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Running Head: WATER CLUB

Water clubs in residential care: Is it the water or the club that enhances health and well-being?

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Abstract

Recent research suggests that establishing water clubs in care homes can counteract the dangers of dehydration and enhance residents' health and well-being. This study provided an experimental test of this idea, and also explored the possibility that it is the social interaction that clubs provide which delivers health-related benefits. Consistent with this hypothesis, the study found no evidence that, on its own, increased **focus** on water consumption enhanced residents' health or well-being. However, residents who took part in water clubs showed improved levels of perceived social support, and those who participated in water and control clubs showed beneficial outcomes in terms of the number of General Practitioner calls they required. Consistent with a social identity approach to health and well-being, a mediation analysis also indicated that clubs achieve these positive outcomes by providing social support that helps to build a shared sense of social identity among residents.

(148 words)

Water clubs in residential care: Is it the water or the club that enhances health and well-being?

Water, thou hast no taste, no color, no odor; canst not be defined, art relished while ever mysterious. Not necessary to life, but rather life itself, thou fillest us with a gratification that exceeds the delight of the senses.

(de Saint-Exupery, 1939, p.172)

As we age, we become more susceptible to dehydration because the body's ability to conserve water is reduced, the thirst sense becomes less acute, and we are less able to respond to changes in temperature (Hodgkinson, Evans, & Wood, 2003; Weinberg, Pals, McGlinchey-Berroth, & Minaker, 1994). Among elderly residents of care homes, fluid intake is particularly poor and reported to be well below the required level of 1500-2500 ml per day (Armstrong-Esther, Browne, Armstrong-Esther, & Sander, 1996; Gaspar, 1999; but see Valtin, 2002). This is widely recognized as a cause for concern because the various symptoms associated with reduced fluid intake (e.g., confusion, dizziness), however mild, can increase the risk of falls, which represent one of the major causes of dependency in residential care (Chang, Morton, Rubenstein, Mojica, Maglione et al., 2004; Jensen, Lundin-Olson, Nyberg, & Gustafson, 2002).

Given the importance of water consumption, the scarcity of interventions that address dehydration amongst care residents is striking (Hodgkinson et al., 2003). One notable exception comes from work by Simmons, Alessi, and Schnelle (2001), which found that verbal prompts and beverage preference compliance increased fluid intake among nursing home residents.

Nevertheless, even after this intervention, residents' average daily consumption increased only slightly (<140 ml) and was still below recommended levels (see also Mentis & Culp, 2003).

A more recent attempt at managing dehydration was initiated by a care home in Suffolk in the United Kingdom and involved introduction of 'water clubs'. Within these clubs, residents learned about the benefits of water in small groups, were encouraged to increase their water intake, and discussed collectively how they could manage the consequences of drinking more water (in

particular, increased toilet visits). Access to water was increased by introducing water coolers to the home and by providing water jugs in rooms. Although this qualitative study involved the setting up of only one water club, its findings were widely reported in the media (e.g., BBC News, 2008). According to the researchers involved, not only did the water club lead its members to report enhanced well-being, but it was also associated with fewer falls and reduced General Practitioner (GP) visits.

In line with the researchers' claims, one obvious explanation for these positive outcomes is that the intervention achieved positive outcomes because it reduced the negative effects of dehydration. However, it is also possible that the observed benefits derived from increased social engagement and identification with other residents who were part of the water club. That is, the benefits of water clubs may derive as much (if not more) from the 'club' than from the 'water'. This possibility is consistent with growing epidemiological evidence, which indicates that social interaction and engagement can have a range of positive consequences for health. For example, greater social integration and membership of social groups has been found to reduce the risk of stroke (Boden-Alabala, Litwak, Elkind, Rundek, & Sacco, 2005), to protect well-being during recovery from stroke (Haslam, Holme, Haslam, Iyer, Jetten, & Williams, 2008), to reduce memory decline (Ertel, Glynour, & Berkman, 2008) and even to reduce vulnerability to dementia (Fratiglioni, Paillard-Borg & Winblad, 2004). These findings complement those from the social isolation literature which highlights the negative effects that lack of social contact can have on physical and mental health (e.g., Berkman, 1995; Berkman, & Glass, 2000; Cornwell & Waite, 2009) and the associated risk of ill-health and mortality (House, 2001; House, Landis, & Umberson, 1998).

The benefits that group-based activity can have for well-being are also consistent with recent research that has been informed by a social identity approach to health (see Haslam, Jetten, Postmes & Haslam, 2009; Jetten, Haslam, Haslam, & Branscombe, 2009; Jetten, Haslam, & Haslam, 2010a). Amongst other things, this suggests that when social group memberships are

internalized, they provide individuals with a sense of social identity that can serve to enhance group members' self-esteem, their sense of connectedness to others (and their willingness to cognitively engage on this basis), and also provide a basis for the provision and receipt of effective social support (Branscombe, Schmitt & Harvey, 1999; Haslam, O'Brien, Jetten, Vormedal, & Penna, 2005; Levine, Prosser, Evans, & Reicher, 2005). As a large body of previous research has shown, perceived social support not only protects individuals in times of physical and emotional distress, but can also enhance the quality of their general day-to-day lives and thereby enhance well-being (e.g., Cohen & Wills, 1985; Underwood, 2000).

The mechanism whereby social support mediates the relationship between social group membership and well-being has been demonstrated in a number of previous studies (e.g., Branscombe et al., 1999; Haslam et al., 2005). However, strong evidence that group-based interventions can impact positively on both the well-being and cognitive performance of residents in care emerges from a recent study reported by Haslam, Haslam, Jetten, Bevis, Ravenscroft and Tonks (2010). These researchers argued that activities delivered in groups should have an advantage over the same activities delivered on a one-on-one basis because the group interventions are more likely to foster a sense of shared social identity. Consistent with this argument, in this research it was only the group-based interventions that improved residents' cognition and well-being. More specifically, group reminiscence enhanced memory performance and a social group activity (involving a game of skittles¹) enhanced subjective well-being. At the same time, one-on-one reminiscence led to a reduction in residents' sense of shared social identity and led to no improvement in either cognitive performance or well-being.

Yet while it has been shown that social support can mediate the relationship between social identity and well-being, researchers have also suggested that, under some circumstances, the relationship between social support and social identification might be reversed (Haslam et al., 2005). Specifically, perceptions of social support may provide an important basis from which to enhance identification with a group and this increased sense of social identification may promote

well-being (Postmes, Haslam & Swaab, 2005). This possibility has been demonstrated in work by Tyler and Blader (2003; Blader & Tyler, 2009), which shows that positive interactions with others (associated with fair treatment) can help to build a sense of shared identity, and that this can have a range of positive effects on social and organizational functioning (see also Amiot, Terry, Wirawan, & Grice, in press).

Recent support for this idea also emerges from a care home study in which residents were either involved or not involved in the process of decision-making surrounding the decoration of a new home into which they were moving (Knight, Haslam, & Haslam, in press). When residents were given an opportunity to meet and decide on their home's decoration, they reported higher levels of social identification with both residents and staff and this contributed to greater use of the new facility and enhanced quality of life and physical health (as rated by both residents and care staff). In this case, then, social support had a positive impact on well-being because it increased perceptions of shared social identity. Indeed, as Knight and colleagues argue, this pathway may be particularly pertinent for care home residents who have already experienced social losses as a result of leaving their home and community and who may have only a weak sense of belonging with other residents.

The present study

The above review suggests that there are two possible explanations for the benefits associated with the creation of water clubs in care homes. First, it is possible that focusing on water consumption (with a view to increasing fluid intake) has positive effects on general health and well-being. Alternatively, it may be the club per se that is critical because it builds a sense of social identification with others in care, providing a vehicle for the delivery of social support which is required to enhance well-being.

The present study was designed as a pilot evaluation to identify the “active ingredients” of the Water Club intervention (see Medical Research Council, 2000, guidelines for complex interventions). More specifically, it sought to ascertain whether the benefits of this intervention are

due to the focus on water intake or to increased identification with others taking part in the groups. In the process, we also sought to explore more closely the nature of the relationship between social identification and social support.

For this purpose, older people residing in care were randomly allocated to receive one of four interventions over an eight-week period. Two interventions involved group activity and two involved individual activity. One group activity involved discussing the benefits of water (water club condition), the other involved discussing current events (control club condition). The same approach was adopted for the individual interventions; the discussion in one individual activity focused on the benefits of water (water solo condition) and the other on current events (control solo condition). A “hydration” model would predict that interventions that centred on the benefits of water (i.e., water club, water solo) would have benefits relative to those that merely involved discussion of current events (i.e., control club, control solo) (Hydration Hypothesis 1; HH1). On the other hand, a social identity approach to health would predict that interventions administered in a group setting (i.e., water club, control club) would have advantages relative to those administered individually (water solo, control solo) (Social Identity Hypothesis 1; SIH1). Furthermore, the social identity approach suggests that these interventions would enhance perceived social support, and that this support would serve to enhance a sense of shared social identity and thereby enhance residents’ well-being (Social Identity Hypothesis 2; SIH2).

Method

Participants

Participants were recruited from three care homes in the South-West of England. Care home residents were initially informed about the study by managers who offered them an opportunity to take part in research on well-being in residential care. A member of the research team then explained the nature of the study before obtaining formal consent. Initially, consent to participate was obtained from 66 residents who met the main inclusion criteria of (a) not occupying a nursing care bed, and (b) having sufficient language ability to take part. Participants

were randomly allocated to one of four conditions: water club (WC; $n=18$), water solo (WS; $n=14$), control club (CC; $n=18$), and control solo (CS; $n=16$). Of these participants, 35% ($n=21$) did not complete the post-intervention survey either due to ill-health ($n=2$), death ($n=1$), discharge ($n=2$), being on an outing on the day of the assessment ($n=6$), or no longer wishing to participate ($n=10$). The attrition rate did not vary significantly across the four conditions ($n_s=5, 3, 6, \text{ and } 7$ for WC, WS, CC, CS, respectively). Of the remaining 45 participants (age: $M=85.33$, $SD=5.3713$, range: 70-97), 13 took part in a water club (2 male, 11 female, aged 75 to 97 years), 11 in water solo (2 male, 9 female, aged 75 to 90 years), 12 in a control club (3 male, 9 female, aged 70 to 93 years), and 9 in control solo (4 male, 5 female, aged 70 to 93 years) conditions.

Design

The study employed a pretest–posttest design in which four intervention² conditions were compared. The design included a baseline assessment, an intervention period (8 weeks in duration), and an outcome assessment. Participants were randomly allocated to one of the four interventions using stratified randomization (i.e., participants within the same home and care level were allocated randomly to conditions).

Materials

Several measures were taken before and after the intervention. These comprised measures of social support, social identification, well-being, and GP visits.

1. Perceived social support. The amount of social support that residents perceived that they received in the care home was measured using a three-item scale. These items were adapted from S.A. Haslam et al. (2005) and included “I get the emotional support I need from other people”, “I get the advice I need from other people”, and “I get the help I need from other people”. As with the next two measures, participants were asked to indicate their agreement with each item on a five-point Likert scale (1= strongly disagree, 5 = strongly agree). The scale had good reliability both pre- and post-intervention (α 's=.78, .70, respectively).

2. *Social identification*. This was measured with four items (from Doosje, Ellemers, & Spears, 1995; e.g., “Do you see yourself as part of the care home”, “Are you pleased to be part of the care home”, “Do you feel strong ties with others in the care home?”, “Do you identify with others in the care home?”). The reliability of this measure was strong before the intervention ($\alpha=.71$), but somewhat reduced after the intervention ($\alpha=.50$). Although this reduction in reliability was unsatisfactory, we retained the scale as it is widely used in this form and generally found to provide a good index of the theoretical construct of social identification (e.g., see Haslam, 2004).

3. *Quality of life*. This was measured with four items taken from Jetten, Haslam, Pugliese, Tonks, and Haslam (2010b; e.g., “In the last few months the quality of my life has improved”; “In the last few months, the quality of my life changed for the worse” (reversed) “Have your life experiences changed you for the better?” “All things considered, are you happy with your life?”). The scale had acceptable reliability both pre- and post-intervention (α s=.63, .66, respectively).

4. *General Practitioner (GP) calls*. In addition to the above measures we were also granted access to medical records to obtain details of the number of GP calls that needed to be made on behalf of residents (excluding routine checks or flu vaccinations). These were summed for both the 12-week period prior to intervention, and the 12 weeks post- intervention³.

Procedure

The Psychology Ethics Committee at the researchers’ university provided approval for the study. In the baseline phase all participants completed the above measures as part of a one-to-one interview, and these were repeated after the intervention. The GP data were collected at the end of the intervention. The interventions were administered in eight weekly sessions, facilitated by four people. Two of these facilitators were activity co-ordinators employed by the care home and two were social work students on placement. All had introductory training in delivery of the interventions, and had considerable experience in running groups. Members of the research team who were not involved in delivery of the interventions collected most of the data. The placement

students, who also facilitated some of the interventions, contributed to 21% of the interviews conducted and these were distributed equally across the conditions. Each session was about 30 minutes long and took place at the same time of day and in the same place.

The general format of these sessions was as follows:

Water Club (WC). In this intervention residents met weekly in small groups (no more than 6 per group) to discuss the benefits of drinking water. These meetings lasted between 20 to 30 minutes and were conducted over a period of 8-weeks. Groups were facilitated and their aim was to share facts about water intake (e.g., drinking water increases energy levels; the most common cause of daytime fatigue is mild dehydration) and to discuss the problems and benefits of doing so (e.g., drinking water may initially encourage people to visit the toilet more often, but toilet function will be more healthy over time; drinking water prevents infections and reduces the need for laxatives). In addition, participants took part in quizzes that also included information about water intake and hydration. Throughout the intervention water was more readily available (both in residents' rooms and in communal areas), and residents were encouraged to drink 8-10 glasses of water per day and record their daily water intake in a diary⁴.

Water Solo (WS). Participants in this condition received the same information and encouragement to drink more water as those in the Water Club, with the exception that the information they gained about the benefits of water was provided in one-on-one sessions. These sessions were also held weekly, taking between 20 to 30 minutes. As in the group water condition, water was more readily available (both in residents' rooms and in communal areas⁵), and residents were encouraged to drink 8-10 glasses of water per day and record their water intake.

Control Club (CC). This intervention was administered in eight weekly sessions, lasting between 20-30 minutes and led by a facilitator. These group-based sessions (with no more than 6 per group) centred on the residents' experiences in the care home, and their daily life. As in the other conditions, participants took part in quizzes about their daily life with one facilitator.

Control Solo (SC). Participants in this condition were visited individually over the same period of time as the other interventions. During this time they talked about their daily life in the care home. As in the other conditions, each session took between 20 to 30 minutes⁶.

Results

Group-level change

We first investigated patterns of inter-individual change (mean-level change) on the four critical dependent variables. Group-level change examines patterns of change within the sample as a whole, and as a function of experimental condition by means of analysis of variance (ANOVA) with condition as a between-participants factor and pre- and post-measures as a repeated factor. This analysis revealed no significant change over time or as a function of the interventions on any of the four measures, all F s < 2 , $p < .14$. Descriptive statistics and all univariate effects are presented in Table 1.

Individual-level change

As group-level analyses revealed no significant effects, we explored individual-level change to determine whether there were changes over the course of the intervention for individuals. Indeed, even in the absence of significant group-level change, there could be significant intra-individual change such that some participants show improvement and others decline. In this context, three outcomes were possible on each of the four variables of interest. First, evidence of improvement in the pre- and post-intervention scores (i.e., increased ratings of social support, social identification, and well-being) would indicate a *positive* outcome, and where this occurred a code of 1 was recorded. Second, there may be no evidence of change and in this event a code of 0 was recorded. Finally, evidence of deterioration would indicate a *negative* outcome where a code of -1 was recorded.

Non-parametric chi-square tests were used to test our hypotheses about the effects within the different interventions (as recommended by Zar, 1974). Here the null hypothesis was that the interventions would have no effect and, accordingly, we would expect that the proportion of

residents showing positive, stable and negative outcomes on the psychological measures would not differ within each intervention. Alternatively, if the interventions had an effect (either positive or negative), then the proportion of residents showing change should be greater than that which an equal distribution might lead one to expect (Siegel, 1956).

In the case of social support, evidence of improvement was found in 64% ($n=9$) of participants taking part in the WC, whilst 21% ($n=3$) showed a reduction in perceived social support and only one indicated no change. This distribution was significantly different from the expected outcome, $\chi^2(df=2)=8.00, p=.02$. The distribution was no different to the expected outcome in the remaining interventions (see Figure 1; WS: $\chi^2(df=2)=3.45, p=.17$; CC: $\chi^2(df=2)=1.30, p=.52$; SC: $\chi^2(df=2)=0.11, p=.73$).

There was no difference from the expected distribution in our measures of social identification (WC: $\chi^2(df=2)=1.07, p=.58$; WS: $\chi^2(df=2)=2.90, p=.23$; CC: $\chi^2(df=2)=1.27, p=.52$; SC: $\chi^2(df=2)=0.40, p=.52$) or in life quality (WC: $\chi^2(df=2)=0.15, p=.92$; CC: $\chi^2(df=2)=4.54, p=.10$; WS: $\chi^2(df=2)=0.22, p=.90$; SC: $\chi^2(df=2)=0.80, p=.67$).

For the GP call data a somewhat different set of assumptions are relevant in light of the expected trends in the physical health among the present population. First, the life expectancy at age 77 (and our sample had a mean age of 85) is only 5-8 years (Brown, McCann, Shaw, & Verne, 2005) and deteriorating health might thus be expected. Indeed, longitudinal data pertaining to the ageing UK population reveal a clear downward trend, which is more dramatic in women (Brayne, Matthews, McGee, & Jagger, 2001; Marmot, Banks, Blundell, Lessof, & Nazroo, 2002). In addition, a primary goal of care is to minimize (rather than eliminate) this deterioration (e.g., Wanklyn, 1996, see also Greaves & Farbus, 2006). Accordingly, in addition to improvement, stability would also be an indicator of health benefit on this measure (particularly as the modal number of GP visits was zero). For this reason, we used a binominal coding for this measure with a *positive* outcome (coded 1) signalled improvement or stability in pre- and post-intervention scores

and a *negative* outcome (coded 0) signalling evidence of deterioration (more GP calls) across pre- and post-intervention scores on variables of interest. We then analysed data by means of a binominal test. This analysis revealed significant positive outcomes both for residents who took part in Water Clubs ($p=.002$) and for those who took part in Control Clubs ($p=.003$). However, the number of positive outcomes was not significantly greater than chance in either Water Solo ($p=.14$) or Control Solo conditions ($p=.09$).

In summary, the results of the above analyses revealed evidence of change from expected distributions only when interventions were administered in groups (i.e, only in Water Clubs or Control Clubs) Specifically, there was evidence of (a) increased perceptions of social support after the Water Club intervention and (b) reduced or stable numbers of GP visits in both the Water Club and the Control Club conditions.

Tests of relations between social support and identification

Results of the individual-level analysis highlighted improvement in social support that were specific to residents who participated in the Water Club. An important question that this raises concerns the process via which this was achieved. In particular, we are interested in whether the enhanced perceptions of social support that the club provided helped to build a sense of shared social identity that in turn protected well-being (as hypothesized in SIH2). To address this question, we conducted additional analyses to examine relationships between social identification, perceived social support and well-being. A first stage involved examination of simple bivariate correlations and the second, mediational analysis.

Simple correlations. All pairwise correlations between social identification, social support, and quality of life were all in the predicted direction. In particular, there were significant and moderately strong positive correlations (a) between quality of life and social identification with others in the care home, $r(46)=.43$, $p=.003$, and (b) between social support and social identification, $r(46)=.37$, $p=.01$. The correlation between social support and quality of life was weaker and only marginally significant, $r(46)=.27$, $p=.06$.

Mediational analysis. To explore SIH2 directly we conducted a mediation analysis using a bootstrapping technique⁷ (Preacher & Hayes, 2004). Here, after controlling for age and gender (neither of which had a significant impact on quality of life), the relationship between perceived social support and quality of life approached significance, $b=.18$, $S.E.=.10$, $t(44)=1.77$, $p=.08$. However, perceived social support was a significant predictor of identification, $b=.25$, $S.E.=.11$, $t(44)=2.28$, $p=.02$, and identification in turn was a significant predictor of quality of life, $b=.34$, $S.E.=.13$, $t(44)=2.47$, $p=.02$. Importantly too, when quality of life was simultaneously regressed on both social identification and social support, the capacity for social support to predict quality of life was no longer significant (to $b=.09$, $S.E.=.10$, $t(44)=0.93$, $p=.35$), as indicated by the fact that the 95% confidence interval did not contain zero (.01 to .29). As predicted, and shown in Figure 2, social identification with other care home residents mediated the effect of social support on quality of life.

In order to test (and rule out) alternative pathways (as recommended by Baron & Kenny, 1986), we tested another model in which social support was specified as a mediator of the relationship between social identification and well-being. Again after controlling for age and gender, the direct effect of identification on quality of life was significant, $b=.38$, $S.E.=.12$, $t(44)=2.96$, $p=.005$ and the direct effect of identification on perceived social support was also significant, $b=.44$, $S.E.=.19$, $t(44)=2.28$, $p=.03$. However, the mediator did not predict quality of life, $b=.10$, $S.E.=.10$, $t(44)=0.93$, $p=.35$, and when quality of life was simultaneously regressed on both social identification and social support, the capacity for social identification to predict quality of life did not decrease substantially, $b=.33$, $S.E.=.13$, $t(44)=2.47$, $p=.02$, as evidenced in confidence interval containing zero (-.04 to .16). Hence, there was no evidence to suggest that social support was a mediator of the effect of social identification on quality of life, which strengthens support for SIH2.

Discussion

The aim of the present study was to determine whether the benefits associated with Water Clubs were due to increased focus on water intake (the hydration hypothesis, HH1) or to social group membership (the social identity hypothesis, SIH1). Additionally, we also sought to establish whether an intervention that fosters perceived social support has positive effects on quality of life because it increases residents' sense that they have access to social support (a second social identity hypothesis, SIH2). No significant effects were found in initial analysis comparing the effectiveness of interventions. However, analysis of individual-level change provided evidence of significant improvement in social support, but only in Water Clubs. In addition, for participants in Water Clubs and the Control Clubs, positive outcomes were observed in relation to GP calls. In contrast, where participants received interventions individually, no positive post-intervention outcomes were significantly better than chance.

The results of the study indicate that where significant positive results were observed post-intervention, these were restricted to conditions in which residents had taken part in group-based interventions. Thus, whereas the previously reported success of Water Clubs has been attributed to the beneficial effects of water (i.e., the hydration hypothesis), in fact it appears that these benefits only emerge when delivered in a *club* (see also Mentis & Culp, 2003; Simmons et al., 2001). Additionally, while some of the benefits were psychological, some were physical in the sense that they impacted on the requirement for visits from GPs. These findings are consistent with findings reported by Haslam and colleagues (2010) who found that reminiscence therapy is more effective in a group setting compared than in an individual one, and those of Crabtree, Haslam, Postmes and Haslam (in press) which identified the positive effects of support groups for individuals with mental illness.

The present results are also in line with previous research which indicates that group membership has benefits for well-being, in part because groups facilitate communication of, and engagement with, information concerning the positive consequences of particular activities (e.g.,

as suggested by Berkman & Syme, 1979; S. Cohen et al., 1997; see also E. Cohen, Ejsmond-Frey, Knight, & Dunbar, 2010). More specifically, it appears that sharing information about the health benefits of drinking water served to increase informational social support among participants and thereby increased their sense of social belonging. While there is a large literature supporting the claim that social support can enhance well-being and health promotion (e.g., Berkman, 1995; Cohen & Wills, 1985; Underwood, 2000), relatively little research has focused on the mechanisms and processes that contribute to this outcome. In this regard a further important contribution of the present research was to test the hypothesis that the positive effects of social support can be partly attributed to its capacity to build a sense of shared social identification amongst those who receive it (e.g., as suggested by Knight et al., in press; Tyler & Blader, 2000; see also Postmes et al., 2005). Consistent with this proposition, mediational analysis provided support for a model in which residents' identification with their care home was a mediator of the relationship between perceptions of social support and quality of life (see Figure 2). More generally, then, the results accord with a growing literature, which supports a social identity approach to health and well-being (e.g., C. Haslam et al., 2010; S.A. Haslam et al., 2009; Jetten et al., 2009, 2010).

Limitations and future research

Although this study provided support for our hypotheses, our capacity to draw definitive conclusions on the basis of its findings is clearly limited by a number of factors. Most particularly, the study's sample size was small and this in turn placed constraints on the statistical analysis that we were able to conduct — with the result that this was rather rudimentary. As well as this, the fact that all researchers were not blind to the condition to which participants had been assigned could potentially bias the evaluation process. This point notwithstanding, it should be noted that knowledge of intervention allocation cannot easily account for data on required GP visits.

Another constraint of the present study was that no data about the hydration status of residents was available. Nevertheless, anecdotal evidence provided by the care staff indicated that, prior to the intervention, residents were generally not drinking enough water. Moreover,

epidemiological studies suggest that a large proportion of the general population is mildly dehydrated (Kleiner, 1999). Nevertheless, we cannot rule out the possibility that participants in the present study were sufficiently hydrated at the start of the study and hence that the ‘water’ component of the study could only have had limited effect. At the same time, there is no indication or reason to believe that the different conditions were unbalanced in terms of residents’ prior hydration levels, and so the specificity of the effects we observe are hard to account for in these terms. Clearly, though, confidence in our conclusions would be greatly enhanced by a double-blinded, controlled replication study with a larger sample size that involved careful monitoring of fluid intake and hydration levels.

The mediation analysis we conducted was cross-sectional in nature and although we tested for the reverse order of the effect, we cannot make definite claims about the causation of the effects. This is a clear limitation especially because recent papers have shown the advantages of mediation models for longitudinal data (e.g., Scholz, Nagy, Goehner, Luszczynska, Kliegel, 2009; Selig & Preacher, 2009). Yet, the present study included only two measurement points and as a result, it is not possible to conduct mediation analysis with different time lags. In addition (and as indicated in the results section), we only found rather weak evidence for group-level change and hence decided to test the process model with the data available at Time 2 as the general recommendation in such analysis is to avoid simple change scores as they are often unreliable (see McArdle, 2009, p.580 for brief overview on this topic). Further, although there are important new approaches for longitudinal data analysis (e.g., McArdle, 2009; Selig & Preacher, 2009) our sample size does not allow for testing these kinds of models (Kline, 2005).

In the present case, the fact that this study did not have these features is largely a reflection of resource constraints. Relatedly, it also reflects the logistical challenges that arise from conducting intervention studies of this form, and problems of participant mortality associated with working with a population of care home residents. It is worth noting, however,

that the methods and design of this study attempted to disentangle some of the factors that could have led to the outcomes of previous (widely publicized) work in this area, which was based on purely anecdotal evidence. Importantly too, we believe that the present study provides evidence that auger well for developing systematic trials that can test the benefits of this and other social interventions aimed at improving the well-being of older people in care.

Moreover, despite its shortcomings, we would argue that the value of the present study lies in its ability to test and support a set of clearly specified, theory-based hypotheses. Generalization is thus made not on the basis of the data per se, but on basis of the theory that these support (Turner, 1981). And here confidence in our conclusions is strengthened by the fact that the present findings are consistent with hypotheses derived from a large body of research in the social identity tradition (S.A. Haslam et al., 2009; see also Michie & Abraham, 2004).

Concluding comment

In the context of our aging population, there is currently a great emphasis on maintaining and, if possible, enhancing the well-being of older adults in care (Ice, 2002). In this regard, the present findings are consistent with claims that group-based activities are a better vehicle for delivering interventions to this population than those that are individual-based (C. Haslam et al., 2010). Amongst other things, it appears that this is because groups serve as a source of social support that can enhance health and well-being by increasing residents' identification with those around them (Knight et al., in press).

These assertions are consistent with previous claims that the creation of Water Clubs in care homes can help to deliver a range of positive outcomes for residents. Yet, whereas previously it has been claimed that the critical ingredient of these has been the water, we believe that there are grounds for believing that it the marriage of water and club. This does not invalidate claims that water can have beneficial effects for those in care homes. What it does suggest, however, is that these effects are most likely to be unlocked through group-based social interaction and the

collective engagement that this fosters (Lewin, 1948). As Antoine de Saint-Exupery claimed, water may indeed be 'life itself', but it may take other people to make that life worth living.

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Footnotes

1. This is a game commonly played in Britain, very similar to bowling, in which the aim is to knock down as many skittles (or pins) with a ball.
2. The four interventions were all complex in nature, tapping into several techniques known to promote behaviour change (see Abraham & Michie, 2008). The two interventions that focused on water were designed to provide information about the water-well-being link (technique 1), provide encouragement (techn. 6), provide instructions, and to prompt self-monitoring of behaviour (techn.12). The social interventions were intended to strengthen social support (techn. 20), though in the case of the Water Club this also included a water component. There was no element of behaviour change in the individual control intervention.
3. These data were obtained for participants who participated in six or more intervention sessions and completed the post-test interview.
4. Within the scope of this study, it was not possible to measure fluid intake. This would have entailed research and/or care staff measuring (between)-meal fluid intake over the course of the interventions (see Simmons et al., 2001). We tried to encourage participants to fill in a self-administered water diary, which was first of all a means of reminding participants to monitor their fluid intake and second to have a measure fluid consumption. However, these data proved to be incoherent, with more than 50% of missing values. This might be due to the fact that the cognitive ability of participants was limited and they had difficulties remembering to complete the diary. This possibility is suggested by the fact that mean value on the Mini Mental State Examination for participants was 17.5 ($SD=7.46$), which is well below the cut-off point for detecting dementia with a good sensitivity and specificity of ≤ 24 (Kahle-Wroblewski, Corrada, Bixia, & Kanas, 2007).
5. The water coolers that were available in the communal area were also available for those participants, who were not in water conditions.

6. All four interventions were run in all three care homes. Of course it is possible that residents communicated with each other about the content of each intervention, but it is unlikely that this alone influenced findings in a consistent way.

7. Bootstrapping is an approach to statistical inference that is based on a resampling method and is among the most popular method of testing mediation because it (a) does not require the normality assumption to be met, and (b) can be effectively utilized with smaller sample sizes ($N < 20$) (Preacher & Hayes, 2004). A test of mediation can be demonstrated by showing that the indirect effect (product of the regression coefficients a and b) is significantly different from zero. To test for mediation, a confidence interval is computed around the product term ($a*b$). If zero is not included in the interval, the indirect effect is significant and thus, a mediation effect can be assumed. For calculation, Preacher and Hayes (<http://people.ku.edu/~preacher/>) provide an SPSS syntax file to conduct the analysis of indirect effects with this bootstrapping method.

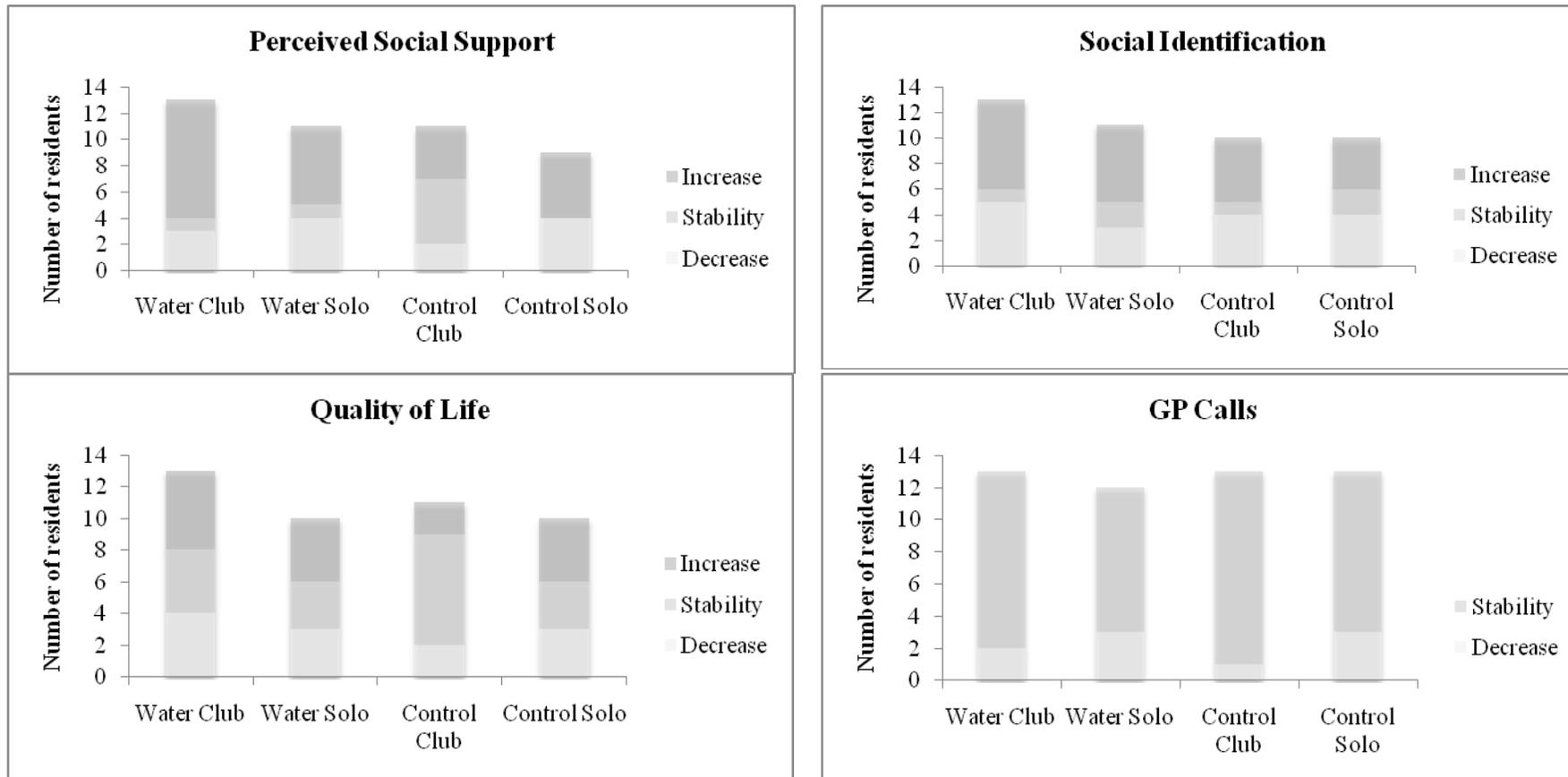


Figure 1a-d. Number of residents per conditions on the outcome variables.

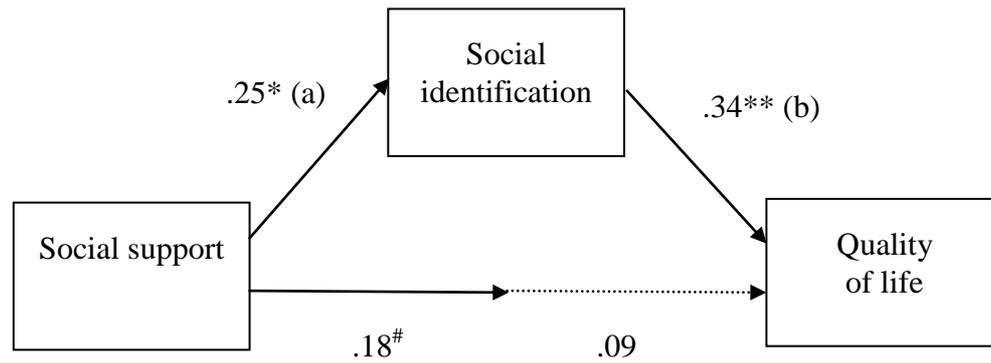


Figure 2. Tests of a mediational model (specified by SIH2) in which social identification with care home residents is mediator of the relationship between the social support that residents receive and their quality of life.

Note: * $p < .05$, # $p < .10$.

Table 1. Residents' self-reported perceived social support, identification, well-being and recorded GP calls (Means and Standard Deviation, N=42)

<i>Measures</i>	<i>Intervention</i>	<i>Time</i>		<i>F-values</i>		
		T1	T2	Inter.	Time	Int x Time
(a) Perceived Social Support	Water Club	3.69 (0.90)	4.12 (0.87)	1.10	0.56	1.10
	Water Solo	3.57 (1.26)	3.66 (1.04)			
	Club Control	3.00 (1.77)	3.30 (1.56)			
	Solo Control	4.12 (0.68)	4.18 (0.79)			
(b) Social Identification	Water Club	4.26 (0.58)	4.00 (0.98)	1.19	0.49	0.28
	Water Solo	3.72 (1.14)	3.56 (1.13)			
	Club Control	3.70 (1.15)	3.70 (0.95)			
	Solo Control	4.18 (0.79)	3.85 (0.94)			
(c) Quality of Life	Water Club	4.03 (0.77)	3.76 (0.94)	1.77	0.93	0.37
	Water Solo	3.29 (0.94)	3.18 (0.81)			
	Club Control	3.44 (0.67)	3.60 (0.91)			
	Solo Control	3.62 (0.96)	3.51 (0.87)			
(d) GP calls	Water Club	0.84 (1.72)	0.53 (1.12)	2.08	3.45	0.30
	Water Solo	2.18 (1.60)	1.27 (1.67)			
	Control Club	1.70 (1.63)	1.40 (1.07)			
	Solo Control	1.70 (1.63)	0.62 (0.74)			