, in which social participation and relationships help to preserve functional ability, "and prevent disability, which, in turn, enables continued social engagement". Mendes de Leon et al. (2001, p. S188) also concluded that there could be "considerable diversity in how specific social relationships affect the disability process". Mendes de Leon et al. (2003) reaffirmed the suggestion that the mechanisms by which social engagement confers benefits on survival and health are not clear, and that there might be complex reciprocal relationships between social engagement and health. Rather than preventing the onset of age-related chronic diseases, Mendes de Leon et al. (2003) postulated that active social engagement might help to modify the effects of age-related changes and disease, by providing a greater sense of purpose and control, and overall self-efficacy.

Conclusions

While the precise mechanisms by which the various types of social engagement are associated with better health and improved survival are not wholly clear (Mendes de Leon et al. 2003), the research evidence to date suggests that social participation in later life is associated with improved health outcomes. However, the studies to date have been conducted only in the US and Scandinavia, and it is not clear whether the benefits associated with social participation are also experienced among older people in other countries, including other parts of Europe. The research literature demonstrates a clear need for further longitudinal research to examine the relationship between social engagement and health among older people. In this special issue, we present a series of longitudinal analyses which examine further the relationship between social activity and health outcomes, using data from a number of European studies. These studies seek to develop our understanding of how these associations may be mediated, e.g. through associated physical activity and functioning, and how the role of current health in enabling social activity affects these relationships. The main research questions addressed in this series of four papers are as follows:

1. What types of social activities and other activities are associated with survival among older persons in a representative sample of older people living in the former West Berlin, Germany? (Maier and Klumb 2005, this issue)
2. Are there associations between social ties and family ties, social participation and ADL disability prevalence, incidence and recovery? (Zunzunegui et al. 2005, this issue)
3. Does social engagement impact on objective and subjective health over time? (Bennett 2005, this issue)
4. Is there a relationship between social engagement and health and social service utilisation and medication use cross-sectionally and longitudinally? (Bath and Gardiner 2005, this issue)

In addition to these main questions, the studies examine the mediating effects of baseline health, and the influence of physical activity on the observed relationships. The series of studies is concluded by Carlos Mendes de Leon's informative discussion of the evidence which has emerged through these studies, and of the contribution which these studies have made to our understanding of the importance of social engagement for health outcomes among older people (Mendes de Leon 2005, this issue).

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