Supporting well-being in retirement through meaningful social roles: Systematic review of intervention studies

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Ben Heaven, Laura J. E. Brown, Martin White, Linda Errington, John C. Mathers, Suzanne Moffatt

Ben Heaven, Research Associate, BA, MA (Hons), PhD, Institute of Health and Society, Newcastle University, UK

Laura J. E. Brown, Senior Lecturer, BSc, PhD, Department of Psychology and Research Institute for Health and Social Change, Manchester Metropolitan University, UK

Martin White, Professor of Public Health, Director of Fuse (UKCRC Centre for Translational Research in Public Health), MB ChB, MSc, MD, Institute of Health and Society, Newcastle University, UK

Linda Errington, Assistant Librarian, Newcastle University, UK

John C. Mathers, Professor of Human Nutrition, Director of Human Nutrition Research Centre, BSc, Dip Nutr, PhD, Hon FAfN, Institute for Ageing and Health, Newcastle University, UK

Suzanne Moffatt, Senior Lecturer, BSc (Hons), MSc, PhD, Institute of Health and Society, Newcastle University, UK

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Corresponding Author:

Dr Suzanne Moffatt

Email: suzanne.moffatt@ncl.ac.uk

Telephone: +44 (0) 191 222 5005

Address: Institute of Health & Society, Newcastle University, Baddiley Clark Building

Richardson Road, Newcastle upon Tyne, NE2 4AX

Abstract

Context

The marked demographic change towards greater proportions of older people in developed nations poses significant challenges for health and social care. A range of studies has demonstrated an association between social roles in later life and positive health and wellbeing outcomes. Following retirement from work, people may lose roles that provide purpose and social contacts. The outcomes of interventions to promote social roles in retirement have not been systematically reviewed.

Methods

Three research questions were examined: (i) what kinds of intervention have been developed to promote social roles in retirement? (ii) how effective have these been in improving perceived roles? (iii) how effective have these been in improving health or wellbeing? Studies included were: those that evaluated the provision of social roles; used a control or comparison group; targeted healthy, community-living, retirement-transition adults; provided an English abstract; took place in a highly developed nation; reported social role, health or wellbeing outcomes. Eight electronic databases were searched and the results combined with hand-searches.

Findings

9062 unique publications were identified by searches and 11 evaluative studies of acceptable quality, reporting seven interventions that met inclusion criteria. Interventions varied in year of inception and scope, but only two were based outside North America. Evaluation of the *quality* or meaning of roles was not reported. Only three studies used random allocation thus limiting inferences of causality to these studies. Interventions providing *explicit* roles and using supportive group structures were somewhat effective in improving one or more of the following: life satisfaction; social support and activity; physical health and activity; functional health; and cognition.

Conclusions

Social role interventions may improve health and wellbeing for people in retirement. Future research should improve intervention and assessment quality and investigate which interventions are most effective and acceptable in facilitating social roles, for diverse older populations.

Key Words: Retirement, Social Role, Systematic Review, Health Promotion

Introduction

The world's populations are ageing. By 2025 average global life expectancy will be 73 years compared with 68 years in 2009 (World Health Organization, 1998; 2011). In industrialised nations this has led to concerns that the demand for state-supported services, such as health and social care, will outstrip the available funding generated by a proportionally smaller workforce (Thane, 2000). It is therefore important that longer years in retirement are accompanied by good health and wellbeing (McNamara and Gonzales, 2011). The promotion of 'healthy ageing' is therefore a central issue for social policy (Bernard and Phillips, 2000).

From the mid-20th century onwards, retirement from full time employment has been regarded as a defining moment in the progression to later life (Thane, 2000). However, the once predictable pattern associated with ageing and retirement is changing (Biggs, 2005). Retirement transitions are increasingly complex, with many older workers now choosing a 'flexible' retirement such as working part time, starting new employment, or doing voluntary work (Quinn and Kozy, 1996). Shifts in the global economy and policy have increased emphasis on extending working lives (Brown and Vickerstaff, 2011), reinforced through changes in state pension age in some industrialised nations. The experience of retirement and ageing is more varied than for previous generations, as identities and roles are re-defined (Jones and Higgs, 2010). Despite variation in how and when people retire, the transition is typified by multiple lifestyle adjustments. Many of these lifestyle changes have consequences for health and wellbeing, including the level and form of physical and social activities.

Social relations in later life have been conceptualized and measured in numerous ways, for example as social integration (Moen *et al.*, 1992), social engagement (Herzog A.R. *et al.*, 2002; Bath and Deeg, 2005; Mendes de Leon, 2005; Glass *et al.*, 2006; Thomas, 2011), social participation (Sirven and Debrand, 2008), social networks (Berkman and Syme, 1979), social ties (Kawachi and Berkman, 2001), social connections (Kaplan *et al.*, 1988) and social connectedness

(Cornwell *et al.*, 2008). Maintaining active social relations is robustly associated with better health outcomes and reduced mortality in later life (Berkman and Syme, 1979; Kaplan *et al.*, 1988; Wang *et al.*, 2002; Bath and Deeg, 2005; Sirven and Debrand, 2008; Holt-Lunstad *et al.*, 2010) However, it is unclear which aspects of social relations are important and amenable to modification or intervention.

We conducted a concept mapping process, (currently being prepared for publication), and identified three conceptual areas where social relations were associated with health and wellbeing outcomes: (i) social networks; (ii) social and emotional support; and (iii) social roles. The first two areas have been the target of intervention programmes (such as those addressing loneliness). Moreover the effectiveness of these interventions has been reported through systematic review and meta-analysis (e.g. Masi *et al.* (2011)). However the third concept we identified - personally meaningful social roles - has been neglected as an area for intervention development and assessment, despite holding similar promise as a means of improving health and wellbeing. Social roles are embedded in social relationships (which give meaning to the role) and are thus included in the broader literature concerned with 'social relations' in later life.

This article focuses on interventions that create meaningful and socially engaging activities for people through retirement transitions. Social roles, as we use the term, are participatory activities related to a particular position in a social network, which may provide a sense of purpose, worth, identity or structure to life. This definition includes, but is not limited to, activities such as volunteering, working for pay, and pursuing personal development through further education or training.

Social roles and related concepts, such as having a sense of purpose, have been described by older people as core components of health and wellbeing (Bryant *et al.*, 2001; Gabriel and Bowling, 2004; Iliffe *et al.*, 2010; Reichstadt *et al.*, 2010). Qualitative studies involving people in retirement transitions found that some older people report a loss of status upon leaving work,

leading to feelings of aimlessness, loss of identity and attempts to reconfigure a new sense of self (Jones *et al.*, 2010; Hobbis *et al.*, 2011). Many older people may prefer to reduce their working hours rather than leave work entirely (Herzog *et al.*, 1991), although this is often at the discretion of an employer and is mediated by personal finance (Moen *et al.*, 2000; Moffatt, 2009).

Whilst comparatively little is known about the health benefits of working for pay compared with volunteer activity in retirement, both paid and volunteer work are associated with independent and significant effects on beneficial health outcomes, and there may be an 'additive' effect for those engaging in both activities (Luoh and Herzog, 2002).

The contribution of social roles to health and wellbeing extends beyond simply 'having something to do' and is linked to personal and social interpretations of the value of the role (Moen *et al.*, 2000; Luoh and Herzog, 2002; Musick and Wilson, 2003; Lum and Lightfoot, 2005). Volunteering therefore may be particularly beneficial for those whose sense of self is embedded within former work roles and who have either changed roles or who are no longer employed (Hobbis *et al.*, 2011; Robinson *et al.*, 2011).

Volunteering has been associated with a range of positive health and wellbeing outcomes for older people (Wheeler *et al.*, 1998; Musick *et al.*, 1999; Van Willigan, 2000; Musick and Wilson, 2003; Lum and Lightfoot, 2005). However the attractiveness and effects of volunteering may be shaped by factors relating to a person's social status, employment, gender, and community involvement (McNamara and Gonzales, 2011; Thomas, 2011). For example in relation to full time employment, working part time encourages women to volunteer but this is not the case for men, and unemployment is a barrier to volunteering for men but not women (Taniguchi, 2006).

Feeling rewarded for one's volunteer work is associated with improved health and wellbeing, whilst performing a volunteer role without a sense of reward can have no, or even adverse, health outcomes (Gruenewald *et al.*, 2007; McMunn *et al.*, 2009).

Whilst much of the literature in this field has focussed on volunteer work, other roles may have beneficial health and wellbeing outcomes for older people. There is some evidence that interventions that promote learning and engagement opportunities can reduce social isolation (e.g. the online learning environment provided by the University of the 3rd Age (Swindell, 2001; Findlay, 2003). However, it is unclear whether the active ingredient is increased access to social networking opportunities, or other factors associated with an 'identity' as a student (such as increased self-confidence, esteem etc.).

In contrast, caring for others such as a chronically ill partner or parent, may be associated with detrimental outcomes including depression and stress (Brody, 1990; Strawbridge *et al.*, 1997). In the current review we did not investigate interventions that focussed explicitly on coping with the negative consequences of an existing role e.g. being a caregiver.

The combined evidence regarding social roles and health and wellbeing outcomes points to the potential value of 'social role' interventions aimed at adults retiring from work. However this literature is limited by lack of good quality studies that assess the effectiveness of interventions. Most evidence showing that social roles are associated positively with health and wellbeing has come from cross-sectional or longitudinal studies. However, such studies are limited in their ability to demonstrate the presence and direction of causality. In light of global concerns regarding both the scarcity of resources and an ageing population, policy decisions regarding which health and social services to invest in should be based on the best available evidence. The effectiveness of *interventions* designed to promote social roles therefore need to be assessed. This was the aim of the current review which addressed the following questions: (i) what kinds of interventions have been developed to promote social roles in the retirement transition? (ii) how effective have these interventions been in improving satisfaction with, or quantity of, participants' roles? and (iii) how effective have these interventions been in improving participants' health and wellbeing?

Methods

Inclusion and Exclusion Criteria

Study Design

To be considered for inclusion in the review, studies had to describe interventions that had the scope to increase or support participants' social roles. To reduce the chance of relevant studies being missed because of differences in terminology or reporting style, studies were included when three of the study authors (LB, BH and SM) agreed that the focus of the intervention was consistent with increasing or supporting roles, even if an aim to improve social roles was not explicitly stated.

Population

Studies involving healthy, community-living adults in the retirement transition were included. Participants were considered to be in the retirement transition if their mean or median age was between 55-70 years; if they had been selected for the study on the basis of being about to retire or having retired within the past two years; or if they were selected for the study on the basis of having a partner who met one of these criteria. We excluded studies in which participants had been selected for the intervention on the basis of having a specific medical illness; having received a specific medical procedure or treatment; experienced a particular traumatic event (e.g. war, bereavement or crime) or interventions that focussed explicitly on coping with the negative consequences of an existing role (e.g. being a caregiver).

Only studies that were conducted in a country defined as having a 'very high level of human development' (United Nations, 2009) were included. These are nations that have the highest life expectancy, literacy rates, education, standards of living and quality of life. This stipulation was made to ensure the interventions were developed for people in broadly similar social and economic contexts. No restrictions were placed on the language in which the literature was published although an abstract or summary of the article in English was required.

Outcomes

Studies had to include at least one outcome measure related to either the participants' perception of their social roles (e.g. satisfaction with role, or qualitative assessment of its meaningfulness), or to some aspect of their health or wellbeing. Therefore we excluded studies that examined only the feasibility of an intervention, or the wellbeing of other potential benefactors of the intervention (such as the recipients of participants' volunteer work). In addition, only studies in which the intervention group were compared with at least one non-intervention control group were included. We did not stipulate that studies include baseline measurements in addition to control or comparison groups. To ensure that a degree of sustainability of any effects could be evaluated, a minimum follow-up period of three months after the onset of the intervention was an inclusion requirement.

Search Strategy

A search strategy was initially developed for Ovid Medline (available on request), and was then adapted as necessary using synonyms appropriate to other databases.

Eight electronic databases (Ovid Medline, Embase, PsycInfo, Scopus, Web of Science, CINAHL, ASSIA and the Cochrane Database of Systematic Reviews) were searched systematically between 29th December 2010 and 19th January 2011, retrieving 9062 unique papers after removal of duplicates. The title and abstract of each reference was assessed independently by two members of the research team (LB and BH). One reviewer (LB) identified 55 potential abstracts, and a second (BH) 25. Of the combined pool of 80 articles, 17 were chosen by both reviewers. After removing duplicates, the reviewers were left with a combined pool of 63 abstracts. Thirteen abstracts were rejected after consultation with a third reviewer (SM), based on the following criteria: targeting caregivers only (n=2); set in a nursing home (n=1); does not provide a social role (n=7); targets people with mental illness (n=2); not an intervention study (n=1). This process left 50 potentially relevant references, for which the full text of each article was sought.

A comprehensive search of other resources was also conducted (by LB) to identify additional published and unpublished material of relevance to the review. For this, requests for information were sent to the mailing lists of three learned societies, 10 academic email discussion lists and individual experts. National Health Service (NHS), voluntary sector and social policy evidence sources as well as reference lists of key publications in the field were also hand searched for relevant material. Twenty-two additional intervention studies identified in this way were taken through to the next stage of study selection (see Figure 1).

[please insert figure 1 about here]

Study Selection

Full texts of the 72 articles selected for inclusion were evaluated independently by two reviewers (LB and BH) against the inclusion criteria. Any discrepancies between the decisions were discussed until a consensus was reached. Fifty nine papers were rejected based on the following criteria: did not describe interventions (n=2); reported on-going studies not sufficiently developed to be included (n=3); did not directly target social roles (n=32); focussed on coping with a negative event (n=1); was not conducted in a country classified as having 'very high human development' by the United Nations (n=1). In addition a further 20 papers were excluded on more than one criterion: not conducted in the target population (n=9), and/or did not have a control group (n=12), and/or did not include measures of wellbeing (7).

Five articles were not published in English (Martin and Kiely, 1983; Dube *et al.*, 2000; Fujiwara *et al.*, 2006; Lee, 2006; Jo and Kim, 2008). Translation was used to assess eligibility for four, and communication with Fujiwara *et al.* (2006) confirmed that the same study was also described in an English language article that we had identified. Overall, 13 articles were deemed to meet the inclusion criteria.

As a final step before data extraction, forward and backward citation searches were

performed on each of the 13 articles that met the inclusion criteria to identify any additional papers that might report details about the design, methods, or results of the intervention. From this, one additional study (Carlson *et al.*, 2009) was identified that met the inclusion criteria for our review, as well as three supplementary papers that did not report evaluation studies but provided additional information relating to the interventions reported in papers that met the inclusion criteria. These papers were retained to help with data extraction. One of the 14 papers described an economic evaluation and was not included in the main analysis. Data extraction and analysis was based on 17 papers in total (14 eligible and three supplemental).

Data Extraction and Synthesis

Relevant information was extracted independently and checked by two members of the team (LB and BH) using a standard data extraction form. Study authors were contacted where necessary to provide incomplete, inconsistent or missing details. Data were collated from the forms and tabulated by intervention and outcome category for the purposes of narrative synthesis.

Assessment of Risk of Bias

Risk of bias in each study was assessed in accordance with the guidelines of the Cochrane Collaboration (Higgins and Green, 2011). Their Risk of Bias tool was modified for use with non-Randomised Controlled Studies and used to assess the risk of bias in each of the following five domains: selection (from the non-equivalence of participants across study groups), performance (from the absence of blinding of participants and intervention personnel), detection (from the absence of appropriate blinding of the outcome assessors), attrition (according to the amount and handling of incomplete data) and reporting (from the selective reporting of outcomes). The risk of bias for each criterion was scored as high, low or unclear, according to standardised criteria (available on request).

Results

The 14 articles included in the review reported 11 separate studies evaluating seven different interventions: Experience Corps; Foster Grandparent Program; Older Mentors for Newer Workers; Research of Productivity by Intergenerational Sympathy (REPRINTS); Retried Senior Volunteers Programme (RSVP); the Successful Aging Programme; and the Senior Citizen Park Maintenance Corps.

Intervention Cultural Setting and Scope

Details of the seven interventions are presented in Table 1. Five of the interventions were based in the US, one was set in Japan (REPRINTS), and one in the Netherlands (the Successful Aging Programme). Collectively the interventions span a 44 year period from the mid-1960s (Foster Grandparent Programme) through to 2008-9 (Older Mentors for Newer Workers). The scope of the interventions varied from extensive – occurring in every US state (Retired Senior Volunteer Programme) - to a single non-profit community service organisation (Older Mentors) (Crawford, 1979; Stevens-Roseman, 2009).

Theoretical basis for interventions

Four of the interventions were informed explicitly by theoretical concepts or models. Erikson's (1959; 1982) concept of *generativity* was cited in reports of both the Experience Corps and REPRINTS interventions. In their assessment of the former, Carlson et al., (2008) quote Erikson (1959) when they explain that "[generativity is] … expansion of care beyond oneself, toward others, and transferring knowledge and wisdom to younger generations" (pp. 799-800). The Successful Aging Programme was informed by Ajzen's (1991) theory of planned behaviour and Bandura's (1986) Social Learning theory (Kocken and Voorham, 1998a; Kocken and Voorham, 1998b). Specifically, the course employed in this programme was based on the understanding that social participation is determined by attitudes towards ageing, the influence of societal opinion regarding the role of elderly people, and self-efficacy in engaging in new activities. Participants were encouraged to challenge their previously held attitudes through the support and example of

a socially active peer role-model, and to foster positive social norms of active ageing and self-efficacy through group activities. Peer facilitators were therefore central to the intervention.

The Older Mentors intervention programme was designed in partnership with older workers in a voluntary organisation, following the principles of community-based participatory research (Stevens-Roseman, 2009). The mentorship role was conceptualised as a means of formally recognising the experience of older workers. Following the principles of role theory (Merton, 1968), the intervention was designed to enhance the status of the work role (through mentoring) with the hypothesis that this would enhance wellbeing.

Provision of explicit social roles

Six of the seven interventions were designed to provide an explicit functional role. These were acting as 'grandparents' to neglected children (Foster Grandparent Programme); assisting in local schools and kindergartens (Experience Corps and REPRINTS); undertaking placements in local voluntary organisations (RSVP); acting as mentors for newer workers in the organisation in which participants were employed (Older Mentors for Newer Workers); and conducting gardening and maintenance work in local parks (Park Maintenance Corps). Intergenerational contact was central to three of the interventions. The Successful Aging Programme was unique in that, rather than providing participants with a specific role, it targeted health and social behaviours, with the aim of facilitating the active participation of older people in all aspects of society.

Commitment to roles

The time commitment associated with each intervention varied from two four-hour meetings in the Successful Ageing Programme, to 20 hours per week in the Foster Grandparent Programme and the Park Maintenance Corps. In the Older Mentors for Newer Workers intervention, participants were recruited from their place of work and mentoring took place during normal working hours, so no additional time commitment was required.

Roles performed in groups

All seven interventions utilised groups in training and support activities, and three interventions also used a group format for recruitment and deployment. Influenced by the empirical findings of Sainer and Zander (1971), participants in the Senior Volunteer Programme were recruited from pre-existing groups of older people to reduce individual anxiety about 'signing up' to a volunteer service (Kornblum, 1981). In the Successful Aging Programme, elements such as peer-educator role models and group-led discussions were used to foster a new social norm of active engagement (Kocken and Voorham, 1998b; Kocken and Voorham, 1998a). In the Foster Grandparent and Older Mentors programmes, support for volunteers was available via group meetings, but the roles themselves focussed on the relationship between individual volunteers and a beneficiary (children, or mentee respectively). In contrast, deployment as part of a mutually supportive team was a feature of both the Experience Corps and REPRINTS. Group work also occurred in the Park Maintenance Corps, where the volunteers carried out tasks that were sometimes physically demanding.

Financial inequalities

Four of the seven interventions addressed limited financial resources in later life through the provision of paid employment (Foster Grandparent Programme and the Park Maintenance Corps) or compensation for travel and other expenses (Experience Corps and RSVP). Participants in the Foster Grandparent Programme (which began in 1965), were paid the US minimum hourly wage with the explicit aim of supplementing income without affecting entitlement to state benefits. Participants with few financial resources were targeted by excluding volunteers with an annual income above $1800 ($ 13,500 when adjusted for contemporary standards of living) and $3000 for couples ($22,500 by today's standards). Likewise, participants in the Park Maintenance Corps were paid $6 per hour ($17.60, today's standards), potentially accruing across the course of the programme $3000 ($ 22, 500, today's standards) each. Roles were advertised as 'jobs' rather than leisure or personal growth activities. Two other interventions (Experience Corps and RSVP)

provided travel expenses and other incentives to participate. In the Netherlands-based Successful Aging programme, adequate finance was discussed as a precursor to wellbeing. However, unlike four of the five US-based studies, the financial barriers to participating in the programme itself were not identified explicitly and data regarding possible financial reimbursement were unavailable. The REPRINTS programme in Japan did not provide participation-related expenses (Personal communication, M. Kuraoka, 15th September, 2011).

Evaluation studies: characteristics and quality

Four of the seven interventions were assessed by single studies and three by multiple studies (Table 2). The duration of the intervention studies ranged from four to 21 months. A total of 1310 participants were assessed at baseline, and 797 of these were followed up at the second assessment point. Across all studies, only 33% of participants were male. The Senior Citizen Park Maintenance Corps is unique in the dataset in including more male (n=46) than female (n=8) participants. Notably this intervention involved physical outdoor maintenance work in contrast with interventions based on activities traditionally associated with productive female roles, such as: child care and education (Experience Corps, Foster Grandparent Programme); voluntary community work (REPRINTS and Older Mentors); or group support (Successful Aging Programme). Five of the 11 studies did not report the ethnicity of participants and none indicated the representativeness of ethnicity data.

[Table 2 about here]

All studies included in the review had a high or unclear risk of bias in at least two of the five categories assessed. The highest levels of risk were associated with selection and performance bias, generally arising from non-random allocation of participants to groups (selection bias) and a lack of participant blinding to group allocation (performance bias). Only three studies randomly assigned participants to groups. Instead, group assignment was often done on the basis of factors such as convenience or perceived need, resulting in high risks of systematic biases existing

between groups. Such biases make it almost impossible to evaluate, with confidence, the success of an intervention.

Eight of the 11 studies showed a low or unclear risk of attrition bias. Attrition rates were linked clearly to recruitment strategies. For example in studies where participants applied to an engaging and demanding paid role (Foster Grandparents Program, Park Maintenance Corps); a role that placed them on a waiting list for 'a place in the program' (Successful Ageing Program); or where groups were self-selecting (Crawford, 1979; Huss, 1988), attrition was low. High attrition occurred in the one study where participants were recruited from existing social groups (Retired Senior Volunteer Program (Kornblum, 1981)). However the high rate of attrition may have occurred, in part, as a result of participants being able to resume their social networks outside the intervention programme.

Outcomes: Social Roles

Measures of perceived roles were limited or absent in the evaluative studies. Only two reported that the meaningfulness of the roles had been recorded but neither study reported the results (Saltz, 1971; Huss, 1988; Saltz, 1989). Roles were also assessed by measures of performance (Saltz, 1971; Saltz, 1989; Fried *et al.*, 2004). Huss (1988) reported the time spent in the role, perception of performing volunteer work and effect of different types of roles (clerical, personal interaction and a combination of both) but found the type of volunteer work did not have a significant relationship with life satisfaction scores. In *post-hoc* analysis, Kornblum (1981) investigated the effect of providing novel versus familiar social roles, but concluded: "… that participation in a new role [compared with a familiar one]… had no measurable impact upon participants" (p. 99). Fried et al., (2004) reported the number and duration of activities that participants engaged in with the Experience Corps. None of the other evaluation studies reported outcomes relating to roles.

Outcomes: Health and Wellbeing

Health and wellbeing outcomes from the 11 evaluative studies are presented in Table 2. When evidence for an intervention effect was reported, the outcome was favourable to those who received the intervention in almost all cases.

The Foster Grandparent Programme was evaluated by two studies. Both Saltz (1971; 1989) and Gray & Kasteler (1970) reported increased life satisfaction for those receiving the intervention. Saltz (1971; 1989) reported a decrease in "hopes for new satisfactions" (ibid. 1989, p. 212) by the intervention group ($p<0.01$), although this finding may indicate greater contentment after receiving the intervention. Gray & Kasteler (1970) also reported favourable outcomes in measures of attitude to life and in total and personal adjustment. Approximately one year after the start of the intervention, participants in the Foster Grandparent Programme scored higher on measures of social activity and participation in organisations than those in the comparison group ($p=0.01$).

The RSVP programme was assessed by three studies. Crawford (1979) reported that participants who received the intervention scored higher on measures of sociability at follow up than people in a comparison group ($p<0.01$), their relationship needs decreased ($p<0.05$), and they had higher confidence than controls ($p<0.01$). In a second study by Kornblum (1981), the intervention group reported fewer headaches at follow-up ($p<0.005$) and a greater proportion reported themselves as being 'young' after taking part in the programme ($p<.025$). A third study, reported by Huss (1988), found that participants who received the intervention increased in measures of both life satisfaction and purpose in life from baseline to follow-up, whilst scores for those in a comparison group decreased slightly over the same period in both domains. However, these findings should be interpreted with caution because adults receiving the intervention were on average eight years younger, and twice as wealthy, as those in the comparison group.

Citizens who took part in the Park Maintenance Corps had higher levels of life satisfaction ($p=0.03$), better self-reported health ($p=0.002$), and a greater proportion perceived an

improvement in their health when looking retrospectively over the preceding six month period when compared with those placed on a waiting list (p=0.01) (Soumerai and Avorn, 1983).

In contrast with the other interventions, Kocken and Voorham (1998a) found no evidence for a statistically significant intervention effect of the Successful Aging Programme across a wide range of outcome measures.

The Experience Corps was evaluated by two studies. The first found that the programme improved perceived social support, perceptions of physical activity and strength, and protected against perceptions of decline in strength over time (Frick et al., 2004; Fried et al., 2004; Glass et al., 2004; Tan et al., 2006; Carlson et al., 2008). Participation in the programme also protected against declines in average walking speed. Participants receiving the intervention performed better at a range of cognitive tasks over time, becoming faster and more accurate, and watched less television from baseline to follow-up, whilst adults in a comparison group performed worse over the same period and watched more television. In a second study, participants receiving the intervention became both faster and more accurate in cognitive tasks and neuroimaging demonstrated increased activity in relevant brain areas (Carlson *et al.*, 2009).

Stevens-Roseman (2009) reported that participants in the Older Mentors for Newer Workers programme who were given an active role increased in life satisfaction from baseline to follow-up, whilst those in a comparison group decreased over the same period (p<0.01).

Active volunteering in the REPRINTS programme led to a range of desirable outcomes in measures of social support and physical and functional health (Fujiwara *et al.*, 2009). However, the intervention and comparison groups differed significantly on a number of variables: years in education; number of grandchildren; and, experience of voluntary activity.

Participants who received the intervention reported offering more assistance to others (p=0.046), and had more contact with grandchildren (p=0.07) and distant friends at follow-up (p=0.044), whilst adults in a comparison group reported receiving more support from others

(p=0.038), and less contact with friends and relatives. Active REPRINTS volunteers' subjective assessments of their health were increasingly positive over time, whilst those of people in the comparison group became less positive (p=0.012) and those who received the intervention lost less grip strength over time (p=0.005). Participants who received the intervention participated slightly less in paid occupational roles than at baseline (p<0.001), and reported receiving less social support at follow-up (p=0.038). However, the former may reflect a greater investment of time in volunteer (rather than paid) activities and the latter was accompanied by reported increases in offering assistance to others, suggesting less perceived need for assistance.

Evidence synthesis

A comparison of the interventions to ascertain which were the most effective in promoting health and wellbeing was limited by a lack of random allocation in all but three of the studies, and a dearth of comparable measurement instruments. The three randomised studies were those that assessed the Park Maintenance Corps (Soumerai and Avorn, 1983); Experience Corp (EC) (Frick *et al.*, 2004; Fried *et al.*, 2004; Glass *et al.*, 2004; Tan *et al.*, 2006; Carlson *et al.*, 2008); and the Older Mentors for Newer Workers programme (Stevens-Roseman, 2009). Collectively they demonstrated effectiveness across the following domains: life satisfaction; social support and social activity; physical health and physical activity; functional health; and cognition. However, in two of these three studies we found only one directly comparable outcome measure: the Life Satisfaction Index A (Neugarten et al, 1961) reported by both Soumerai & Avorn (1983), and Stevens-Roseman (2009). Measures of 'social support and social activity' were applied in two studies, but each measured a different sub-concept and utilised different instruments (see Table 2). Likewise, Soumerai & Avorn (1983) measured self-reported overall physical activity and perceived health, whilst the study of the Experience Corps measured self-reported behaviour across 12 activities.

It was inappropriate to conduct a meta-analysis of the three randomised studies. The interventions were substantially heterogeneous, differing in the type of social role provided, population targeted, and the outcome measures used to assess their efficacy.

Across all the studies included in the review, only two instruments were identified that had been used in more than one study. These were Cantril's Ladder of Aspiration (Saltz, 1971; Soumerai and Avorn, 1983; Saltz, 1989), and the Neugarten Life Satisfaction Index A (LSIA) (Gray and Kasteler, 1970; Soumerai and Avorn, 1983; Huss, 1988; Stevens-Roseman, 2009). Additional items on self-report questionnaires or physical activity measures were analogous across studies (e.g. walking speed), but too few in number to form the basis of meaningful comparisons.

Only one study reported the cost-effectiveness of a social role intervention. Frick et al., (2004) found that the Experience Corps in Baltimore cost on average $205,000 for each quality adjusted life year (QALY) gained by the older participants. The authors concluded that the programme was cost-effective or cost saving, but only when also considering the benefits to children who were recipients of support from volunteers.

To facilitate comparison the interventions were grouped according to their prominence in one of the following intervention domains: having an explicit theoretical basis; providing participants with an explicit role; requiring high levels of commitment from participants (at least four hours per day, five days a week); the use of groups in at least three of four areas of recruitment, training, deployment or support; and specifically targeting adults with low financial resources (see Table 3). Outcome measures were grouped into eight descriptive conceptual categories: (1) life satisfaction; (2) perception of age and aging; (3) productivity and self-actualisation; (4) social support and social activity; (5) physical health and physical activity; (6) functional health; (7) cognition; and (8) mental and psychological health. The intervention groups and their respective pooled outcomes were then compared. Note that only three intervention

groups contained outcome categories applicable to every intervention in the group.

The Park Maintenance Corp and the Foster Grandparent Programme targeted adults with low financial resources. We rated both as requiring a 'heavy commitment' from participants in comparison with the other interventions. There was some evidence that both interventions were associated with increased life satisfaction.

Two interventions (Retired Senior Volunteer Programme, Experience Corps) utilised a group format for recruitment, training, deployment and support of programme participants. Of the eight conceptual categories, only two were applicable to both interventions, which collectively showed some evidence for improving social support and social activity. Out of a combined pool of 25 measures for physical health and physical activity, only two (self-perception of being more physically active over time, and reported headaches, insomnia and/or stomach trouble) showed evidence of an intervention effect.

The Successful Ageing Programme did not provide an explicit role to those receiving the intervention and was the only intervention that did not produce evidence of an intervention effect. There were no individual outcome categories that could be applied across all remaining six interventions. However, the pooled outcomes demonstrated that, as a whole, interventions that provided an explicit role were associated with an increase in life satisfaction and moderate success in improving perceived social support and social activity.

Discussion

Our review shows that amongst those of retirement transition age, interventions that provide an explicit social role with group support have potential to produce health and wellbeing advantages for those who carry out the role. However major sources of bias affecting the studies in this review limit how confidently we can claim that the interventions were effective. Conclusions regarding causality can only be drawn with confidence from the three studies using

random assignment to groups. All three studies demonstrated a beneficial intervention effect, although factors such as the heterogeneity of intervention design, small number and quality of studies, and non-comparable outcome measures prevent a meta-synthesis of these outcomes.

In both the empirical and theoretical literature social roles are linked to wellbeing outcomes through the way in which they are interpreted (such as providing feelings of worth, purpose or perceptions of usefulness and status) (Musick and Wilson, 2003; Lum and Lightfoot, 2005; McMunn *et al.*, 2009; Jones *et al.*, 2010; Reichstadt *et al.*, 2010; Hobbis *et al.*, 2011). A lack of 'social role' measurement is therefore problematic when trying to establish the mechanisms that underlie any changes in health or wellbeing. For instance, taking on 'tasks' can result in increases in social contact, physical activity and financial remuneration, all of which may independently influence aspects of health and wellbeing irrespective of the perceived value of the role. Social role measures would help to identify whether social role interventions are worth investment. This is particularly pertinent as they compete for resources with other interventions targeting physical health and 'lifestyle' factors, which while important, are not the sole components of wellbeing in retirement (Bryant *et al.*, 2001; Gabriel and Bowling, 2004; Iliffe *et al.*, 2010).

Demographic factors (e.g. gender and socioeconomic status) shape the attractiveness of particular types of role (McNamara and Gonzales, 2011; Thomas, 2011). If social role interventions are effective in promoting health and wellbeing, it will be important to maximise the applicability of an intervention to different sections of society, or to offer roles that are attractive to those with the most need for intervention. This will require assessment of the value and meaning of different types of role.

Only one of the interventions was designed to offer a flexible assignment by matching volunteers to available roles in the community (Retired Senior Volunteers). All other interventions made just one specific role available to participants, or offered no explicit role, which likely limited

their perceived relevance and attraction to particular groups of people. For instance, the Park Maintenance Corp primarily attracted men who had previously worked in manual, semi-skilled occupations. In studies where the intervention provided stereotypically female roles (e.g. child care, teaching, volunteer activities), participants were predominantly women.

The generalizability of the interventions beyond their original setting may be limited. Programmes set in the USA were designed with a greater emphasis on financial wellbeing than the Successful Aging Programme or REPRINTS, possibly reflecting the socio-political context of retirement in North America where provision of support by the state is less extensive than in Europe (Alesina and Angeletos, 2003) and Japan (Campbell, 1992). Moreover, Japanese cultural mores regarding the role of older people within the family and expectations of familial support may explain an absence of financial provision in REPRINTS (Okamoto and Tanaka, 2004). This highlights the limited cultural and varied temporal context of the interventions. For example, most of the interventions (those set in the US) generated a 'work like' role by supporting participants as they delivered services to others in a formal or structured setting, possibly reflecting US cultural ideals of productivity (Alesina *et al.*, 2006).

It is important not to assume that work-like social roles are necessary for wellbeing in retirement (Atchley, 1971). In the Netherlands where 'early retirement' and full state pensions are both available (Kapteyn and de Vos, 1999), the 'successful ageing' intervention focussed on self-development outside a work setting. Nevertheless financial resources have long been a key concern in retirement and older age, and will continue to be so in most societies (Moffatt, 2009). Thus roles that lead to some financial remuneration may be attractive to those with the least resources.

Strengths and limitations of the methods

Developing sensitive, unbiased search strategies that lead to the retrieval of a manageable number of search records is problematic for many systematic reviews, and particularly so when

searching for concepts, such as 'social roles', where definitions have evolved and overlap with other concepts. Therefore, whilst we cannot be confident that all relevant literature was identified in this review, the overall search strategy used offered a credible solution that achieved a good balance between sensitivity and specificity.

Across most of the time period spanned by the cited interventions (1965 to 2004), the average age of retirement decreased in many industrialized nations (Banks and Smith, 2006). Reduced average retirement age could have limited the number of relevant studies included in the review if the mean age of retirement in some nations was below our inclusion criteria (55-70 years). However, Gendall reported that mean retirement ages from 1965 to 1995 across four industrialised nations (including two in this review: Japan and the USA) for both men and women did not fall below 59.9 years (1998). Moreover, since the early 2000s retirement age increased in the UK (Office for National Statistics, 2012) and other developed nations (Banks and Smith, 2006). Whilst these figures lend support to the use of our inclusion criteria, they also demonstrate the changing social and political context of retirement across the time frame of the interventions.

Our review focussed deliberately on retirement transitions in countries categorised as having a 'very high level of human development' (United Nations, 2009). Countries ranked one to four on the Human Development Index (HDI) are: Norway; Australia; Iceland; Canada, with the Netherlands; Japan; US and UK ranked sixth, 10th, 13th and 21st respectively (ibid). This inclusion criterion was chosen to ensure that the review focussed on interventions that were applicable to populations experiencing broadly similar infrastructure, culture and standards of living. Our search revealed that only one study (from Brazil by de Souza and Grundy (2007)) was excluded because it was not conducted in a country of 'very high human development' confirming that there is little relevant work in countries not ranked as such.

This analysis was restricted to articles that had an abstract or summary in English. None of the 9062 papers identified in the initial search (after de-duplication) were excluded based on a

non-English language abstract. The Centre for Reviews and Dissemination - citing Atkins, Lewin, Smith et al (2008) and Flemming & Briggs (2007) - state that studies from non-English speaking countries are less likely to be published in English if they report non-significant results, thus producing a bias in reviews which exclude non-English language papers (The Centre for Reviews and Dissemination (CRD), 2008). The implications of the strategy we used (including non-English language papers but insisting on an English language abstract) are less clear, although it is possible that this is a limitation of our selection strategy.

Generating robust evidence about social interventions for policy makers

Robustly evaluating complex behavioural interventions remains a challenge (Craig *et al.*, 2008; Michie *et al.*, 2009), although the application of standard clinical trial techniques could have improved the quality of the studies cited in this review.

In future, studies should ensure that some or all of the following techniques are used (as appropriate): randomisation at the individual level or by existing social groups through cluster randomisation techniques; inclusion of control groups who take part in activities that differ only in the absence of the intervention component under investigation (e.g. attending a general social group vs. one where members were also given a specific role); and use of 'intention to treat' (ITT) analyses to minimise the risk of attrition bias. Notably, ITT analysis was not used in any of the three studies in this review that used random assignment to groups, despite evidence of unequal dropout rates. Publishing study protocols prior to the commencement of data collection and analysis can reduce reporting bias and blinding outcome assessors to the participants' group assignment can reduce detection bias.

A panel of standardised, appropriate measurement tools to assess the health and wellbeing of older people would be a significant aid in comparisons of intervention modalities. One current example is the NIH Toolbox which assesses cognition, motor, sensation and emotional health (Gershon et al., 2010).

Appropriate application of these techniques and outcome measures to the evaluation of social interventions would improve the basis on which policy decisions are made.

Conclusions and implications for policy and practice

Social roles are important for people making the transition into retirement. From a policy perspective, the potential value of social role interventions is the theoretical and empirical link between meaningful roles and beneficial health and wellbeing outcomes. However a systematic review of the evidence in this field has been lacking. Our review addresses this gap. We identified a range of different types of social role intervention and found that the weight of available evidence supports the view that social role interventions can produce health and wellbeing benefits for older people. However the evidence is not currently robust enough to recommend social role interventions as an effective health promotion tool in practice.

Future research should ensure that the development and assessment of social role interventions is methodologically sound and of a standard that permits causal attribution of effects. Measures of participants' perceptions of the quality of their social roles should also be included and reported. This will improve our understanding of meaningful and appropriate roles for different groups of older adults and contribute to the development and implementation of interventions that improve the health and wellbeing of ageing populations.

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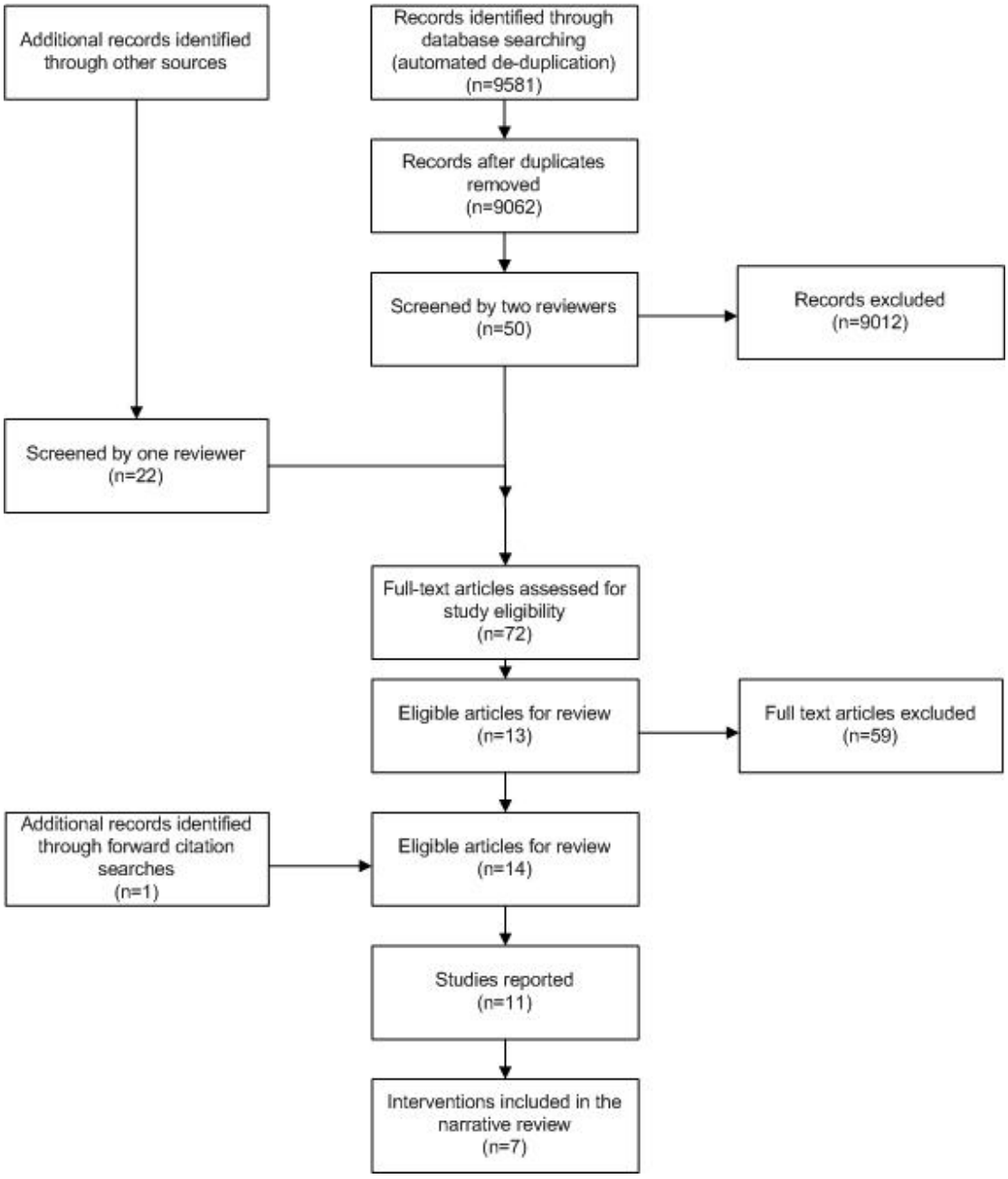

Figure 1: Selection of studies for review (PRISMA 2009 flow diagram adapted from (Moher *et al.*, 2009))

Table 1: Key features of interventions targeting social roles for people in the retirement period

Intervention, (year of first implementation)	**Funding (f)** **Setting (s)** **Scope (sc)**	**Aims**	**Theory (T) & Content (C)**	**Commitment (C),** **Training & Support (S), Incentives (I)**
Foster Grandparent Programme 1965	(F) Federally sponsored (Dept. of Health, Education and Welfare) (S) Home for neglected children. About 150 children, ranging from infants to 12 years. Staffed by nuns and laypersons. (SC) 262 projects across the USA (1986)	To "alleviate financial & psychological problems faced by impoverished elderly by providing interesting, paid employment" [page 314, Saltz 1971]; To "provide institutionalized young children with individualized care" [page 314, Saltz 1971]; To "investigate older workers' proficiency as workers, & predict individual differences in performance". [pg 318, Saltz 1971].	(T) None. Authors cite a shift away from disengagement theory (Cumming & Henry, 1961), and support for Birren (1964, p. 218). (C) Ps assigned to 2 or 3 children (aged < 6) each. They were encoraged to form personal bonds. Duties' included rocking and feeding babies, playing with children, hugging, comforting, taking children to school, taking part in craft activities etc. The *Gray and Kasteler (1970)* study was similar to above except children had learning disabilities and 1 child was assigned per couple.	(C) Four hours per day for five days per week i.e. 20 hours per week. This was either 8am-12:00 or 15:30-19:30 (S) 2 hour sessions per week by nurses or social workers (40 hours total) – plus P's received on-going support (I) US minimum hourly wage
Retired Senior Volunteer Program (RSVP) 1971	(F) Federal ACTION Agency and local agencies, such as county governments or senior citizens organizations. (S) Placement in local organisations that require voluntary workers without displacing paid employees (SC) 664 programs, across every state in the USA, 164,000 senior citizens (1975)	"… bringing together …retired senior citizens rich in experience with non-profit organizations that desperately need volunteer help … while at the same time helping senior citizen to better adjust to their life styles" (Crawford, pp.2-3).	(T) None. However, draws on components of the 'group work model (Sainer and Zander, 1971)" (p. 56), and has clearly defined principles (C) P's are placed in a variety of settings ranging from … "working with physically or mentally handicapped children to … libraries and historical societies" (Crawford, p. 2).	(C) Typical commitment is 3 hours per week. (S) RSVP staff offer continuing support (I) Free health insurance and reimbursement for travel expenses + meals
Park Maintenance Corp. 1981	(F) US Department of the Interior Parks and recreation Recovery Program. (S) City parks & playgrounds	To measure the effects of paid, part-time employment on perceived health status, morale, and activity levels in retirees.	(T) None. (C) P's worked in teams of 5 to trim grass and hedges, remove litter in parks and playgrounds in local neighbourhoods. P's given a large amount of creative control and autonomy and encouraged to think up own	(C) Four hours per morning, 5 days per week for 25 weeks. (S) Training and supervision was provided by the city's landscape gardener. Assistance was occasionally provided with heavy

	(SC) One city (Revere) in the USA		ideas for park.	lifting or strenuous work. (I) $6 per hour ($17.60 today's standards)***
Successful Aging 1995	(F) Unknown (S) Unknown (SC) The community of Ridderkerk, Netherlands	"… improvement of the social, psychological and physical wellbeing of older adults" (p 16)	(T) Ajzen's theory of planned behaviour and Bandura's Social learning theory (C) A course organized in support of Government's policy to provide older adults with opportunities to participate in society and live a meaningful life. Each meeting began with a senior health educator giving an introduction to a topic, followed by a peer-facilitated discussion. There were approx 23 people per group.	(C) 4 group meetings of 2 hrs each. (S) Peer facilitators (aged 55 or over) called 'senior health educators', had 1 year of training prior to leading groups (I) unknown
Experience Corp (EC) 1996*	(F) Erickson Foundation, U.S. Department of Education, Baltimore City, and federal support through the provision of Americorps funding (S) Placement in local schools in Baltimore (SC) 9 US cities (1996)	[EC] was created to help older adults become: (a) motivated to be engaged through the opportunity to ''give back'' and make a difference in the success of the next generation; b) cognitively active through reading with children and library service; (c) physically active through daily transit to and service in schools (d) [be] introduced into new social networks, which include other team members, children, teachers, and staff in the school community"(p. 794)	(T) Erikson's (1982) concept of generativity (individuals); a model based on social capital (schools) (C) P's fulfil needs identified by principals in local schools. Core features of the intervention include having a 'critical mass' of volunteers who are trained, and given a placement, in a team of 10 or more. Roles identified by school principals included (1) support literacy in class (2) support library functions (3) teach children how to solve problems and play (4) increase attendance]" (Fried et al (2004, pg 794).	(C) 15 hours per week, over 3–4 days [in a school] normally for 1 academic year [4,6, or 8 months] (S) Both training and placement were central to the intervention. Training took 32-hrs over a 2-week period per group of volunteers. (I) stipends to reimburse expenses **
Older Mentors for Newer Workers 2008-9	(F) Funding source unknown (S) Full time employees at a non-profit community service organization. (SC) A non-profit community service organization in one locality	To improve life satisfaction, with implications for workplace retention and workers' health.	(T) Based on a 'Community-based participatory research'' (CBPR) principal, but also explicitly informed by Role Theory (Merton, 1968) (C) P's matched with a newer agency worker employed for < 6 months. The role of mentor was to listen and provide support, not to problem solve.	(C) Intervention lasted 6 months. (S) Feedback sessions were provided halfway through and at the end of the 6 month intervention. A recognition ceremony was also held at the end of the intervention. (I) unknown
REPRINTS 2004	(F) Tokyo Metropolitan Institute of Gerontology (TMIG), and later also via local municipal bodies. (S) Schools & kindergartens across Tokyo and Nagahama	(1)Intergenerational engagement in which older adults contribute to the children's growth (i.e. the sharing of knowledge and values and the building of intergenerational trust) (2) Maintain social roles and to engage in intellectual activity in a way that helps to maintain physical and psychological health (3) support life-long learning	(T) Erikson's (1982) concept of generativity. (C) P's visit elementary schools, child care centres and kindergartens in groups of 6-10 and served as book-reading volunteers. Participants selected picture books and used them to connect with the children. Also went to libraries to select books, and practised reading them	(C) P's took part over an 18 month period (working once a week or fortnight). (S) 3 month period of weekly training with on-going advice and feedback. Regular meetings held before/after reading sessions for

	(SC) Regional (set up by research team)		at home or with others. In the kindergartens: P's read a picture book to approximately 20 children and played with toys for 30 minutes.	info and mutual learning. Professionals sometimes invited to share their own knowledge. (I) None

Table 2: Design and outcome of evaluative studies

Studies (presented as individual papers) **Intervention**	**Study Design** **Assessment Points** T0: baseline T1: follow-up assessment 1 N= number (Gender) **Recruitment** **(R)** Recruitment & assignment **(C)** Control or comparison group activities **Ethnicity** African American (AA) White (w) Hispanic or Latino (HL)	**Risk of Bias** (1) selection (2) performance (3) detection (4) attrition bias (5) reporting bias: H= high, L=low, U: unclear	**All reported outcomes** (superscript: evidence for a significant effect of the intervention)	**Evidence for effects of the intervention** SD = Standard Deviation
Saltz (1971); (1989) **Detroit, US** **Foster Grandparent Programme (FGP)**	**Assessment Points** T0: just prior to placement, n=59, (8M:51F) T1: 12 m's after T0 **Recruitment** **(R)** Community. Groups recruited separately. Approx. 50% of controls chosen from those who had been turned down from FGP because all slots had been filled or because they were over the minimum income level. Others were selected 'from the community'. **(C)** No information given **Ethnicity** Exp: 44% AA, 56% w; Ctrl: 48% AA, 52% w	**Risk of Bias** 1:H 2:H 3:H 4:U 5:H	**Life Satisfaction:** [1]Life adjustment: responses scored as present satisfactions (Cantril, 1962); [2]Life adjustment: content analysis: number of present satisfactions (Cantril, 1962); [3]Life adjustment: content analysis: number of hopes for new satisfactions (Cantril, 1962); Life adjustment: content analysis: number of present dissatisfactions: (Cantril, 1962); Life adjustment: content analysis: number of fears or worries (Cantril, 1962); Total adjustment (Havinghurst and Albrecht, 1953; and Neugarten et al, 1961). **Mental & Psychological Health**: Self-concept: Semantic differential (Osgood et al, 1957)	Note: measurement at first follow-up (10-12 months post intervention) is not reported. At follow-up two (24 months post-intervention) no comparisons are made with the control group. ***Life Satisfaction*** (1) Mean number of responses scored as 'present satisfactions' increased from 1.5 to 3.6 (SD not reported), within the intervention group (P<0.001). No baseline or follow up data for the control group are provided. (2) Mean % of total responses scored as 'present satisfactions' through content analysis increased from 26 to 55, (SD not reported) within the intervention

				group (P<0.01). No score given for controls. (3) Mean % of total responses scored as 'hopes for new satisfactions' through content analysis decreased from 45 to 14 (SD not reported), within the intervention group (P<0.01). No score given for controls.
Gray & Kasteler (1970) **Utah, US** **FGP**	**Assessment Points** T0: on application, n=106 (33M:73F) T1: 12 m's post intervention, n=104 **Recruitment** **(R)** Community. A subset of p's who met inclusion criteria were selected for intervention. Selection based on a range of factors including financial need, so that 'the best' of the applicants were selected. The rest became the control group. **(C)** No information given **Ethnicity** No information	**Risk of Bias** 1: H 2: H 3: U 4: L 5: H	**Life Satisfaction:** [1]Life satisfaction (Neugarten et al, 1961); [2]Activities and Attitudes' scale: Attitude score (Burgess et al, 1949); [3]Total personal and social adjustment (Burgess et al, 1949) **Social Support & Social Activity:** [4]Activities and Attitudes' scale: Activities Score (Burgess et al, 1949);	***Life Satisfaction*** (1) Responses scored as 'high' life satisfaction did not differ between the two groups at baseline (control = 56%, experimental = 50%; chi square = 0.33, n.s.), but were significantly greater in the experimental group (77%) compared to the control group (57%) at follow up (chi square = 4.43, p=0.01). (2) Responses scored as 'good' or 'average' attitude increased from 56% at baseline to 100% in the experimental group, and 61% to 89% in the control group. chi square = 5.67, p=0.01 (3) The percentages of responses scored as 'good' or 'average' on total personal and social adjustment (combination of activities and attitudes scale scores) for each group were not reported at baseline. However, at follow up, there were significantly more in the experimental group (100%) compared to the control group (61%), (chi square = 23.51, p=0.01) ***Social Support & Social Activity*** (4) The percentages of responses scored as 'good' or 'average' on social and organisational activity for each group were not reported at baseline. However, at follow up, there were significantly more in the

				experimental group (100%) compared to the control group (74%), (chi square = 14.42, p=0.01)
Crawford, (1977) **Salt Lake County, Utah, US** **Retired Senior Volunteer Program (RSVP)**	**Assessment Points** T0: 0-3 m's prior to intervention, n=400 (no data) T1: 8-11 m's post T0 8 m's post start of intervention, n=381 **Recruitment** **(R)** Two community centres. Two researchers stood at the entrance and distributed numbered yellow cards to the first two RSVP members to enter, skipping the third. The same technique, using green cards, was used to select 100 people who were not RSVP members but who also attended the community centres. **(C)** No training or activities were offered (participants were free to continue using the community centres). **Ethnicity** No information	**Risk of Bias** 1: H 2: U 3: L 4: L 5: L	**Productivity & Self-actualisation**: self-actualisation needs (Reddin & Sullivan's Self-Actualization Inventory – no reference provided) **Social Support & Social Activity**: [1]relationship needs (item on Reddin & Sullivan's Self-Actualization Inventory – no reference provided); [2]Sociability (Bernreuter's Personality Inventory, 1968). **Mental & Psychological Health**: Adjustment: Social adjustment (retiring vs aggressive types, Bell's Adjustment Inventory); Emotional adjustment (emotional vs stable, ibid.); [3]Confidence (Bernreuter's Personality Inventory)	***Social Support & Social Activity*** (1) Within group comparison for the intervention group only from baseline to follow-up. The number of respondents that indicated 'very high' need decreased, whilst those indicating low and very low need increased on a 5 point scale (very high, high, medium, low, very low need). X2 = 10.52, df = 4, p<.05 (2) The intervention and control groups did not differ in mean score to a statistically significant level at baseline: intervention group mean 2.77 (SD 68.81), control 5.22 (SD 51.09), t-test T= .40, df = 398, P> .05. At follow-up the group means differed to a statistically significant level t= 3.45, df = 379, p < .01, with the intervention group having a higher (lower score) mean sociability of -7.08 (SD 32.75). The control group mean at follow-up was 5.5 (SD 38.06). ***Mental & Psychological Health*** (3) The intervention and control groups did not differ in mean score to a statistically significant level at baseline: intervention group mean 17.53 (SD 40.72), control 17.59 (SD 40.5), t= 0.01, df = 398, p > .05. At follow-up the group means differed to a statistically significant level T= 3.51, df= 379, p <.01, with the intervention group having a higher (lower score) mean confidence of 2.11 (SD 45.59). The control group mean at follow-up was 17.97 (SD 42.42).
Kornblum, (1981) **Philadelphia, US** **RSVP**	**Assessment Points** T0: start of intervention, n=198 (17M:138F) T1: 6-7 m's post T0, n=149 **Recruitment** **(R)** Researcher & RSVP staff approached established groups of older people and invited participation in the programme. Exp group were those who remained in the programme for 6 months. Ctrl group were those who initially expressed interest but did not	**Risk of Bias** 1: H 2: H 3: H 4: H 5: L	**Life Satisfaction**: Life Satisfaction Index B (Havinghurst 1963). **Social Support & Social Activity**: Quest. items: No. of phone calls made and received on an average day; Phone calls made and received on the previous day; Acquisition of new friends and acquaintances over the previous six months; Frequency of loneliness. **Perception of Age & Aging**: Quest. Items: [1]How do you consider your own age?; Do you feel older or younger than peers? **Physical Health & Physical Activity**: subjective health,	***Perception of Age & Aging*** (1) Age identification: identify self as either young (Y), early middle-aged (EM), late middle-aged (LM), or old (O). At baseline, no statistically significant differences between intervention and control groups on this measure X2 = 5.541, df = 3, p> .10. At follow-up a greater proportion of participants in the intervention group identified as 'Young' in comparison to controls. X2 = 8.985, df = 3, p<.025 ***Physical Health & Physical Activity***

	complete first 3 weeks. Self-selecting sample. **(C)** No further training or activities were offered once participants chose to leave the RSVP **Ethnicity** Exp: 6.4% AA; 92.3% w; 1.3% other Ctrl: 16.9% AA; 83.1% w; 0% other	Quest. items: Current evaluation of health; Amount of worry about health during past three months; [2]Extent of change in health during past three months; [3]Number of times in past 3 months when poor health stopped you going out; Number of incidents during the past week with: [4]headaches; insomnia; stomach trouble. Levels of activity, Quest. items: Active enough most days of the week?; Frequency of boredom; No. of days you look forward to? **Functional Health**: Functional Health, (Rosow functional Health Index, Rosow and Breslau, (1966).	(2) At baseline, differences between intervention and control groups were borderline sig. (P>0.05). At follow-up group means differed to a sig. level, however pre-post within group changes were not sig. Kornblum (1981) suggested a cumulative effect of opposite 'drift' in group means was large enough to produce a sig. difference and that self-selection rather than programme participation was responsible for the significant differences at T2 (see p. 96) (3) see above. (4) At baseline, no statistically significant differences between intervention and control groups on this measure were reported T= .902 p>.20 At follow-up the group means differed to a statistically significant level T= 2.806, p<.005. The intervention group reported less headaches, insomnia and/or stomach trouble 0.254 (SD 0.937) compared with baseline 0.333 (SD 0.863) whilst the control group reported more, 0.494 (SD 1.304), and follow-up 1.036 (SD 2.072).
Huss (1989) **Iowa, US** **RSVP**	**Assessment Points** T0: start of intervention, n=65 (11M:47F) T1:6 months after T0, n=58 **Recruitment** **(R)** Exp group recruited from new volunteers as they entered the RSVP. Ctrl group were recruited through meal clubs at Senior Citizen Centres and groups within elderly housing centres in two cities. Self-selecting convenience sample. **(C)** No training or activities were offered **Ethnicity** No information	**Risk of Bias** 1: H 2: H 3: L 4: L 5: L	**Life Satisfaction**:[1]Life Satisfaction Index A (Neugarten et al, 1961); [2]Purpose in Life (PIL) test (Crumbaugh & Maholick, 1969). **Social Support & Social Activity**: Social Provisions Scale (SPS) (Russell and Cutrona, 1984). **Physical Health & Physical Activity**: Quest. items: Global judgement of own health; number of days ill in last six months (self-report); number of 'significant events' (positive or negative)	Note: Seventeen (57%) of controls were over 75 years of age. The intervention group had only three (11%) subjects over 75 years. In addition, the medium income for the intervention group was $15,000,($21,896 by today's standards) compared with only $6,036 ($8,810 by today's standards) in the control group. ***Life Satisfaction*** (1) The mean score of the intervention group increased from baseline (mean 10.75, SD: 4.36) to follow-up (mean 11.89, SD: 4.04). The control group mean score slightly decreased across both time points (mean at baseline 10.23, SD: 4.16, and at follow-up: mean 9.86, SD: 3.92). Regression analysis found a 4% increase in explained variance when group status was combined with pre-test scores as predictors of post-test scores in the regression (p<.01). (2) The mean score of the intervention group increased from baseline (mean 111.321, SD: 15.04) to follow-up (mean 114.82, SD: 13.62). The control group

				mean score slightly decreased across both time points (mean at baseline 111.9, SD: 19.48 and at follow-up: mean 107.76, SD: 16.19). Regression analysis. Found a 6% increase in explained variance when group status was combined with pre-test scores as predictors of post-test scores in the regression (p<.01).
Soumerai & Avorn (1983) **Revere, Massachusetts, US** **Park Maintenance Corps (SCPMC)**	**Assessment Points** T0: 2-4 m's pre intervention, n=54 (46M:8F) T1: 7-11 months after T0, n=47 **Recruitment** **(R)** Adverts placed in local newspapers, senior citizen newsletters, elderly housing complexes, community centres and banks, advertising jobs for retirees to work in the city's parks. Names were publically drawn from a revolving drum. 25 names were selected for the experimental group. 30 participants for the control group were selected using a random number table. **(C)** No training or activities were offered **Ethnicity** No information	**Risk of Bias** 1: L 2: L 3: H 4:H 5: U	**Life Satisfaction**: [1]Life Satisfaction, Cantril Self-Anchoring Scale (Cantril, 1965); Life Satisfaction Index A (Neugarten et al, 1961). **Social Support & Social Activity**: Social activity level, Cantril Self-Anchoring Scale (Cantril, 1965) **Physical Health & Physical Activity**: Physical activity, (measured on a Cantril ladder scale from 1-9); Perceived health, Quest. items: [2]perceived health at end of project; [3]perceived change in health over 6 months	Note: the intervention and control groups were compared at baseline on demographic variables, but not on the outcome measures used at follow-up ***Life Satisfaction*** (1) At follow up, 92% of participants in the intervention group scored 'high' in life satisfaction, compared with 59% in the comparison group. Mann Whitney U = 343, P=0.03 (one-tailed) ***Physical Health & Physical Activity*** (2) Participants in the intervention group rated their health at the end of the project as excellent (35%) and good (56%) compared with ratings of excellent (14%) and good (41%) in the comparison group. Mann Whitney U = 401, P=0.002 (one-tailed) (3) Participants in the intervention group perceived a change in health over the last 6 months as: better (28%), same (68%) and worse (4%) compared with 4%, 82%, and 14% in the comparison group. Mann Whitney U = 356, P=0.01 (one-tailed)
Kocken & Voorham (1998)a, & ibid., (1998)b **Ridderkerk, Rotterdam, The Netherlands** **Successful Aging**	**Assessment Points** T0: start of intervention, n=146 (55M:91F) T1: 1 m post intervention, n=146 T2: 4 m's post intervention **Recruitment** **R)** Invitation letter sent to all eligible members of the community. Participants were assigned to either intervention (first 150) or control group (next 182) according to the order in which the applications were received	**Risk of Bias** 1: H 2: H 3: L 4: U 5: U	**Life Satisfaction**: Wellbeing, (Short 8 item version of the Dutch Scale for Wellbeing of the Elderly (Linschoten, Gerritsen, & Romijn, (1993)). **Perception of Age & Aging**: Quest. Item: Attitude to Aging (five items); Perception of societal opinion on position of elderly in society (one item: "older adults have too little a say") **Social Support & Social Activity**: Social support (a validated scale of perceived everyday support, van Sonderen, 1991); Quest. item: No. of hours per week spent on hobbies & activities with others outside the home.	

	(C) Participants were put on a waiting list and given the opportunity to participate in the programme at the end of the study. **Ethnicity** No information		**Physical Health & Physical Activity**: Subjective health assessment (measure on a scale 1-10). **Mental & Psychological Health**: self-efficacy (A Dutch version of the validated general self-efficacy scale, Sherer, et al, 1982; Bosscher et al, 1992)	
Carlson et al,(2008); Fried et al, (2004); Frick et al, (2004); Glass et al (2004);Tan et al (2006).] **Baltimore, US** **Experience Corp (EC)**	**Assessment Points** T0: just prior to training, n=128 (11M:117F) T1: 8, 6 or 4 months post training, n=125 **Recruitment** **(R)** Community: social groups & churches near chosen schools, senior events, job fairs, recruitment in the street, and a local American Association of Retired Persons mailing list. Random allocation. **(C)** On a waiting list until the next academic year **Ethnicity** Exp: 97.1% AA; w or other: 2.9% Ctrl: 94.7% AA; w or other: 5.3%	**Risk of Bias** 1: L 2: H 3: H 4: H 5: H	**Social Support & Social Activity**: quest. items: number of adults: [1]you could turn to for help (mean); who would check on you if sick (mean); One could depend on (mean); Seen in a typical week (mean); Could you have used more emotional support (from others past year)? **Physical Health & Physical Activity**: Quest. items: [2]self-perception: more active at follow-up?; Number of blocks walked/week (mean); Proportion walking no blocks/week; Flights of stairs climbed/week (number climbed (mean); Proportion climbing no stairs/week; Activity in kilocalories/week (mean); Number of hours lying down or sitting while awake (mean); Physical activity per week (mins); Leisure time physical activity: walking for exercise (kCal per week); Leisure time physical activity: household chores (kCal per week); Leisure time physical activity: exercise (kCal per week); Leisure time physical activity: recreational activity (kCal per week); % who are active. **Functional Health**: Quest. items: [3]Strength: Very good/excellent; [4]Feel stronger at follow-up?; Fallen in past 12 months?; Cane use: less often; [5]Walking speed (m/s). **Cognition**: Quest. items, No. of activities engaged in past month: High-intensity cog. activities; Moderate-intensity activities; Low-intensity activities; Books read/month (mean); [6]Hours of television/day (mean); cog. Assessment: Trail Making Task - A (seconds);[7]Trail Making Task - B (seconds); Rey-Osterrieth complex figures test - copy score; [8]Rey-Osterrieth complex figures test - delayed recall score; word list memory - immediate recall (score /60); word list memory - delayed recall (score /20). **Mental & Psychological Health**: Depression (Geriatric depression scale) – no data available	Note: Statistical comparisons were for the amount of change from baseline to follow-up between intervention and control groups (using chi square or t-tests as appropriate). Comparisons between groups at baseline only, and at follow-up only were not reported (excluding baseline demographic comparisons). ***Social Support & Social Activity*** (1) Mean number of reported adults increased from 5.3 at baseline to 6.2 at follow-up in the experimental group, and decreased from 5.8 to 4.3 in the control group. The amount of change differed between the two groups (p<0.03) ***Physical Health & Physical Activity*** (2) At follow-up, self-perceptions regarding an increase in activity from baseline were reported by 62.7% of participants in the intervention group, and 42.6% in the control group. P<0.04 ***Functional Health*** (3) Strength rated as either 'very good' or 'excellent' increased from 47.7% of participants at baseline to 64.8% at follow-up in the experimental group, and decreased from 52.4% to 35.9% in the control group. P<0.03 (4) Reported increased strength at follow-up was 43.6% of participants in the intervention group, and 18.2% in the control group. P<.02 (5) Average walking speed (m/s) decreased less from baseline to follow-up in the intervention group compared with controls (0.95m/s to 0.92 for intervention group, 1.06 to 0.86 for controls). P<0.001 ***Cognition***

				(6) Mean hours of television watching from baseline to follow-up decreased for the intervention group (4.6hrs to 4.4hrs) and increased for controls (4.5hrs to 5.3hrs). P<0.02 (7) Mean seconds taken to complete the Trail Making Task B (adjusted for age, education and exposure duration), decreased for the intervention group from baseline to follow-up (174.3s to 160.7s) and increased for controls (169.6s to 191.3s). P<0.05 for change score (interaction effects in ANCOVA not significant: p<0.1). (8) Mean delayed recall score (adjusted for age, education, and exposure duration) increased for the intervention group (intervention group were more accurate) from baseline to follow-up (11 to 12) and decreased for controls (11.4 to 10.3).
Carlson et al, (2004) **Baltimore, US** **EC**	**Assessment Points** T0: post-training, n=18 (0M:17F) T1: 6 months post baseline, n=17 **Recruitment** **(R)** No information. Potential P's attended an information event. **(C)** On a waiting list until the next academic year **Ethnicity** Exp: 100% AA Ctrl: 100% AA	**Risk of Bias** 1: U 2: H 3: U 4: L 5: L	**Cognition**: [1]response times [RTs] on Flanker test: % interference; Accuracy on flanker test in congruent trials; [2]Accuracy in incongruent trials; Activation of brain regions of interest (ROI) during Flanker test: [3]ROI ACC; 4ROI left vLPFC; 5ROI left dLPFC.	(1) Mean response times [RTs] on the Flanker test expressed as % interference. A reduction in interference (i.e. better performance) was reported for the intervention group from baseline to follow-up (9 to 8%) compared with matched controls where interference was stable (9%). Repeated measures ANOVA showed a significant time × group interaction ($F(1,13) = 5.28$; $p < .04$). (2) Mean accuracy on flanker test improved for the intervention group in comparison with controls from baseline to follow-up, but only when the 'cues' used in the trial were incongruent with the correct response – making the task more complex. Repeated measures ANOVA showed a significant time × group × congruency interaction ($F(1,13) = 5.77$; $p < .03$), with post hoc comparisons at p<0.5) (3) Neuroimaging activity in three regions of interest (ROI) in the brain during Flanker test . Reported intervention-specific increase in brain activity in selected ROI from baseline to follow-up across all levels of complexity compared with controls. No raw data (activation time) provided. Repeated measures ANOVA. Showed significant time × group interaction

				(F (1,13) = 13.22; p < .003) (4) As above, left vLPFC region, (F (1,13) = 5.16; p < .04) (5) As above, left dLPFC region, (F (1,13) = 8.99; p < .01)
Stevens-Roseman (2009) **Houston, Texas, US** **Older Mentors for Newer Workers**	**Assessment Points** T0: prior to group assignment, n=22 (1M:21F) T1: 6 m's after T0, n=16 **Recruitment** **(R)** Recruitment occurred within a workplace, with older employees given the chance to participate. Participants signed up as they arrived at an introductory meeting. Every other name in the list was chosen for the experimental group, and every other name for control. **(C)** Continued to work as usual. **Ethnicity** Exp: 36% AA; 5% w; 36% HL; 23% missing Ctrl: No data	**Risk of Bias** 1: U 2: H 3: L 4: H 5: U	**Life Satisfaction**: [1]Life Satisfaction Index A (Neugarten et al, 1961).	(1) There was no difference between the life satisfaction scores of the intervention (14.36 (SD 1.91)) and control group (14.00 (SD 2.86)) at baseline (p=0.73). At follow up, the intervention group (15.7 (SD 1.34)) scored significantly higher than the control group (11.83 (SD 3.66); p<0.01).
Fujiwara et al, (2010) **Chuo-Ward (Central Tokyo);Tama-Ward in Kawasaki City (Tokyo suburb); Nagahama City in Shiga Prefecture (city in West Japan)** **REPRINTS**	**Assessment Points** T0: Start of training, n=141 (38M: 103F) T1: 9 m's post training, 5 m's post job placement, n=122 T2: 21 m's post training, 17 m's post placement **Recruitment** **(R)** Community: Advertisements and events targeting social activity & hobby clubs, adult volunteering, and community-based health promotion programs. Groups recruited separately. **(C)** No specific training or program was used. Participants were asked not to engage in intergenerational activities.	**Risk of Bias** 1: H 2: H 3: L 4: H 5: H	**Productivity & Self-actualisation**: personal activity, The Social Activity Checklist (Takahashi et al. 2000); lifelong study, The Social Activity Checklist (Takahashi et al. 2000); [1]occupation, The Social Activity Checklist (Takahashi et al. 2000). **Social Support & Social Activity**: social or volunteer activity, The Social Activity Checklist (Takahashi et al. 2000); providing social support, scale developed by Noguchi et al, (1991) (3 categories of 4 items each, data presented only for each category): to family members living together; to family members living apart; [2]to friends or neighbours; receiving social support: as above (family together, apart, [3]friends and neighbours); Social network score (frequency of communication): friends/neighbours; [4]grandchildren; neighbourhood children; [5]distant children (via volunteer work etc); No. of friends or neighbours	Note: Analysis based on mixed model ANOVA. Statistical comparisons were not made between the groups at follow up. Factors of time and group, with age and gender controlled. ***Productivity & Self-actualisation*** (1) Decrease in mean scores from baseline 0.3 (SD 0.4) to follow-up 0.2 (SD 0.4) for the intervention group, control means 0.3 (SD 0.5) to 0.3 (SD 0.4). Significant group x time interaction (p<0.001). ***Social Support & Social Activity*** (2) Increase in mean scores from baseline 11.2 (SD 5.9) to follow-up 13.1 (SD 4.5) for the intervention group, control means 12.7 (SD 5.0) to 12.7 (SD 4.4). Significant group x time interaction (p=0.046). (3) Decrease in mean scores from baseline 9.9 (SD 4.8) to follow-up 8.8 (SD 4.6) for the intervention group,

	Ethnicity No information	contacted; [6]No. of distant friends contacted. **Physical Health & Physical Activity**: Quest. items: number of chronic conditions; systolic blood pressure; diastolic blood pressure; [7]self-rated health score **Functional Health**: Quest. items: Use of eye glass; Functional capacity: % full scorers (Tokyo Metropolitan Institute of Gerontology Index of competence); Functional capacity: self-maintenance (see prior); usual walking speed (m/minute); maximum walking speed; [8]hand grip strength (KG); one leg standing duration test; 'elaboration of fingers'/ peg test (gross movements of hands, fingers and dexterity as necessary in assembly tasks); functional capacity: social role. **Cognition**: functional capacity: intellectual activity (Tokyo Metropolitan Institute of Gerontology Index of competence); cognitive function: immediate recall (Japanese version of Rivermead Behavioural Memory Test); delayed recall; verbal fluency: phonological; verbal fluency categories; information (WAIS-R: Information subtest); picture completion (from WAIS-R); digit symbol (from WAIS-R). **Mental & Psychological Health**: Depression (Geriatric depression scale);Self-esteem (Rosenberg's 10-item scale); Self rated health score (includes depression); Locus of control (Kamahara's 18-item version of Locus of Control (LOC))	slight increase in means for the control group 10.5 (SD 4.8) to 11.0 (SD 4.1). Significant group x time interaction (p=0.038). (4) Increase in mean scores from baseline 2.1 (SD 2.1) to follow-up 2.4 (SD 2.1) for the intervention group, decrease in means for control group 2.7 (SD 2.0) to 2.4 (SD 2.0). Significant group x time interaction (p=0.07). (5) As expected, the intervention group increased their frequency of contact with children outside their own neighbourhoods (through volunteer activity) with means of 1.6 (SD 1.7) at baseline and 3.3 (SD 1.1) at follow-up and 1.6 (SD 1.8) to 1.4 (1.5) for controls. Significant group x time interaction (<0.001). (6) Increase in mean scores from baseline 3.1 (SD 1.3) to follow-up 3.5 (SD 1.1) for the intervention group, decrease in means for control group 3.3 (SD 1.2) to 3.2 (SD 1.1). Significant group x time interaction (p=0.044). ***Physical Health & Physical Activity*** (7) Increase in mean scores from baseline 1.9 (SD 0.6) to follow-up 2.1 (SD 0.7) for the intervention group, decrease in means for control group 2.1 (SD 0.5) to 2.0 (SD 0.6). Significant group x time interaction (p=0.012). ***Functional Health*** (8) participants got weaker over time, with greater loss of strength in the comparison group. Intervention group means 25.7 (SD 6.8) at baseline to 25.4 (SD 6.4) at follow-up; control group means 26.6 (SD 5.9) to 25.1 (SD 6.7). Significant group x time interaction (p=0.005).
Total: Studies: n=11 USA: 9 Japan: 1 Netherlands: 1 Interventions: n=7	**Total**: T0 n=1310 (220M:666F) T1 n= 797	**Total:** Life Satisfaction: n=16 Cognition: n=25 Social Support & Social Activity: n=29 Functional Health: n=15 Physical Health & Physical Activity: n=33 Productivity & Self-actualisation: n=4 Perception of Age & Aging: n=4 Mental & Psychological Health: n=*9	**Total:** Life Satisfaction: n=10 Cognition: n=8 Social Support & Social Activity: n=9 Functional Health: n=4 Physical Health & Physical Activity: n=**5 Productivity & Self-actualisation: n=1 Perception of Age & Aging: n=1 Mental & Psychological Health: n=1

		*Excludes mental & psychological health measure from EC where no information on outcome was available	**Excluding two results likely due to self-selecting bias

Table 3: Interventions grouped by characteristic features with pooled outcomes

Intervention Feature	***Most intensive***	***Medium Intensity or non related category***	***Least intensive***	**Outcome categories for 'most intensive' interventions** *N= total measures across all studies of the intervention (No. measures indicating a stat. sig. effect of the intervention)*	***Evidence for statistically sig. intervention effects across pooled interventions*** **Outcome category applied to all pooled interventions* *†Significant effect only applicable to one intervention in the group*
Theoretical basis	***Explicit theoretical basis***	***Explicit evidence base***	***Atheoretical or no explicit evidential basis***		
	REPRINTS EC Successful Aging Older Mentors	RSVP	FG Park Maintenance	**REPRINTS** Productivity & Self-actualisation: 3 (1) Social Support & Social Activity: 13 (5) Physical Health & Physical Activity: 4(1) Functional Health: 9(1) Cognition: 8(0) Mental & Psychological Health: 4(0) **Experience Corps.** Social Support & Social Activity: 5 (1) Physical Health & Physical Activity: 13(1) Functional Health: 5(3) Cognition: 17(8) Mental & Psychological Health: (No information) **Successful Aging** Life Satisfaction: 1(0) Perception of Age & Aging: 2(0) Social Support & Social Activity: 2(0) Physical Health & Physical Activity: 1(0) Mental & Psychological Health: 1(0) **Older Mentors** Life Satisfaction: 1(1)	Life Satisfaction: 2(1), 50% †Cognition: 25(8), *32%* Social Support & Social Activity: 20 (6), *30%* Functional Health: 14(4), *29%* Physical Health & Physical Activity: 18(2*), 11%* Perception of Age & Aging: 2(0) Mental & Psychological Health: [1]5(0) [1]Excludes mental & psychological health measure from EC where no information on outcome was available.

Provision of explicit roles	***Provides explicit role***	***No explicit role***		
	Park Maintenance FGP REPRINTS EC RSVP Older Mentors	Successful Aging	**Park Maintenance Corps:** Life Satisfaction: 2(1) Social Support & Social Activity: 1(0) Physical Health & Physical Activity: 3(2) **FGP** Life Satisfaction: 9(6) Mental & Psychological Health: 1(0) Social Support & Social Activity: 1(1) **REPRINTS** (see previous) **Experience Corps.** (see previous) **RSVP** Productivity & Self-actualisation: 1(0) Social Support & Social Activity: 7(2) Mental & Psychological Health: 3(1) Life Satisfaction: 3(3) Perception of Age & Aging: 2(1) Physical Health & Physical Activity: 12(1) Functional Health: 1(0) **Older Mentors**(see previous)	Life Satisfaction: 15(11), 73% *↑*Perception of Age & Aging: 2(1), 50% Social Support & Social Activity: 27 (9), 33% *↑*Cognition: 25(8), 32% Functional Health: 15(4), 27% Productivity & Self-actualisation: 4 (1), 25% Physical Health & Physical Activity: 32 (5), 16% *↑*Mental & Psychological Health: [1]8(1), 13% [1]Excludes mental & psychological health measure from EC where no information on outcome was available.
Commitment to role	***Heavy***	***Medium or sustained***	***Minimal***	
	Park Maintenance FGP	RSVP EC REPRINTS	Successful Aging Older Mentors	**Park Maintenance Corps** (see above) **FGP** (see above)	*↑*Physical Health & Physical Activity: 3(2), *67%* *Life Satisfaction: 11(7), *64%* * *↑*Social Support & Social Activity: 2(1), *50%* Mental & Psychological Health: 1(0), *0%*

Group design ***(i) recruit.*** ***(ii) training*** ***(iii) deployment*** ***(iv) support***	***4 factors***	***3 factors***	***2 factors***		
	RSVP EC	REPRINTS FGP Older Mentors Park Maintenance	Successful Aging	**RSVP** (see previous) **Experience Corps.** (see previous)	↑Productivity & Self-actualisation: 1(1), 100% Life Satisfaction: 3(3), 100% Functional Health: 6(3), 50% ↑Perception of Age & Aging: 2(1), 50% ↑Cognition: 17(8), 47% ↑[1]Mental & Psychological Health: 3(1), 33% *Social Support & Social Activity: 12(3), 25% *Physical Health & Physical Activity: 25(2), 8% [1]Excludes mental & psychological health measure from EC where no information on outcome was available.
Financial inequalities	***target low SES adults***	***Remove financial barriers to participation*** *(all SES)*	***Do not address financial inequalities directly***		
	Park Maintenance FGP	RSVP EC	Successful Aging REPRINTS Older Mentors	**Park Maintenance Corps** (see previous) **FGP** (see previous)	↑Physical Health & Physical Activity: 3(2), 67% *Life Satisfaction: 11(7), 64% *↑Social Support & Social Activity: 2(1), 50% Mental & Psychological Health: 1(0), 0%