Time Banking and Health: The Role of a Community Currency Organization in Enhancing Well-Being

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Time banking is an international movement that seeks to transform traditional asymmetric social service models into social networks in which members both provide and receive services that are assigned equal value. Time banks have been shown to enhance social capital, and there is some evidence for improved health. This article, based on a survey of 160 members of a hospital-affiliated time bank, examines the likelihood and predictors of improvement in physical and mental health as a result of membership. Men, people with lower income, and those who were not working full-time reported highest levels of participation in exchanging services; attachment to the organization was greatest among women, older members, people with less education, and those with the highest participation levels. Multivariate analyses revealed that physical health improvement attributed to membership was significantly predicted by attachment to the organization and living alone; mental health gains were predicted by general health changes, average number of exchanges, and attachment to the organization. We conclude that a sense of belonging, a dimension of social capital, is key to improved well-being and that time banking may be particularly valuable in promoting health and belonging among older and lower-income individuals and those who live alone.

Keywords: *time banking; health; mental health; community currency*

An innovative program called time banking has grown into an international movement that challenges the traditional social service model by creating an environment in which everyone's work has value and organizational members can help others as well as themselves. Time banks are intended to reduce members' dependence on the conventional monetary system and on traditional social services by

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creating a social network in which members can exchange services. In this type of system, all work, whether it be lawn mowing or medical care, has equal value; services are valued only in terms of the time spent doing them. Unlike typical barter arrangements, a member can provide a service to one person and receive a service from someone else in the network. There are also many opportunities to exchange services with the organization itself, such as through attending classes or helping in the office. A central database (the "bank") records hours accrued by services provided and hours spent by services received (Cahn, 2004). Time banks function as strategies of informal employment, providing the jobless with a means to develop skills, build contacts, and contribute to society (Seyfang, 2001, 2003; Seyfang & Smith, 2002). Time banks have also been shown to foster social capital by integrating socially isolated groups into broader networks (Collom, 2005, 2008b; Seyfang, 2002).

It has been well established that social capital, social cohesion, social support, and social networks can all have a significant impact on individual health, physical activity, and well-being (Bailis & Chipperfield, 2002; Keyes et al., 2005; Lasker, Egolf, & Wolf, 1994; McNeill, Kreuter, & Subramanian, 2006). Yet in spite of the fact that a number of time bank organizations are affiliated with medical care providers and are designed explicitly to reach out to isolated individuals, there has been little research to document the effects of time bank membership on individual health. Thus, they offer an opportunity to examine whether this type of intervention, which focuses on building social capital, can have a positive and measurable impact on the physical and mental health of its members. That is the primary purpose of the current study, a survey of 160 members of a hospital-based community currency organization that examined the impact of membership on physical and mental health.

BACKGROUND

Social Capital, Social Support, and Health

Seeman's review of the literature (1996) concludes that social integration, particularly when the quality of relationships is good, is related to reduced mortality and improved mental health, as well as recovery from illness, whereas social isolation and poor social relationships are associated with worse health outcomes. Berkman, Glass, Brissette, and Seeman (2000), drawing on the intellectual traditions of Durkheim and Bowlby, elaborate on the mechanisms by which successive layers of the social environment might affect health. They develop a conceptual model that describes a "cascading causal process beginning with the macro-social to psycho-biological processes that are dynamically linked together to form the processes by which social integration effects health" (p. 846).

Similarly, Kawachi and Berkman (2001) concluded in their review that social ties are generally conducive to better mental health and possibly to improved cognition among elderly people. Yet they also acknowledge the methodological limitations in establishing the

causal direction of relationships among these variables as well as the variation in benefits by social group. An important example of the latter is that those who are most embedded in networks that impose restrictive norms or burdensome social obligations—more often women—may experience worse mental health (Kawachi & Berkman, 2001). De Silva, McKenzie, Harpham, and Huttly (2005) point out that it is misleading to conflate different types of social capital in positing effects on individual well-being; they conclude from their review that individual-level "cognitive" social capital—interpersonal trust and norms of reciprocity—is related to improved mental health, whereas the evidence for the impact of more macro-level "ecological" social capital is not as convincing. Yamaoka, in an East Asian study (2008), also found a greater effect of cognitive dimensions of social capital in explaining fewer somatic symptoms and improved health satisfaction.

Given the complexity of the concepts involved as well as the challenges of measuring the impact of different aspects of an individual's social environment, many questions remain about how best to design interventions that might increase social capital or expand social networks in order to influence physical and mental health outcomes in a positive way (De Silva et al., 2005; Kawachi & Berkman, 2001).

Time banks have been successful in building social networks and social capital (see Collom, 2008b; Marks & Lawson 2005), without the potentially burdensome obligations that arise out of traditional family and community networks. Yet their impact on members' health and well-being has not been well explored. There are a few important exceptions. One study of a British time bank showed an increase for many members in self-confidence and a decrease in taking antidepressant medication (Seyfang, 2005). Another British study, of a time bank based in a medical group practice (New Economics Foundation [NEF], 2002), concluded that membership in the organization led to enhanced self-esteem, provided relief for caregivers of ill patients, offered support for members addressing health challenges, and improved the relationships of health practitioners in the practice to their patients. Other recent British reports (Boyle, Clark, & Burns, 2006; NEF, 2008) describe several time bank programs that were designed to enhance health and mental health; they concluded based on interviews with members and staff that there were improvements resulting from the programs, including reduction of medications and hospitalizations and increased well-being, fitness, and energy. These effects were attributed both to reduced isolation and to specific health-related programs such as healthy produce co-ops, smoking cessation classes, patient support activities, and group exercise activities.

In the United States, New York City's Elderplan, a social health maintenance organization that created the member-to-member time bank, surveyed 167 members and found that many believed that the program enabled them to stay independent in the community. In a comparison to Elderplan members who did not belong to the M2M program, those who did belong reported better mental health and less loneliness at follow-up interviews despite having the same levels of mental health and loneliness as nonmembers at baseline (Kyriacou & Blech, 2003).

Aside from these few reports, there is no other research that examines health effects of participation in time bank organizations. There is a great need for more systematic investigation not only of whether there is an effect on members' overall well-being but also what aspects of membership are most likely to contribute to such effects.

The Time Bank Movement, Nationally and in the Lehigh Valley, Pennsylvania

The time banking concept, originated by Edgar Cahn in 1980, was designed to make social service recipients into "coproducers" of the services they receive, by also providing services that others need (Cahn, 2004). The earliest programs were launched in the mid-1980s in the United States and were known as "service credit" banks. These agency-based programs were mostly intragenerational, recruiting older persons to help other older people remain independent and in their homes (Coughlin & Meiners, 1990; Meiners, Treat, & McKay, 1996). Individuals earn Time Dollars for each hour they spend helping someone else, which can in turn be used to "purchase" services from others in the network. Other contemporary forms of local currencies include Local Exchange and Trading Systems (LETS) and Hours networks, such as Ithaca Hours in upstate New York (see Collom, 2005; DeMeulenaere, 2006; Meeker-Lowry, 1996).

The Lehigh Valley in Pennsylvania, a metropolitan area of more than 600,000 people approximately 60 miles north of Philadelphia, is home to Community Exchange (CE). CE began in 1999 as an initiative of the Lehigh Valley Hospital Department of Community Health, in collaboration with representatives of 12 other nonprofit community organizations. They sought to create a community currency system that would be available to individuals throughout the area and that would especially attract people who were poor, disenfranchised, and isolated. The goals were to improve individual health by connecting people through the sharing of skills and services, to strengthen the community, and to build trust through individual exchanges,

social gatherings, classes, and community projects (Letcher, Perlow, Marcon, & Rogers, 2005).

CE has been funded by the Dorothy Rider Pool Healthcare Trust. A staff of three full-time employees—a Program Manager, Membership Coordinator, and Data Coordinator (currently supplemented by AmeriCorps VISTA volunteers)—makes it possible to recruit new members, maintain the database of individual exchanges, and create a wide variety of communal activities. Examples of such activities include pot-luck dinners, classes in tai chi and Spanish, "days of abundance" to which members bring unwanted clothes and household items and take away whatever they want, and affiliations with local nonprofit organizations that result in activities such as ushering plays in exchange for tickets or receiving medical care in exchange for helping in a clinic. At the time of the study reported here, there were approximately 340 members.

Research Questions

A main concern of this research is to determine the extent to which participation in time banking produces health benefits. In addition, we sought to identify the demographic and membership characteristics that contributed most to health gains. Third, we asked whether "cognitive social capital," the sense of belonging to a collectivity of trust and reciprocity (De Silva et al., 2005), contributes to health benefits or if it is the number and frequency of exchange activities. To answer these questions, we explore associations among demographic characteristics, levels of participation in CE, attachment to and identification with the organization, and effects on health. Who are the most active traders? Who identifies most with and has the greatest attachment to CE? Do these characteristics relate to health changes?

METHOD

Participants and Procedure

Drawing on the participatory action research model (Greenwood, Whyte, & Harkavy, 1993), CE staff and members collaborated with the investigators in the design and implementation of the survey. Approximately 10 members and staff met with the research team to identify project goals, and several members as well as the staff contributed to the design and pretesting of the survey instrument. After approval by Lehigh University's institutional review board, the survey was sent to all members of the CE network (340 people) in March 2006. Each survey was labeled with a unique identifier so that the incentive of two Time Dollars could be credited to the accounts of the respondents. Members were given the option of returning the survey by mail, responding online via www.surveymonkey.com, being interviewed by phone, or completing the survey in person at the CE office. One hundred sixty members (47.1%) responded to the survey; 141 filled out a hard copy, most of them returning it by mail, and 19 responded online. None chose to be interviewed by telephone.[1] In addition to the survey data, we were also granted access to the time bank's database, which contains the transaction records. These were linked to survey responses by member identification number.

Measures

The survey incorporated a combination of previously published instruments and original questions created for the current study. They included the following topics and measures pertinent to this report.

Demographic information. We asked standard questions about gender, age, race, income, household characteristics, and employment.

Participation in CE. We have two different sources for measuring participation. The first is the CE membership database, from which we extracted the records of those members who had participated in the survey. The database allowed us to calculate the length of time (in quarters) that participants had been members at the time of the survey. We also used the record of transactions to construct a measure of participation, which is the average number of quarterly recorded transactions. These were recoded into five categories: 1 or less, 2 to 3, 4 to 8, 9 to 20, more than 20.

The second measure of participation was derived from questions posed on the survey that asked how often in the past 12 months participants had provided services, and how often they had received services, with five possible answers: once a week or more, a couple of times a month, once every month or two, a few times per year, and once a year or less. Thus, we have four different ways of assessing participation: *length* of membership, *number* of transactions that were recorded in CE's database over the course of membership, and participants' perception of *frequency* of providing and receiving services in the past year.

Identification with and attachment to community exchange. The Collective Self-Esteem Scale was developed by Luhtanen and Crocker (1992) to measure individuals' identification with and evaluation of the social groupings they are part of, such as religion, race, and gender. We selected one of its four subscales—importance

to identity—that seemed most pertinent in examining an individual's identification with an organization (Ervin, 2001). The Community Attachment Scale was developed by Theodori (2004) to measure local sentiments and social bonds and was used to assess members' attachment to CE. These previously published instruments have not been used in any previous studies of local currency groups. Appendix A provides the text of the items as well as descriptive statistics for both scales; Cronbach's alpha for these scales (.82 and .91, respectively) indicate that they have good internal consistency reliability in this sample.

Health benefits. We asked participants to assess the impact of membership in CE on their physical and mental health (on a 5-point scale from *worsened a lot* to *improved a lot*, with *stayed the same* as a midpoint); these variables are labeled "physical health gains" and "mental health gains." Because some respondents had been members for more than 6 years, it is possible that some have experienced health changes across the period independent of their involvement with CE; we therefore constructed a simple, general health change measure to serve as a control variable. The widely used one-question self-rating of health ("In general, my health is . . . ," with five choices ranging from *excellent* to *poor*) was posed for both the present and, relying on a retrospective pretest design (Campbell & Stanley, 1963), for the time before joining CE;[2] the difference between the two was computed as a measure of "general health change" and introduced as a control variable in the analyses.

Analysis

We begin by exploring bivariate associations among demographic characteristics and levels of participation in CE to determine who is the most active in the system. Six demographic variables (sex, age, income, education, living alone, and full-time employment status) are tested for their association with the four indicators of engagement (length of membership, average number of recorded transactions, reported frequency of providing, and reported frequency of receiving). Next, we use all 10 of these variables as predictors of attachment to CE and identification with CE. Four different bivariate statistical tests (chi-square, Pearson's *r*, *t* test, and *F* ratio) and their appropriate effect sizes are used in accordance with the levels of measurement of the variables. Similar exploratory bivariate testing was conducted with the 12 previously identified variables (see Appendix B) used as predictors of physical health gains and mental health gains. Because of the exploratory nature of these analyses, no multiple comparison adjustment was made.

Finally, the determinants of these health gains are explored through logistic regression models, introducing "general health change" as a control. Only those variables having bivariate effects on physical or mental health gains are included in the regressions. There is one exception. Although all three engagement variables (average number of recorded transactions, reported frequency of providing, and reported frequency of receiving) influenced at least one of the health gain variables, only the average number of transactions variable did when all three were used simultaneously in the regression models. These measures of participation are intercorrelated, creating a multicollinearity problem in the regression models. The average number of recorded transactions variable might be considered more "objective," and it also reflects a longer history of participation. Therefore, only that measure is included in the multivariate models. Multicollinearity was not an issue in the final models, and all of the assumptions of logistic regression were met. A p level of .05 was used as the criterion of significance for all analyses.

RESULTS

Demographic Information

Characteristics of the sample are reported in Table 1.[3] The sample was similar to the overall membership of CE (as collected in administrative records at the time of the study); they differed in the sample having significantly more women and fewer people under 45 years of age. When compared to U.S. Census data for the population of Lehigh County, where most members live, survey participants were significantly more likely than the general population to be female, older than 65, more educated, and living alone. The gender disparity has been documented in other studies of local currencies as well (Collom, 2008b; Seyfang & Smith, 2002; Williams et al., 2001). One third of the sample was older than 65, compared to 15.2% of the county. Most also had lower incomes than the population of the county, which in 2004 had a median household income of $46,015, compared to the median response from CE members being in the $25,000 to 35,000 range. Because there was very little variation in race in the sample (four people checked each of the categories of African American, Latino, Asian, and other), it is not included in further analyses.

Participation in CE

The organization's database indicates that the average survey respondent had been a member for more than 3 years (12.79 quarters with a range from 1 to 25; see

TABLE 1
Sample Characteristics Compared to Membership and County Distributions (one-sample *t*-test results; *n* = 160)

	Sample, %	*Membership, %*[a]	*Lehigh County, %*[b]
Gender			
Female	83.1	76.0*	52.8***
Age, years			
<45	11.9	17.0*	60.0***
45-64	53.7	50.0	24.8***
≥65	34.4	33.0	15.2***
Race			
White	90.0	89.0	87.4
Household			
Lives alone	43.8		27.1***
Education			
BA degree or higher	52.5		26.7***

a. Obtained from the Community Exchange database.
b. U.S. Bureau of the Census 2006 American Community Survey.
*$p < .05$. ***$p < .001$.

Appendix B). About 13% had been members for 1 year or less and 22.5% had participated for 5 or more years. The key measure of engagement in a local currency group is the number of transactions (providing or receiving services) completed. Each individual's average *number* of recorded transactions per quarter was computed from the CE database to control for the time bias of a total transactions measure (the longer people are in the system, the more transactions they have been involved in). Our categorical variable indicates that one quarter of respondents are involved in an average of 1 or fewer transactions per quarter, 23.8% engage in 2 to 3, 20.6% complete 4 to 8, 15.0% are involved in 9 to 20, and 15.6% complete more than 20 transactions in an average quarter.

With regard to the measure of *frequency* of participation in the past year, participants reported that they provided services, on average, more often than they received them. Thirty-eight percent provided services at least once every month or two, compared to 25% who received services at least once every month or two. A substantial portion of the membership was not very active; 44.2% reported receiving services once a year or less, whereas 34% provided services once a year or less. Of the 127 people who listed the types of services they provided, the most frequent responses were transportation (31%), household help (moving, gardening, maintenance: 31%), personal services (sewing, massage, photography, prayer: 28%), and companionship (25%). Of the 103 people who listed services they receive, the most frequent responses were household services (30%), educational programs (exercise, cardiac pulmonary resuscitation, sign language: 25%), transportation (20%), and companionship (18%).

Health Benefits

For the present self-rating of general health, 41.3% of the respondents reported having very good or excellent health, 34.4% described it as good, and 24.4% reported being in fair or poor health. When current health status was compared with the retrospective report of health prior to joining CE, the results showed that 9.4% had experienced a diminishing of health since joining, 81.3% showed no change, and 9.4% indicated improved general health.

When asked specifically about changes due to CE membership, nearly one fifth (18.1%) reported physical health gains and nearly one third (32.5%) reported mental health gains because of their participation in CE. The majority of respondents reported that their physical and mental health had "stayed the same" (78.8% and 66.3%, respectively) and very few reported any worsening (3.2% and 1.3%, respectively). Therefore, the outcome variables—gains in physical and mental health due to membership in CE—were recoded into dichotomous variables, to separate out those whose health improved from those for whom it did not.

Respondents were asked in open-ended follow-up questions to explain any changes; the two most commonly cited reasons for improved physical health were increased social interaction (e.g., "Making social contacts and additional contributions to the community improves my mood and fills the gaps in my social life and friends network; this improves physical feelings.") and classes offered through CE, specifically tai chi and exercise classes. Those who reported an improvement in their mental health as a result of CE membership most often cited the social aspect and the opportunity to serve others as the two main reasons they felt that their mental health had improved. One member commented: " . . . through comm. exchange I know there are people to see and things to get involved in when I'm able. It gives me *hope*." Another wrote, "I feel good about helping to create CE and see the wonderful impact it has in our community—AND the *HUGE* potential remaining!" Other responses indicate that CE had a positive effect on members' feelings about themselves and on their sense of belonging to a community. Their comments included "It's the best thing that could

TABLE 2
Summary of Bivariate Results: Transaction Variables by Demographic Predictors (n = 160)

	Test Statistic (effect size)	*Average No. of Recorded Transactions*	*Reported Frequency of Providing*	*Reported Frequency of Receiving*
Sex	χ^2 (Cramer's V)	5.34 (.18)	7.93* (.22)	10.53* (.26)
Income	χ^2 (γ)	26.41* (–.16)	17.07 (–.11)	26.84** (–.30)
Full-time employment	χ^2 (γ)	9.20 (.46)	10.91** (.47)	1.64 (.24)

*$p < .05$. **$p < .01$.

have happened to me!!! I am beginning to come out of my shell, I like being the person I used to be," and "I felt an increase in self-esteem and increased enthusiasm about the future."

Demographic Differences in Participation

Three of the six demographic variables tested—sex, income, and full-time employment—were significantly associated with at least one of the four indicators of participation; age, living alone, and education were unrelated to any of the indicators of participation (see Table 2). Sex was a significant determinant of both the reported frequency of providing and receiving services; men in the sample both provided and received services significantly more often than the women. More than half (59.2%) of the male respondents reported that they provide services at least once every month or two compared with only 32.3% of female respondents. As far as receiving services, 40.7% of men receive at least every month or two whereas only 21.1% of women reported doing so. This difference was not found in the database of recorded transactions, perhaps indicating a difference in the likelihood of recording services or the different metric used for the two measures.

Family income was significantly related to two of the participation variables. First, those with lower household incomes have a higher number of recorded exchanges: 23.3% of those in households earning less than $15,000 per year participate in 20 or more transactions per quarter compared to 18.4% of those in the $15,000 to $34,999 range, 7.7% of those in the $35,000 to $74,999 range, and 4.8% of those earning $75,000 or more. Although income is not associated with the self-reported frequency of providing, those with lower incomes report receiving services more often: 44.2% of those in the less than $15,000 group receive services at least every month or two. This is a considerably higher rate than those in the $15,000 to $34,999 range (15.8%), the $35,000 to $74,999 bracket (12.8%), and the $75,000 or more range (14.3%).

Of all of the employment status categories, only one had any impact on any of the participation variables. Those who are employed at full-time jobs provide services less often in the CE network. Although 38.8% of those not employed full-time provide services at least every month or two, only 23.8% of those who are full-time employees do so. This may simply reflect the "time bind" that many full-time workers face.

Demographic and Participation Differences in Identification/Attachment to Community Exchange

As summarized in Table 3, three of the six demographic variables are associated with CE attachment and/or CE identification. Female respondents report a higher level of attachment to CE, and age is significantly associated with both attachment and identification. The analysis of variance post hoc least significant difference results for both scales indicate that the key difference is between members aged 75 or higher and the rest of the membership, with the oldest participants more attached to and having greater identification with CE. Those with a high school education or less are significantly more attached to CE than those who have college experience. Income, full-time employment, and living alone are unrelated to these measures.

With regard to participation variables, length of membership is unrelated to either identification or attachment. With the additional exception of the nonassociation between reported frequency of providing and CE attachment, the participation variable results are consistent and positive in direction. Those who are more active in the system report higher degrees of attachment to and identification with Community Exchange.

TABLE 3
Summary of Bivariate Results:
CE Attachment and Identification by Demographic and Transaction Predictors (n = 160)

	Test Statistic (effect size)	*CE Attachment*	*CE Identification*
Sex	t (Cohen's d)	–2.15* (.56)	–1.02 (.26)
Age	F ratio (partial η^2)	2.97** (.09)	3.19** (.09)
Education	F ratio (partial η^2)	2.94* (.05)	2.11 (.04)
Average no. of recorded transactions	F ratio (partial η^2)	4.24** (.10)	5.76*** (.13)
Reported frequency of providing	F ratio (partial η^2)	1.74 (.03)	5.70*** (.10)
Reported frequency of receiving	F ratio (partial η^2)	8.40*** (.14)	7.25*** (.12)

NOTE: CE = Community Exchange.
*p < .05. **p < .01. ***p < .001.

TABLE 4
Summary of Bivariate Results: Physical and Mental Health Gains by Demographic, Transaction, Attachment, and Identification Predictors (n = 160)

	Test Statistic (effect size)	*Physical Health Gains*	*Mental Health Gains*
Living alone	χ^2 (γ)	6.82** (.50)	3.19 (.29)
Average no. of recorded transactions	χ^2 (γ)	15.13** (.41)	18.06*** (.46)
Reported frequency of providing	χ^2 (γ)	10.78** (.41)	11.00** (.34)
Reported frequency of receiving	χ^2 (γ)	13.23** (.47)	10.76** (.36)
CE attachment	t (Cohen's d)	–4.63*** (.96)	–5.01*** (.85)
CE identification	t (Cohen's d)	–4.21*** (.87)	–4.68*** (.79)
General health change	χ^2 (γ)	15.50*** (.33)	17.28*** (.46)

NOTE: CE = Community Exchange.
**p < .01. ***p < .001.

Predictor Variables' Association With Physical and Mental Health Gains

Analyses of the 12 predictor variables and the "general health change" control variable in relation to health gains revealed that reports of physical or mental health benefits due to CE membership were unrelated to either length of membership or to any of the demographic variables except living alone. Thus males and females, young and old, people with higher and lower socioeconomic status, and old and new members were all about equally likely to report improvements in their physical or mental health attributed to membership. The six variables that *were* significantly associated with health gains, both physical and mental, were general health change in a positive direction, higher scores on the three frequency of participation measures, and higher scores on the attachment and identification scales (see Table 4). The striking impact of participation can be seen in the fact that 44.0% of those who recorded 20 or more average transactions per quarter reported improved physical health gains, compared to only 10.0% of those who recorded 1 or less per quarter. Mental health gains show a similar pattern—60.0% of those with more than 20 transactions reported improved mental health, compared to 12.5% of those who had 1 transaction or less per quarter.

Multivariate Analysis

As the reader will recall, the chief objective of this research is to ascertain the extent to which time banking produces health benefits and to identify the determinants of physical and mental health gains. The general health change variable is intended to capture health changes across time independent of the respondent's involvement in CE. In this sense, general health change is a particularly nice control variable when considering the other predictors. As noted above, frequency

TABLE 5
Odds Ratios and 95% Confidence Intervals From the Logistic Regression of Physical and Mental Health Gains on General Health Change, Average Transactions, CE Attachment, and CE Identification (n = 160)

	Physical Health Gains			*Mental Health Gains*		
	OR	*Lower CI*	*Upper CI*	*OR*	*Lower CI*	*Upper CI*
Living alone	2.69*	1.05	6.91	1.54	0.71	3.32
General health change	2.21	0.84	5.81	3.06*	1.23	7.58
Average no. of recorded transactions	1.29	0.92	1.82	1.37*	1.03	1.83
CE attachment	1.11*	1.01	1.22	1.09*	1.01	1.17
CE identification	1.07	0.95	1.19	1.06	0.97	1.16
–2 log likelihood	116.63			159.58		
Cox & Snell R^2	.196			.232		
Nagelkerke R^2	.320			.324		

NOTE: CE = Community Exchange.
***p < .001, **p < .01, *p < .05; two-tailed tests.

of providing and frequency of receiving were not included, because preliminary analyses showed average number of quarterly transactions, which is highly correlated with the other two variables (Pearson's r = .626 and .511, respectively) to be a better predictor of health gains.

Table 5 contains both models. In the model for physical health gains, there are two statistically significant predictors. The odds of those who live alone reporting physical health gains are 2.69 times greater than the odds of those who are living with others. Also, those who report greater attachment to CE are more likely to report physical health gains. The large confidence interval width for the living alone variable indicates that this estimate is not very precise and a strong conclusion cannot be reached from this data set. Although there is an association between living alone and physical health gains, the relationship could be fairly trivial (the lower end of the confidence interval is very close to 1.0) or it could be very important given the large value of the upper end of the confidence interval. The Cox and Snell and Nagelkerke R-squares at 19.6% and 32.0% indicate that this model is fairly robust.

The mental health gains model is slightly more robust than the one on physical health gains. General health change, average number of transactions, and attachment to CE all have positive effects on reporting mental health gains. The odds of those who have had general health improvements reporting that they have experienced mental health gains due to CE are 3.06 times greater than the odds of those who did not report any general health improvements. Again, the large confidence interval width here indicates that this estimate is not very precise. In the next section, we interpret these findings, which are a unique contribution to the existing literature.

DISCUSSION

CE of the Lehigh Valley has enrolled a diverse group of community members. They are more likely than the surrounding population to be female, older, educated, low-income, and living alone. Approximately half of the total sample indicated that their health is less than *very good* or that they have a specific health concern or disability. CE does appear to attract and involve some hard-to-reach populations, such as the economically disadvantaged, disabled, and elderly that typically are underrepresented in volunteer programs. It is likely that the organization thrives in part because it also attracts many members who are highly educated and physically and mentally well. Although individuals join for a host of different reasons, the mutual reciprocity and learning that comes from having personal interactions with people one would not usually interact with drives community building and, for some members, has health benefits as well.

Our first research question asked about the extent to which participation in time banking produces health benefits. In this sample, almost one in five believe that their membership has led to improved physical health, and one in three believe that it is has led to improved mental health.

Our second research question addressed the demographic and membership characteristics that contribute

most to health gains (see Table 4). The only demographic variable significantly related to health gains was living alone; people who live alone were more likely to report physical health gains as a result of membership. Participation as well as attachment and identification were the key factors in health gains. Members who record greater numbers of transactions in the database and also report providing and receiving services most frequently in the past year are more likely to say that their physical and mental health improved as a result of membership. Those who are most attached to and identified with CE are also most likely to report both physical and mental health improvements. Finally, those whose general state of health before joining and at the time of the survey showed an improvement were more likely to attribute improvements to membership.

Finally, we were interested to know if health benefits of membership are to be attributed specifically to participation activities or to the sense of belonging in a collectivity of trust and reciprocity (cognitive social capital). The results of the logistic regression analysis highlight the importance of the latter in predicting both physical and mental health gains. Along with living alone, attachment to CE is the only significant predictor of physical health gains. Along with general health change and average number of transactions, attachment also predicts mental health gains. These findings suggest that respondents' feeling of connectedness to the organization, more than the number of specific transactions, leads to the perception of an improvement in physical health due to membership. Improvement in mental health reflects both feelings of attachment and actual transactions. These are important findings; the fact that those who report gaining physical health benefits from participating in CE are highly attached to this organization, above and beyond the specifics of their transactions or any general health changes that occurred since they joined, suggests that this is a lot more than just a service exchange network. These participants are joining and creating a new community.

In addition to answering these key research questions about health gains, the study results reveal important information about patterns of participation in and attachment to this time bank.

With regard to demographic differences in participation, it is noteworthy that lower income time bankers have been found to be more active, consistent with Collom's (2007) finding that those with annual household incomes less than $20,000 have a higher number of average transactions. Presumably, low-income participants are likely to be in greater need, but they also are significantly less likely to be working full-time ($\chi^2 = 9.855$, $p = .020$, $\gamma = -0.542$, $df = 140$) and thus may have more time available. Overall, those who work full-time were found to provide services less often than others. We also found that men are more active than women, both in receiving and in providing services. These gender differences are novel results; although there are only a few studies, previous research on local currency groups has found no association between gender and transaction frequency (see Collom, 2008a).

Another notable finding, not included in the tables, is that those who have been members of CE for a longer period report fewer average transactions per quarter (Pearson's $r = -.22$, $p = .006$, $df = 159$). This is the opposite of what has been found elsewhere. In case studies of a different U.S. time bank, a positive association between participation length and average transactions has been documented (Collom, 2007, 2008b). Perhaps there is a novelty effect that produces greater engagement in the early phase of involvement. Another possibility is that longer-term members continue to exchange but are less likely to record their activities; their established interactions become integrated into their lives and they do not perceive them as services that earn credits. This possibility is suggested by the data: 77.8% of those who have been members less than a year say that they report exchanges just about all the time, compared with only 54.5% of those who have been members for more than 3 years.

Overall, higher levels of participation are, not surprisingly, strongly related to attachment to and identification with CE. Yet this is not the case when looking at subgroups separately. Thus, although age was unrelated to frequency of transactions, attachment to CE was greatest among the oldest respondents. And although men exchanged more often than women, attachment was greater among women. The gender difference in attachment may be partially attributable to the composition of the network's members; men make up less than one quarter of the membership and may feel less attached because of this. It is also possible that men consider their connection to CE in a more instrumental fashion or that the wording of the items is more likely to elicit agreement from women.

Attachment to and identification with CE were highest among low-income, less educated, and older participants. These findings appear to be a positive reflection of CE's mission; those who presumably are in the greatest need and have fewer opportunities in society are most likely to be connecting with the organization. Because the oldest members of society face greater risks of isolation and poor health, we also view the finding

that they are most attached to and most likely to identify with CE very positively.

We found from a variety of other indicators not reported in this article's results that member attitudes toward and experiences with CE were very positive. In addition to members reporting that their involvement with CE has positively affected their physical health (18.6%) and mental health (33.3%), more than half of the respondents (51.2%) reported that their level of social support had increased a little or greatly as a result of membership in CE. In addition, in comparing participants' ratings of their self-efficacy before joining CE and again at the current time, we noted that 29.4% had increased scores. These findings from CE are also supportive of the idea that participation in a time bank organization can contribute to overall well-being (Lasker et al., 2006).

Limitations

Some limitations of the study include lack of more information about how nonrespondent members differ from the respondents. There is also the possibility of a social desirability effect in responses to questions about how participating in CE affected physical and mental health, particularly among those who are most committed to the organization.

Of course, the direction of causality among participation, attachment, and health gains is difficult to determine. For example, one could conclude that those who participate more are more likely to *perceive* a positive effect on their well-being; this could be interpreted as a form of placebo effect. Yet it has been widely demonstrated that such effects work in improving overall well-being (Beauregard, 2007; Koshi & Short, 2007; Meissner, Distel, & Mitzdorf, 2007), and it does seem clear that this is the case with CE membership as well. Because many people who join time banks are older and experiencing health problems, it would not be surprising to see some decline in health over time, especially among older members who have been members for several years. Yet the fact that just as many CE members reported gains in general health as reported declines is especially noteworthy. So is the belief on the part of some members that being involved with CE has improved their well-being.

Comments offered by survey participants to explain their answers about health changes suggest that social interactions fostered by CE may be contributing to improved health behaviors via enhanced self-efficacy and the concrete benefits of specific classes. Our findings are consistent with other studies that have found social interaction as well as peer influence to affect overall health and well-being, partly through changes in health-related behaviors (Berkman et al., 2000). Members also explicitly link social support and reduction of isolation to improved health. In addition, the opportunity to help others is identified by respondents as an important factor in their mental health.

Finally, there is a problem with focusing on recorded transactions; not all participants report all of their transactions to the office. Time bank coordinators are well aware that some members negotiate some exchanges with each other and do not report them to the office. This is often reflective of the fact that some members make deep friendships within the network and want to give without receiving any form of remuneration. As reported above, recording of transactions declines over time. Although the majority report their exchanges (60.7%) just about all the time, 12.7% responded that they rarely or never report transactions. Because we have more than one source of data on participation, we are able to address this limitation to an extent.

CONCLUSION

The results lend support to previous research on community currencies that documents increased social capital and health benefits. CE is serving its intended function of building social networks, providing a system of social support, and increasing self-efficacy, all of which appear to be contributing to the overall well-being of members. These gains are best explained by the average number of transactions and attachment to CE and are found more in people who live alone. The findings that attachment to the organization predicts health benefits and that members record fewer of their transactions over time both lend support to the idea that time banking contributes to valuable community-building and social ties.

Future research on time banking should examine changes in health status in greater depth and use initial membership as a time to collect baseline health data. The "rate your health" question can be asked at the time a person joins and then again at a follow-up. Because the one general health question has only five categories of response, it is less likely to show change than a measure such as the SF-12, which can also be easily administered at the time one joins (Ware, Kosinski, Turner-Bowker, & Gandek, 2002). Documenting health benefits of time banking will be valuable in seeking financial and organizational support, particularly from medical care organizations, as well as providing an additional motivation for community members to participate.

APPENDIX A

Survey Items, Identification with and Attachment to Community Exchange Scales

	M	*SD*
Identification with Community Exchange Scale Items (coded 1 = *strongly disagree* through 7 = *strongly agree*)		
Overall, Community Exchange has very little to do with how I feel about myself (reverse coded)	3.32	1.89
Community Exchange is an important reflection of who I am	3.75	1.75
Community Exchange is unimportant to my sense of what kind of person I am (reverse coded)	4.06	1.90
In general, belonging to Community Exchange is an important part of my self-image	3.95	1.66
Identification with Community Exchange Scale (α = .82)	14.96	5.95
Attachment to Community Exchange Scale Items (coded 1 = *disagree strongly* through 5 = *agree strongly*)		
Overall, I am very attached to the Community Exchange	3.15	1.25
I feel like I belong in the Community Exchange	3.67	1.05
The friendships and associations that I have with other people in the Community Exchange mean a lot to me	3.60	1.12
If the members in CE were planning something, I'd think of it as something WE were doing rather than THEY were doing	3.19	1.22
If I needed advice about something I could go to someone in the Community Exchange	3.32	1.20
I think I agree with most members in the Community Exchange about what is important in life	3.42	0.97
I feel loyal to the members of the Community Exchange	3.67	0.99
I plan to remain a member of the Community Exchange for a number of years	4.35	0.88
I like to think of myself as similar to other members of the Community Exchange	3.34	1.08
The future success of the Community Exchange is very important to me	4.31	.90
Attachment to Community Exchange Scale (α = .91)	36.01	7.89

APPENDIX B

Descriptive Statistics (n = 160)

	Minimum	*Maximum*	*M*	*SD*
Sex	1.00	2.00	1.83	0.38
Age (categories)	2.00	7.00	4.94	1.29
Income (categories)	1.00	5.00	2.59	1.33
Education (categories)	1.00	4.00	2.63	1.06
Employed full-time	1.00	2.00	1.87	0.34
Lives alone	0.00	1.00	0.44	0.50
Quarters participated	1.00	25.00	12.79	6.90
Health change	−1.00	1.00	0.00	0.43
Average no. of recorded transactions	1.00	5.00	2.73	1.40
Reported frequency of providing	1.00	4.00	2.24	1.12
Reported frequency of receiving	1.00	4.00	1.88	1.01
Attachment to Community Exchange Scale	10.00	50.00	36.01	7.89
Identification with Community Exchange Scale	4.00	28.00	14.96	5.95
Physical health gains	0.00	1.00	0.18	0.39
Mental health gains	0.00	1.00	0.33	0.47

NOTES

1. The distribution of all the demographic variables was compared for those who filled out a paper copy of the survey to those who completed it online. No differences were found. The demographic profile of both sets of respondents was equivalent. Moreover, we also included a survey type variable (hard copy vs. online) in the multivariate models. This variable never came close to approaching statistical significance and was therefore excluded from final analyses.

2. The use of one question for a global self-rating of health (GSRH) has well-established validity (see, e.g., DeSalvo, Fan, McDonell, & Fihn, 2005; Eriksson, Unden, & Elofsson, 2001).

3. Of the 29 variables used in these analyses, most had a few missing cases. Only 1 variable had eight missing cases, whereas all the others had five or fewer (and many had none). Listwise deletion resulted n the loss of 12% of the sample. Therefore, following Schafer and Graham (2002), it was determined that the missing data problem would be most accurately corrected using the maximum likelihood estimation procedure. Schafer's (1999) NORM software was used to produce these estimates. Descriptive statistics of all of the variables used in the analysis are provided in Appendices A and B.

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