

## ORIGINAL ARTICLE

# Does worksite social capital enhance retention into a worksite weight-loss programme?

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## Summary

### Objective

To determine if worksite social capital predicted retention in a worksite-based weight-loss programme using structural equation modelling. A secondary aim was to determine if worksite social capital was related to changes in weight at 6 months.

### Methods

Overweight or obese employees from 28 worksites enrolled in a larger 12-month worksite weight-loss trial. Workplace social capital was assessed using an eight-item scale specific to the workplace. Weight was measured using a HealthSpot<sup>tm</sup>, and change in weight was computed from weigh-ins at baseline and 6 months and reported as pounds (lbs) lost. Retention was defined as those employees who completed a weigh-in at 6 months.

### Results

Across the trial,  $N = 1,790$ ; age =  $46.6 \pm 11$ ; 73% women; 73% White overweight or obese employees participated. The odds of participant attrition were 1.12 times greater with each unit decrease in social capital score at baseline ( $p < 0.05$ ), and while the model testing the direct effect of social capital at baseline on weight loss at 6 months demonstrated acceptable fit, social capital was not a significant predictor of weight loss ( $p > 0.05$ ).

### Conclusions

Increased worksite social capital was predictive of retention in a worksite weight-loss programme. To maximize return on investments for employee wellness and weight-loss programmes, employers may benefit from understanding the facets of the 'social' environment such as social capital that may increase the likelihood of sustained participation.

**Keywords:** Retention, social capital, weight loss, worksite.

## Introduction

Obesity causes or worsens several chronic conditions such as diabetes, cardiovascular disease and some forms of cancer (1). Medical costs to treat this constellation of chronic conditions are rising dramatically (2), and these increased healthcare costs are borne in part by employers who provide medical insurance to employees. Thus, the workplace is a potential high-impact setting to promote weight loss through healthful eating and regular physical activity (3). The benefits of promoting healthy

weight loss through the workplace include unique opportunities for individual and environmental-level strategies while also providing a supportive social environment for employees trying to lose weight.

A number of research teams have attempted to leverage the opportunities for worksite weight-loss interventions, and the evidence confirms that these programmes, on average, lead to employee weight loss (3,4). Yet, the magnitude of effect varies broadly, and participant attrition is a common challenge with reported attrition ranges of 30% to 90% (5). Unfortunately, it is unclear what an average

attrition rate may be as these data are under-reported in the worksite weight-loss literature, and few studies report on factors that could be related to improved retention (5). These data are particularly important given the typically positive relationship between the magnitude of weight loss and participant retention over time (3,4). One emerging area of study is the role of 'social environmental' aspects of the worksite in either facilitating or reducing participant retention (6,7).

In the past decade, social capital has entered public health research as a potentially relevant determinant for a variety of health outcomes (8–10). Generally, social capital is grounded in concepts of shared values, trust, norms of reciprocity and the potential resources available to those within a given network (9,11,12). Worksites are important social settings as working adults spend a significant amount of their day at their jobs. Low worksite social capital is related to lower health status and increased odds of lifestyle risk factors (13–15). For example, Suzuki *et al.* found in a large sample of Japanese workers that low perceptions of trust and reciprocity among workers was related to low self-rated health after controlling for individual socio-demographics characteristics and lifestyle behaviours such as smoking, alcohol consumption and body mass index (13). In a longitudinal study, Vaananen and colleagues found increased odds for lifestyle risk factors such as smoking, heavy drinking and physical inactivity with lower baseline worksite social capital (15). Conversely, increased workplace social capital may be protective of general health and may encourage health-promoting behaviours (16,17). Sapp *et al.* found that higher workplace social capital buffered the relationship between job stress and smoking (16).

Despite the growing body of evidence linking worksite social capital to health outcomes, less is understood about the potential predictive ability of social capital on employee retention in worksite-based programming such as wellness or weight-loss programmes. The purpose of this brief report was to determine the relationship between worksite social capital and programme retention at 6 months in a worksite weight-loss trial for overweight/obese adults. A secondary aim was to determine if worksite social capital was related to changes in weight at 6 months.

## Methods

### Study design and intervention description

Study participants were from a large cluster-randomized controlled trial. In this trial, 28 worksites were randomly assigned to receive (i) an intervention that used modest financial incentives and content based on social cognitive theory to help initiate weight loss over 6 months, followed

by 6 months of relapse prevention and maintenance resources (IncentaHEALTH) or (ii) a minimal contact condition (Livin' My Weigh) providing participants with healthy eating, physical activity and weight-loss information through quarterly newsletters and group resource sessions over 12 months (16). Hence, the 6-month weigh-in was used as both a study assessment and as an intervention feedback point for all participants in the study. Eligible worksites employed 100–600 persons at a single location at which employees had access to the Internet and could provide a location for the weigh-in kiosk. Enrolled worksites agreed to make the programme available to all adult employees with a body mass index  $> 25 \text{ kg/m}^2$  who were free of serious health conditions and not currently participating in other weight-loss programmes. Participants in the study, regardless of experimental condition, lost a modest, but significant amount of weight at 6-month follow-up (18). Because of the lack of between group differences, all participants were included in the examination of the relationship between social capital, retention and weight loss. Virginia Tech Institutional Review Board approved the study.

### Measures

#### *Workplace social capital*

Workplace social capital was assessed using an eight-item scale specific to the work environment (14). Items were scored on a Likert scale, 1–5 and summed across the eight items (14). Higher scores indicate more positive perceptions of workplace social capital. After trimming two collinear items, the single-factor measurement model demonstrated acceptable model fit ( $\chi^2$  degrees of freedom (df) = 136.317(9), RMSEA(90% CI) = 0.090(0.077, 0.104), CFI = 0.978, SRMR = 0.028). Composite reliability was 0.921.

#### *Retention*

A dichotomous variable was computed for retention (0 = not retained or 1 = retained). Participants were classified as retained if they completed the initial weigh-in and the 6-month weigh-in. Participants that only completed the initial weigh-in were coded as not retained.

#### *Weight*

Weight was measured at baseline and at 6 months using a HealthSpot<sup>tm</sup> weigh station (16) and was reported in pounds. Weight loss was computed as the difference between weight at baseline and at 6 months, and was reported as pounds (lbs) lost.

*Analytical procedures*

All data were analysed using Mplus 7.11. All models were estimated with robust maximum-likelihood estimation to control for clustering within worksites. Initial path models were completed by intervention condition to determine if all data could be collapsed across randomization condition when determining the relationships between social

capital, retention and weight loss. Sample characteristics were compared across groups using logistic regression models, and structural equation models were specified to test the measurement model for social capital and structural models predicting subject retention and weight loss by baseline social capital. Equivalence of prediction of each outcome variable by social capital was tested between groups and genders using the Wald statistic

**Table 1** Sample descriptive and group comparisons using logistic regression models controlling for clustering within worksites

	Total sample <i>N</i> = 1,790 M(sd)	IncentaHEALTH group <i>N</i> = 999 M(sd)	Livin' My Weigh Group <i>N</i> = 791 M(sd)
Age*	46.6(11)	45.5(11.2)	48.1(10.1)
Baseline weight (lbs)	207.5(45.9)	205.8(44.8)	209.7(47.2)
Baseline BMI	33.3(6.5)	33.3(6.5)	33.4(6.5)
Baseline social capital score	29.9(5.8)	30(5.5)	29.8(6.2)
6-month weight (lbs)	203.8(44.9)	201.2(43.2)	207.2(46.8)
6-month BMI	32.6(6.3)	32.4(6.3)	32.8(6.4)
Weight loss (lbs)	2.4(11.4)	3.1(11.8)	1.6(10.8)
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Sex			
Female	1,312(73.3)	791(79.2)	521(65.9)
Male	430(24.0)	189(18.9)	241(30.5)
Ethnicity			
Hispanic or Latino	42(2.3)	19(1.9)	23(2.9)
Not Hispanic or Latino	1,528(85.4)	876(87.7)	652(82.4)
Not sure	107(6)	57(5.7)	50(6.3)
Race			
White	1,312(73.4)	703(70.4)	611(77.2)
Black or African-American	365(20.4)	246(24.6)	119(15)
Asian	12(0.7)	6(0.6)	6(0.8)
American Indian/Alaskan Native	9(0.5)	5(0.5)	4(0.5)
Native Hawaiian or Pacific Islander	2(0.1)	1(0.1)	1(0.1)
Not sure	4(0.2)	2(0.2)	2(0.3)
Other	33(1.8)	18(1.8)	15(1.9)
Education			
Grades 0–8	11(0.6)	3(0.3)	8(1.0)
Grades 9–11	22(1.2)	15(1.5)	7(0.9)
High School	243(13.6)	121(12.1)	122(15.4)
Some college	580(32.4)	363(36.3)	217(27.4)
College Graduate	603(33.7)	339(33.9)	264(33.4)
Post college work	284(15.9)	141(14.1)	143(18.1)
Annual household income			
Less than \$15,000	21(1.2)	12(1.2)	9(1.1)
\$15,000 to \$29,999	216(12.1)	134(13.4)	82(10.4)
\$30,000 to \$49,999	418(23.4)	242(24.2)	176(22.3)
\$50,000 to \$99,999	682(38.1)	376(37.6)	306(38.7)
\$1000,000 or more	382(21.3)	208(20.8)	174(22.0)
Retained for 6-month measurement			
Yes	1,219(68.1)	692(69.3)	527(66.6)
No	571(31.9)	307(30.7)	264(33.4)

\*Indicates significant group differences  $p < 0.05$ .

BMI, body mass index.

with expectations that such an effect would not differ according to group or gender. When expectations were supported, hypothesis testing continued using the combined sample. Model fit was evaluated using conventional absolute and relative fit indices (17). Available sample sizes were adequate for model tests (18). Critical z-scores (parameter estimate) were used to test significance of relations between variables ( $p < 0.05$ ). There was 2.5% missing data across social capital assessment at baseline.

## Results

A total of 1,790 employees were included in the analysis. All participants were overweight or obese per inclusion criteria. Sample descriptive and group comparisons by logistic regression are displayed in Table 1.

### Structural models for retention and weight loss

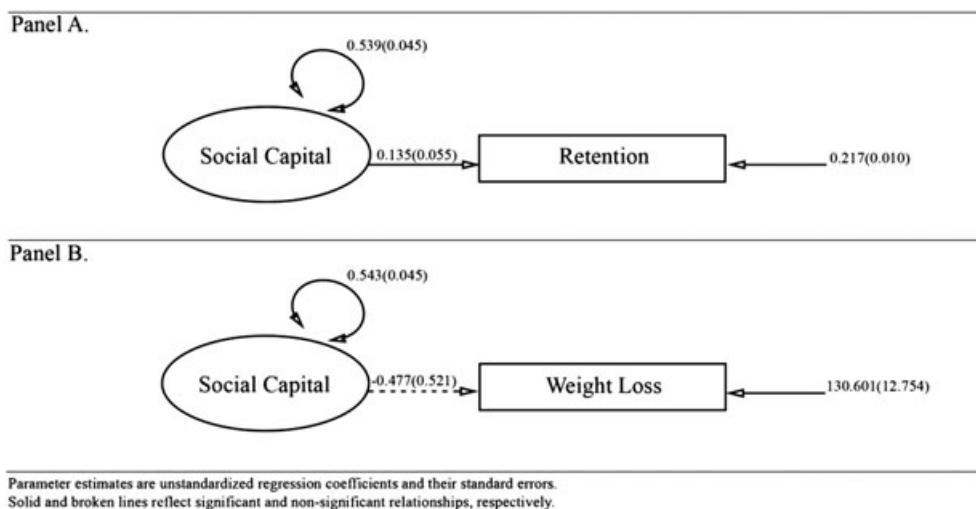
Path coefficients for the direct effect of social capital on retention did not differ between intervention groups ( $W = 0.037$ ;  $p = 0.847$ ), as a result, all participant data were used in subsequent models testing the relationships between social capital and retention. Similarly, path coefficients did not differ by gender ( $W = 0.175$ ;  $p = 0.676$ ). The model testing the direct effect of social capital on 6-month retention demonstrated acceptable model fit ( $\chi^2(df) = 165.097(14)$ ,  $RMSEA(90\% CI) = 0.079(0.068, 0.090)$ ,  $CFI = .974$ ,  $SRMR = 0.025$ ), and indicated a significant relationship between social capital and participant retention (Figure 1, Panel A) such that the odds of dropping out were 1.12 times greater with each single unit decrease in social capital score at baseline ( $p = 0.014$ ).

Social capital did not significantly predict weight loss differentially according to group ( $W = 0.146$ ,  $p = 0.702$ ) or gender ( $W = 1.563$ ,  $p = 0.211$ ). Further, logistic regression indicated that weight loss did not differ by group (odds ratio = 1.01) or gender (odds ratio = 0.99). The model testing the direct effect of social capital at baseline on weight loss at 6 months (Figure 1, Panel B) demonstrated acceptable fit ( $\chi^2(df) = 168.938(14)$ ,  $RMSEA(90\% CI) = 0.079(0.069, 0.090)$ ,  $CFI = 0.974$ ,  $SRMR = 0.025$ ), although social capital was not a significant predictor of weight loss ( $\beta = -0.031$ ,  $SE = 0.034$ ,  $p = 0.367$ ).

## Discussion

These data support the hypothesis that worksite social capital may be a factor for programme retention, and those workers reporting lower worksite social capital at baseline had increased odds of dropping out at 6 months. Our findings suggest that considering worksite social capital as a potential target for intervention may be appropriate when worksites are having difficulty retaining participants in weight-loss programmes. This aligns with the US Preventive Services Task Force that concludes there is room for improvement in understanding the factors that contribute to higher levels of sustained engagement by employees in worksite wellness opportunities (3). When worksites initiate changes in physical resources such as onsite workout facilities, locker rooms or other capital investments, it may be helpful to initiate strategies that enhance social capital in the worksite to support sustained use of these resources by employees and maximize the investment in worksite wellness (19–21).

These data also provide an area of future research related to the potential of interventions to appreciably



**Figure 1** Path models for prediction of 6-month outcomes by baseline social capital.

increase social capital. To date, much like the study we have presented here, there is an absence of published studies that are designed to test interventions to increase social capital in worksites. However, given the nature of worksites and team structure, a fruitful area for future research may be to develop and test strategies that focus on the concepts underlying social capital factors (e.g. shared values, trust and norms of reciprocity) to improve employee retention in weight-loss programmes. Targeting social capital through strategies that are intended to reduce voluntary employee turnover, bridging of structural holes within the workplace and focus on work-related structures, relationships across employees and departments and organizational goals are undoubtedly beneficial for work-based quality of life, but could also influence the degree to which employees engage in wellness programmes in a sustained way (22).

In contrast, social capital was not related to weight loss. Given our finding that social capital was related to retention, and that those with lower perceptions of social capital were less likely to return for a 6-month programme weigh-in – it is difficult to draw a strong conclusion from these data. Specifically, it is difficult to determine if those that did not return for the 6-month weigh-in were more or less successful than those that returned – although it could be hypothesized that participants that are less successful with weight loss may be less likely to return for follow-up. If this is the case, and participants with lower social capital are less likely to be retained, then the results documented in our study cannot provide a definitive answer on this issue.

Relatedly, there were two primary limitations of the study that should be noted. First, our measure of participant retention based on completion of a 6-month intervention weigh-in is a crude estimate of participant engagement and does not necessarily indicate that those retained were more engaged or received a higher dose of intervention. In this study, the 6-month weigh-in was both a study assessment point and an intervention strategy promoted as a feedback point for participants by both interventions tested in the larger randomized control trial (RCT) (18). Second, our attrition rate was relatively high (32%) and, as it was related to social capital (and likely weight-loss success), reduced our ability to test the relationship between social capital and weight loss or to appropriately use multiple imputation to resolve the issue.

## Conclusions

This study documented that increased worksite social capital was predictive of retention into a worksite weight-loss programme. To maximize return on capital investments into employee wellness and weight-loss

programmes, employers may benefit from understanding the facets of the 'social' environment such as social capital that may increase the likelihood of sustained participation. Additional research into worksite social capital and retention and ultimately, if interventions can increase worksite social capital, are needed.

## Conflict of Interest Statement

The author and co-authors have no conflicts of interest to disclose.

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