OBESITY AND SOCIAL CAPITAL OVER THE LIFE COURSE: DOES GAINING WEIGHT MEAN BOWLING ALONE?*

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ABSTRACT

In this research, we seek to integrate two burgeoning literatures that rarely intersect: social capital from the social sciences and the obesity epidemic in public health scholarship. Using the Wisconsin Longitudinal Study, we explore whether changes in body mass between the ages of 17-18 and 53-54 influence the acquisition of social capital, and whether these effects differ for men and women. In addition to weight change, other potential sources of social capital accumulation are taken into account, including social background and social psychological influences. Results indicate that rather than having broad, predictive power, the influence of weight change is linked to participation in certain kinds of associational life, and furthermore, differs in some respects for men and women.

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INTRODUCTION

Research on social capital has burgeoned in recent years in numerous fields of scholarship. Although social capital is a concept permeating much current empirical research, few attempts have been made to demonstrate its link with obesity over time. Previous research on social capital and health has tended to focus almost exclusively on social capital as a characteristic of collectivities (e.g., communities, neighborhoods, households) rather than exploring possible individual-level relationships. In this research, we propose to integrate two rapidly expanding literatures that rarely intersect: social capital from the social sciences and the obesity epidemic in public health scholarship. Briefly, the current analysis explores whether changes in body mass influence the acquisition of social capital over the life course.

PREVIOUS RESEARCH

Research applying a social capital framework to health-related studies has surged in the last few years, including a variety of health conditions. In much of this scholarship, social capital serves as a protective factor against unhealthy behaviors or adverse health conditions at the community level. The precise mechanisms which mediate the relationship between social capital and health conditions, however, remain unspecified (Kawachi et al. 1997; Subramanian et al. 2001; Sundquist et al. 2006), as few studies have relied upon panel data (Sundquist et al. 2006) or focus specifically on the individual rather than the aggregate level (for a review see Lundborg 2005 or Poortinga 2006). Moreover, studies exploring the links between social capital and obesity are, to date, quite rare (Holtgrave and Crosby 2006).

The general thrust of this research is that social capital can insulate communities and, by extension, individuals residing within them from adverse health conditions. The proposed relationship is an inverse one: communities characterized by high levels of social capital are better able to discourage risky behaviors and limit exposure to adverse socio-environmental conditions among community members. While potentially indirect, through mechanisms such as social isolation, social norms, health care accessibility and health education, the proposed relationship can be perceived as a positive force especially at the community level.

The benefits related to acquiring social capital may be unequally distributed across individuals exhibiting various characteristics, such as social background, sex, ethnic group membership and—of particular importance for this study—body type. Elevated body mass early in the life course could be a barrier to participation in community life in much the same manner as it tends to predict adverse health outcomes in later life. Although evidence on this point is mixed, obese teenagers are conceivably more likely to suffer social stigmas than their non-obese peers (Schwimmer, Barwinkle and Varni 2003; Swallen et al. 2005), which may discourage social interaction and community integration over the life course. Furthermore, the likelihood of becoming obese is related to position in the social structure (Mokdad et al. 1999) and social-psychological factors (Cutler, Glaeser and Shapiro 2003), further underscoring the need for an individual-level focus.

In this research, we seek to understand 1) the predictors of social capital formation over time and 2) whether these processes differ for men and women. Generally, we explore two mechanisms that may influence association memberships: (1) health-related (i.e. weight change) and (2) resource-based explanations.

SOCIAL CAPITAL FORMATION: HEALTH AND RESOURCE-BASED EXPLANATIONS

Research on social capital has a long-standing place in sociological research, though the recent surge in scholarship is often linked with work of Pierre Bourdieu (1983) and James Coleman (1988, 1990). Social capital, broadly defined, consists of beneficial aspects of associations and ties that serve as integrative forces between individuals, effectively undergirding social life (Paxton 1999, 2002). Relationships between these aspects of social capital are multifaceted and complex, exhibit both quantitative and qualitative dimensions, and have both individual-level and group-level properties. This characterization was broadened in scope in subsequent research as its popularity grew with the work of Putnam (1993, 2000), where attention to aggregate and/or community-level properties was at the forefront. Unfortunately, inattention to different types of social capital has led to confusion about the meaning of social capital, an inability to disentangle causes and effects, and has produced its current status, in some arenas, as a catch-all explanation (Paxton 1999; Portes 1998).

Research on associations highlights one facet of social capital that shows conflicting relationships with regard to civic engagement over time. On the one hand, Putnam (1993, 2000) suggests evidence of a decline over time in citizen involvement, defined specifically as association memberships, while on the other hand, others find no evidence of a decline over time (Paxton 1999). Although there is some support for a recent upsurge in involvement (Putnam 2002), other research points to an overall decline in civic association activity that exhibits a gendered dimension (Andersen, Curtis, and Grabb 2006). The general thrust of this approach is that participation in group life has positive benefits for individuals and communities, and that high levels of participation

foster democracy and strengthen social ties by promoting a variety of forms of civic engagement (Foley and Edwards 1997). For instance, individual ties cultivated by group membership increases information flows, undergirds aspects of the democratic process that rely on open channels of communication among the broadest possible range of actors, and stimulate political participation (Verba, Schlozman and Brady 1995).

Overall social scientists conceive of social capital as a resource that provides access to a range of social, political and material benefits. However, like other social commodities, access to social capital varies across different socioeconomic, racial, gender and/or ethnic groups. Moreover, social capital within communities may not benefit communities as a whole. Some research points to differences in associational involvement where participation is linked with privilege and processes of social inclusion and exclusion (Skocpol 2003; Wuthnow 2002). For example, less privileged or socially marginalized groups are increasingly less involved in associational life compared to more privileged groups. Furthermore, some research points to gender-based differences in associational membership depending on the size of the organization, its particular emphasis, and whether or not the association is tied to work or occupational organizations (McPherson and Smith-Lovin 1982, 1986, 1987, Popielarz 1999).

Health-based explanations

In the scholarship exploring links between health and social capital, social capital serves as a protective factor against initiation into unhealthy behaviors or exposure to dysfunctional communities. Though the precise nature of the relationship between social capital and health conditions is elusive (Kawachi et al. 1997; Subramanian et al. 2001;

Sundquist et al. 2006), research applying a social capital framework to health-related studies has surged in the last few years and has considered a variety of health conditions[1].

Social capital has been shown to have positive influences on a variety of aspects of both physical and psychological health, ranging from mortality (Kawachi, Kennedy, Lochner, and Prothrow-Smith 1997) to general psychological well-being (Araya, Dunstan, Playle, Thomas, Palmer and Lewis 2006). For instance, studies demonstrate that states with low levels of aggregate social capital have higher rates of mortality (Kawachi et al. 1997; Subramanian, Kawachi, and Kennedy 2001), and that important community-level covariates can be identified with coronary heart disease (Sundquist et al. 2006). Studies have also shown that poor self-rated health is linked with various individual risk factors, and that these effects are even more pronounced in states with low levels of social capital (Kawachi, Kennedy and Glass 1999).

Despite evidence supporting a relationship between social capital and health outcomes, the mechanisms underlying this relationship are not well understood. The links between social capital and health, for example, are perceived to be positive yet tend to focus on aggregate rather than individual-level measures (for a review see Lundborg 2005 or Poortinga 2006) and rarely rely on panel data (Sundquist et al. 2006). Finally, studies exploring the links between social capital and obesity very rare (Holtgrave and Crosby 2006). For some health outcomes and for obesity in particular, it is vital to

[1] For example, studies in this vein explore mortality (Kawachi, Kennedy, Lochner and Prothow-Stith 1997; Subramanian, Kawachi, and Kennedy 2001), smoking (Lindstrom 2004a, 2005; Lundborg 2005), mental health (Araya, Dunstan, Playle, Thomas, Palmer, and Lewis 2006), self-reported health (Kawachi, Kennedy, and Glass 1999; Lindstrom 2004b; Poortinga 2006), coronary heart disease (Sundquist, Johansson, Yang, and Sundquist 2006), and nutritional risk (Locher, Ritchie, Roth, Baker, Bodner and Allman 2005).

explore individual-level causes and consequences in addition to aggregate or community-level factors and outcomes.

As noted above, elevated body mass early in the life course could be a barrier to participation in community life in much the same manner as it tends to predict adverse health outcomes in later life. Thus, there is some evidence that obese teens are more likely to face stigmas that may reduce group participation compared to non-obese teens (Schwimmer, Barwinkle and Varni 2003). Furthermore, obesity may affect men and women's accumulation of social capital differently. Research on the effects of physical attractiveness on occupational outcomes, for instance, has found that women are particularly disadvantaged due to gender-specific socio-cultural preferences and expectations about female attractiveness (Jackson 1992). Thus, more attractive women enjoy significant earnings premiums and are more likely to be preferred by employers (French 2002; Frieze et al. 1991; Hamermesh and Biddle 1998). Thus, to the extent that occupational life represents an important arena of social capital accumulation, obese women may be at a particular disadvantage.

Overall we argue that to fully explore the consequences of health-related factors such as obesity on the accumulation of social capital requires both an individual-level analysis and a life course approach.

Resource-based explanations

The socioeconomic status or SES model of social capital formation relies on scholarship related to political participation over time (Verba et al. 1995; Brady, Verba, and Schlozman 1995). According to this model, the accumulation of social capital (and other types of resources such as human and cultural capital) is dependent on social

background characteristics of individuals. Essentially, privileged individuals participate more in various types of political activities, including associations. Higher socioeconomic status, measured individually in terms of education, income, or occupational status or in combination, leads to greater political participation (Leighley 1995). The proposed mechanism underlying this relationship is that higher status individuals possess the time, money and skills required for civic engagement (Verba et. al 1995; Brady et al. 1995).

As noted above, social scientists typically conceive of social capital as providing access to a range of benefits in social, political, and material life. However, it is also possible that access to social capital itself is dependent on socioeconomic status or other group memberships. Thus, according to Edwards and Foley (1998: p. 129), "Access to various forms of capital is shaped substantially by inequalities of social location, whether these are patterned along lines of race, class, sex, geography, or other salient features…" In other words, social capital may serve as a protective factor against poor health outcomes for some individuals and not others, and differential access to social capital may have consequences that accumulate over the life course.

By using individuals as the unit of analysis, integrating more classical sociological theories of social capital that emphasize the importance of context, and exploring the relationship between social capital and obesity over time, this research addresses a number of limitations of previous research and advances our understanding about how such processes unfold over the life course. Moreover, recasting the attention to social capital as a property of individuals is vital for advancing our thinking about how

these processes potentially operate in different ways and for different social groups over time.

Our research is motivated by two questions. First, what are the correlates of social capital formation over time? And second, do these processes differ for men and women? We explore two distinct mechanisms that may influence association memberships: (1) health-related (i.e. weight change) and (2) resource-based explanations. To guide our analyses and explore our key research questions, we test the following hypotheses:

H1: Weight change over time will influence social capital accumulation.

H2: Socioeconomic status will positively predict social capital accumulation over the life course.

Throughout the analysis we focus on differences between men and women with regard to the relationships between the aforementioned processes related to social capital formation over the life course.

DATA AND METHODS

Data for this investigation are from the Wisconsin Longitudinal Study (WLS), which has followed a random sample of 10,317 persons who graduated from a public, private or parochial high school in Wisconsin in 1957 (Sewell et al. 2004). In the initial wave, the WLS collected information on academic ability, socioeconomic background, attitudes toward higher education, educational and occupational aspirations, and a handful of contextual factors (Hauser 2005). Subsequent waves in 1964, 1975, 1993 and 2004 collected data from WLS respondents (and other family members) on a wide range of issues that are essential to studying the life course, including educational and

occupational histories, indicators of socioeconomic status, military service, marital status, family characteristics, social participation, psychological well-being, health behaviors and health outcomes (Hauser 2005; Sewell et al. 2004). Although the WLS is not nationally representative, its respondents resemble over two-thirds of Americans who are now entering retirement age in terms of academic achievement and ethnic background (Hauser 2005).

Dependent Measures

To address our research question regarding how adolescent body mass influences the acquisition of social capital, we begin by including two sets of analyses. First, our main dependent variable is association memberships from 1975. Association memberships distinguish individuals with any memberships in associations with those who have none. A second set of analyses explores the correlates of social capital in 1993. Due to the multidimensional nature of social capital posited in the literature, our analyses explore three measures of social capital: 1) an aggregate measure that includes all sixteen types of associations in an index (church-connected groups, labor unions, veterans' organizations, fraternal organizations, business and civic groups, parent-teacher associations, community centers, nationality-centered groups, sports teams, country clubs, youth groups, professional groups, political clubs, neighborhood improvement groups, charity or welfare organizations, and hobby groups), 2) conceptual categories of associations (family-oriented, which includes parent-teacher and youth group involvement; community-based, which includes community center and neighborhood improvement group involvement; workplace-related, which include labor unions, professional groups and business/civic groups; and politically-related, which includes

political clubs, veterans, fraternal, and nationality groups), and 3) each of the sixteen associational groups considered individually.[2]

Independent Measures

Our main independent measures are weight change, gender, and socioeconomic characteristics. Until recently, the WLS was limited by the lack of a baseline measure of body mass, disallowing the kind of life course analysis proposed here. However, recent methodological innovations have led to the development of baseline values of relative body mass (RBM) for WLS respondents that are both reliable and remarkably effective in predicting BMI, health symptoms, chronic health conditions and mortality later in life (Reither 2006). This methodological development allows us to explore how changes in body mass between adolescence and mid-life affect social capital accumulation.

RBM scores were combined to form the standardized relative body mass index (SRBMI). SRBMI was calculated separately for male and female photos by (1) generating coder-specific *z*-scores, (2) summing *z*-scores across coders and (3) dividing the sum of *z*-scores by the number of coders in the study. That is,

$$\text{SRBMI} = \frac{\sum_{i=1}^{n}[(x_{ijk} - \bar{x}_{ijk}) / s_{ijk}]}{n},$$

where i is an individual coder, n is the number of coders in the study, j is one of the 3,027 WLS respondents, k is the respondent's gender and x_{ijk} is the series of RBM scale scores for coder i and respondent j of gender k, with mean $\bar{x}_{ijk}$ and standard deviation s_{ijk}..

To facilitate our analyses, SRBMI was divided into standard BMI classifications for adolescents: underweight, normal weight, at risk for overweight, and overweight.

[2] These conceptual categories were also explored via correlation analyses and, where appropriate, confirmatory factor analyses. Results are available from the authors.

Previous research (Ogden, Flegal, Carroll & Johnson, 2002) has used BMI percentiles from CDC growth charts (Centers for Disease Control and Prevention, 2000) to define underweight at or below the 5th percentile, normal weight between the 5th and 85th percentiles, at risk for overweight between the 85th and 95th percentiles and overweight at or above the 95th percentile. To provide sufficient statistical power for each subgroup, these percentile ranges were altered slightly for body mass categories derived from SRBMI; underweight was defined at or below the 10th percentile of SRBMI, normal weight between the 10th and 80th percentiles, at risk for overweight between the 80th and 90th percentiles and overweight at or above the 90th percentile.

In addition to SRBMI in 1957, we assessed BMI (kg/m^2) from self-reports of height and weight in 1993. BMI was divided into standard categories for underweight (BMI<18.5), healthy weight (18.5≤BMI<25), overweight (25≤BMI<30) and obese (BMI>30). Using these categories of adolescent and adult body mass, we created a series of weight change categories spanning 1957 to 1993.[3]

Six categories summarize possible weight changes throughout the thirty-six year period: 1) individuals whose weight remained stable in the normal range, 2) individuals at risk for obesity with stable weight (i.e., at risk for overweight in 1957 and overweight in 1993), 3) obese individuals with stable weight, 4) individuals who experienced slight weight gain (e.g., from at risk for overweight in 1957 to obese in 1993), 5) individuals who experienced substantial weight gain (i.e., from normal weight in 1957 to obese in 1993) and 6) individuals who experienced measurable weight loss (e.g., from at risk for overweight in 1957 to normal weight in 1993). The underweight categories were not

[3] Unfortunately the WLS did not collect body mass information in 1975. Due to this omission we are only able to consider changes in body weight between two time periods: 1957 and 1993.

used in this classification scheme (i.e., they were collapsed into normal weight) due to small numbers. This was particularly true in 1993, where only 0.3 percent of cases reported a BMI of less than 18.5.

In addition to weight change, sex, and socioeconomic characteristics (i.e. education and household income), our models will also include social psychological variables as determinants of later social capital accumulation. Generally, we hypothesize that increased body mass will have a negative effect on social capital formation later in life, over and above other social forces.

Analyses

Since our analyses in some respects represent new territory with regard to the relationship between obesity and social capital, we proceed in a series of stages. As a first step, we explore whether changes in weight influence experiences with associational life. Our analyses examine separate models for men and women to see whether there are gender-based differences in levels of involvement and participation in various associations. We then include socioeconomic and social psychological predictors of engagement with group life to determine whether weight change categories matter for inclusion or exclusion in group life, over and above other social forces.[4] We include the following determinants of later social capital accumulation: weight change, sex, socioeconomic status (i.e. education and household income), and social psychological

[4] In forthcoming work (not shown), we will employ structural equation modeling to examine the influence of obesity on social capital formation in models that include the 2003 data. Using two-stage least squares regression, we will model contemporaneous and lagged effects of body mass on social capital (i.e. association memberships), as well as the lagged effect of obesity and social capital on themselves (Finkel 1995).

variables (i.e. to gauge personality types like extroversion or openness to change), as appropriate.

Results

Descriptive findings are shown in Table 1. Roughly half of the total sample belonged to at least one association. The highly gendered nature of this result was somewhat unexpected; 71.8% of women belonged to at least one organization, compared to just 42.1% of men. Much of this overall differential is attributable to the substantially larger percentage of women who were involved in a religious, charitable or hobby-related association. Again to our surprise, a larger share of women was involved in professional organizations (27.6% vs. 19.0%) and political clubs (13.1% vs. 6.7%).

The overall impact of weight change on aggregate levels of associational involvement is shown in Table 2. In the total sample of WLS participants, those in the stable, at risk for overweight and stable overweight categories had significantly more associational involvement than those with stable, normal weight. Counter to our hypotheses, those who experienced slight weight gain also reported significantly more associational involvement. Controlling for social background and social psychological characteristics actually strengthened this association in several weight categories, particularly among those in the stable, at risk for overweight category.

Also contrary to our hypotheses was the finding that women who experienced slight weight gain between 1957 and 1993 reported significantly more associational involvement than women with stable, normal weight. Women who experienced either substantial weight gain or weight loss reported significantly less associational

involvement, although these effects were relatively small and did not achieve the criterion of statistical significance. After introducing SES and social psychological controls for men, none of the results for the weight categories were statistically significant. However, it is worth noting that the direction of all of the effects for men in both the stable and dynamic overweight categories were *positive*. Unfortunately, due to limited statistical power, the standard errors were large relative to the coefficients. Nevertheless, the overall thrust of these results suggests that overweight and weight gain may contribute to social capital formation among men.

Tables 3a-3d show results for various associational categories. Overall, the effect of weight change was weak and insignificant for participation in family-oriented associations, community-based associations and workplace-related associations. There were three exceptions to this generalization. First, women in the stable, overweight category belonged to significantly more family-based associations than women in the normal weight category, after SES and social psychological controls were introduced (see Table 3a). Second, in the combined sample of WLS participants, those in the stable, at risk for overweight category belonged to significantly more workplace-related associations than WLS participants in the stable, normal weight category (see Table 3c). Third, women who experienced weight loss belonged to significantly fewer workplace-related associations than women in the stable, normal weight category (see Table 3c). However, the introduction of SES and social psychological controls attenuated this effect by 85%, rendering it statistically insignificant.

Despite few significant findings in Tables 3a-3c, there were a number of significant and interesting findings for political and specialty organizations in Table 3d.

WLS participants with stable, elevated weight and those who experienced weight gain belonged to significantly more political and specialty associations than WLS participants with normal, stable weight. This finding was especially strong for those in the stable, at risk for overweight category. Closer inspection reveals the gendered nature of these findings. Among men, elevated weight and weight gain were generally associated with more involvement in political and specialty associations. Particularly contrary to our expectations was the finding that men who gained a substantial amount of weight belonged to significantly more political and specialty associations than men in the stable, normal weight category. We observed no such effect among women who gained either a slight or a substantial amount of weight. However, women in the stable, at risk for overweight category belonged to significantly more political and specialty associations than women with normal, stable weight.

DISCUSSION

Our primary findings are threefold. First, we find solid support for the resource-based theory of social capital accumulation. Overall, men and women with higher levels of education and higher levels of household income are significantly more likely to belong to various types of associations. When we break memberships down by particular types of associations, however, interesting socioeconomic patterns emerge. Perhaps not surprisingly, one's membership in country clubs, professional associations, political clubs and business groups is significantly correlated with high socioeconomic status (results from these models available from the authors upon request). Thus, for instance, educational level and household income strongly predict membership in work-related

associations for both men and women. Similarly, participation in organizations such as labor unions and community centers is strongly correlated with lower levels of education and income. Interestingly, our findings also suggest that socioeconomic status is a strong predictor of participation in associations such as parent-teacher associations and youth groups. It is possible that active membership in such associations requires a certain degree of leisure time and flexibility more readily available to those of a higher socioeconomic status.

Our second main finding suggests that, counter to our initial hypothesis, obesity does not significantly limit one's involvement in associational life. Indeed, compared to those who remained in the normal weight category over this 36 year period of observation, those who experienced slight gains were actually more likely to belong to or participate in community associations, and those who experienced slight and substantial gains were significantly more likely to participate in political groups. When we consider participation in particular types of organizations, we find that obesity does not hinder one's participation in family-oriented groups, such as the PTA or Boy Scouts, nor in community-based associations like church groups, nor even in political associations, such as political party or environmental organizations. Indeed, the only instance where body size significantly and negative impacts associational membership is in terms of workplace-related organizations. However, this finding is the opposite of what we predicted: only women who experienced weight loss are significantly less likely to participate in work-related groups.

Finally, our analysis does suggest some important ways in which the impact of body size on associational involvement follows gender-specific patterns. For instance,

while weight gain does not (generally) affect women's participation in political groups, men who experienced slight or substantial weight gains over time are significantly more likely to belong to political organizations. Conversely, while body size does not affect men's participation in family-oriented associations, overweight women are significantly more likely to participate in such groups. Overall these findings provide some support for the "beauty myth" hypothesis, which suggests women may be disproportionately and negatively affected by gender-specific socio-cultural preferences when it comes to joining particular groups. However, weight is not a barrier to joining traditionally feminized organizations, including those devoted to family issues. Despite previous research documenting the ways in which physical attractiveness benefits women in the workplace (French 2002; Frieze et al. 1991; Hamermesh and Biddle 1998), we find no evidence that body size—as one potential indicator of physical attractiveness—affects women's participation in work-related associations.

Conclusion

While admittedly highlighting the positive benefits of social capital in the current analysis, we also recognize that there are also potentially negative effects of particular types or community-based patterns of associational memberships (Beyerlein and Hipp 2005; Edwards and Foley 1998; Paxton 1999, 2002; Stolle and Rochon 1998). While we agree with Putnam and others that participation in voluntary associations can be a valuable source of strong community ties, we also recognize the possibility that, under certain conditions, community-level social capital may not benefit all community members equally.

The stratifying potential of community-based patterns of associational membership may be particularly relevant for studies of health outcomes. Because we observe a number of interactions between social group membership and risk factors for various diseases, we might conclude that while the accumulation of social and political capital may be beneficial, these benefits may be unequally distributed across gender, income, educational, and racial/ethnic categories.

Future research should also further distinguish types of group bonds and the impact of certain types of bonds on health outcomes. Previous research has demonstrated that associations vary to the extent they generate and cultivate in-group or out-group orientations, as well as the degree to which groups promote bridging and/or bonding within and among associations (Beyerlein and Hipp 2005; Stolle and Rochon 1998).

Bonding occurs when associational links are forged mainly or exclusively among members of the same group, while bridging occurs when groups facilitate ties across groups within the same community. A key distinction between the kinds of social capital fostered by bonding and bridging mechanisms lies in the strength of ties, stronger in the former and weaker in the latter (Beyerlein and Hipp 2005; Granovetter 1973; Paxton 2002; Putnam 2000).

How might these distinctions matter for individuals' health status generally and obesity status more specifically? Differences between associations regarding their bridging or bonding features may provide an explanation for the influence of BMI on social integration and/or the pursuit of active social/associational memberships over the life course. It is possible that some associations are better able to establish ties with groups or individuals less integrated into mainstream groups (e.g. obese individuals),

while other groups are more likely to exclude members from participation on the basis of individual characteristics.

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Table 1. Frequency Distributions For Measures of Social Capital

	Percent of Total	*n*	Percent of Women	$n^{\text{♀}}$	Percent of Category	Percent of Men	$n^{\text{♂}}$	Percent of Category
All Associations	54.0	1097	71.8	593	54.1	42.1	504	45.9
Categories of Assoc.								
Family	11.0	224	13.6	112	50.0	9.4	112	50.0
Community	17.0	344	23.7	216	62.8	12.4	148	43.0
Workplace	34.0	689	39.8	329	47.8	30.1	360	52.2
Political	21.8	442	25.4	210	47.5	6.0	72	16.3
Individual Associations								
Religious	30.4	616	43.1	356	57.8	21.7	260	42.2
Sports	16.6	336	14.9	123	36.6	17.8	231	68.8
Country Club	6.2	125	5.9	49	39.2	6.3	76	60.8
Parent-teacher	8.9	180	11.7	97	53.9	6.9	83	46.1
Youth Groups	4.3	86	4.0	33	38.4	4.4	53	61.6
Community Center	7.6	153	10.2	84	54.9	5.8	69	45.1
Neighborhood Improvement	13.6	276	19.6	162	58.7	9.52	114	41.3
Labor Union	12.3	248	12.4	102	41.1	12.2	146	58.9
Professional Group	22.5	456	27.6	228	50.0	19.0	228	50.0
Business	16.8	340	18.9	156	45.9	15.4	184	54.1
Political Club	9.3	180	13.1	108	60.0	6.7	80	44.4
Veterans	7.0	142	5.6	46	32.4	8.0	96	67.6
Fraternal Org	9.7	197	9.4	78	39.6	9.9	119	60.4
Nationality	4.0	81	4.8	40	49.4	3.4	41	50.6
Charity/welfare	23.3	471	33.4	276	58.6	16.3	195	41.4
Hobby	20.6	417	30.0	248	59.5	14.1	169	40.5
Weight Change								
Stable, normal weight	33.22	399	43.38	282	70.7	21.23	117	29.3
Stable, at risk	4.16	50	3.54	23	46.0	4.9	27	54.0
Stable, overwt	4.41	53	3.38	22	41.5	5.63	31	58.5
Slight Gain	36.39	437	28.31	184	42.1	45.92	253	57.9
Subst. Gain	13.32	160	11.38	74	46.3	15.61	86	53.8
Weight Loss	8.49	102	7.87	65	63.7	3.09	37	36.3

Table 2. Results of Aggregate Levels of Associational Involvement Regressed on Categories of Weight Change, Social Background and Social Psychological Predictors

				Women			Men		
	Model I	Model II	Model III	Model I	Model II	Model III	Model I	Model II	Model III
Intercept	6.504	-3.265	-6.762 ***	6.447	-2.776	-6.619 **	6.641	-4.187	-5.846
	(.292)	(2.187)	(2.282)	(.326)	(2.552)	(2.668)	(.573)	(4.001)	(4.144)
Weight Change [a]									
Stable, at risk	2.016 **	1.787 **	1.681 **	1.118	1.666	1.371	2.692 **	2.151	1.879
	(.875)	(.849)	(.826)	(1.188)	(1.146)	(1.118)	(1.323)	(1.308)	(1.271)
Stable, overwt	0.666	1.064	1.497 *	0.326	1.541	1.706	0.811	0.651	1.199
	(.853)	(.829)	(.805)	(1.213)	(1.163)	(1.137)	(1.252)	(1.239)	(1.199)
Slight Gain	0.737 *	0.823 **	0.838 **	0.531	0.957 *	1.022 **	0.790 *	0.600	0.478
	(.404)	(.392)	(.381)	(.519)	(.496)	(.487)	(.693)	(.685)	(.662)
Substantial Gain	0.559	0.770	0.744	-0.582	-0.287	-0.191	1.452	1.564 *	1.353
	(.546)	(.529)	(.514)	(.716)	(.681)	(.668)	(.880)	(.871)	(.845)
Weight Loss	-0.484	-0.184	0.117	-1.278	-0.769	-0.254	0.872	0.821	0.875
	(.647)	(.628)	(.610)	(.754)	(.720)	(.709)	(1.169)	(1.152)	(1.116)
Social background [b]									
Associate's Degree		0.208	-0.097		0.815	0.305		-0.728	-0.788
		(.495)	(.484)		(.637)	(.629)		(.775)	(.751)
Bachelor's Degree		1.491 ***	1.153 **		2.634 ***	2.042 ***		0.048	0.097
		(.460)	(.452)		(.576)	(.577)		(.741)	(.718)
Master's Degree		3.796 ***	3.386 ***		4.620 ***	3.987 ***		2.739 ***	2.608 ***
		(.551)	(.542)		(.703)	(.706)		(.873)	(.845)
Doctoral Degree		2.388 **	2.289 **		2.773	2.566		1.671	1.958 *
		(.942)	(.924)		(2.005)	(1.967)		(1.172)	(1.146)
Household Income (log)		0.819 ***	0.559 ***		0.734 ***	0.508 **		0.966 ***	0.587
		(.201)	(.198)		(.235)	(.233)		(.367)	(.359)
Social Psychological Predictors									
Autonomy			-0.138 **			-0.058			-0.203 **
			(.060)			(.078)			(.091)
Personal Growth			0.132 *			0.169 *			0.103
			(.071)			(.090)			(.114)
Positive Relationships with Others			0.134 **			0.044			0.258 ***
			(.054)			(.072)			(.082)
Extraversion			0.333 ***			0.281 ***			0.407 ***
			(.061)			(.079)			(.097)
Openness to Change			0.229 ***			0.245 ***			0.085
			(.068)			(.087)			(.114)
Adjusted R-sq	0.004	0.068	0.127	0.003	0.101	0.152	0.001	0.036	0.105

[a]Ref category is stable normal weight

[b]Ref category is high school degree

Table 3a. Results for Family-Oriented Associations

	Family-oriented Associations			Women			Men		
	Model I	Model II	Model III	Model I	Model II	Model III	Model I	Model II	Model III
Intercept	0.429 ***	0.298	-0.029	0.436 ***	-0.107	-0.414	0.410	0.882	0.688
	(.054)	(.401)	(.432)	(.060)	(.474)	(.510)	(.105)	(.731)	(.784)
Weight Change [a]									
Stable, at risk	0.011	-0.011	-0.028	-0.001	0.024	-0.004	0.034	-0.061	-0.095
	(.160)	(.156)	(.156)	(.219)	(.213)	(.214)	(.243)	(.239)	(.240)
Stable, overwt	0.175	0.205	0.234	0.291	0.439 **	0.444 **	0.106	0.070	0.108
	(.156)	(.152)	(.152)	(.224)	(.216)	(.217)	(.230)	(.226)	(.227)
Slight Gain	-0.008	0.013	0.016	-0.083	-0.016	-0.016	0.060	0.058	0.049
	(.074)	(.072)	(.072)	(.096)	(.092)	(.093)	(.127)	(.125)	(.125)
Subst. Gain	-0.054	-0.011	-0.017	-0.112	-0.074	-0.084	0.008	0.041	0.023
	(.100)	(.097)	(.097)	(.132)	(.126)	(.128)	(.161)	(.159)	(.160)
Weight Loss	-0.066	-0.026	-0.008	-0.190	-0.134	-0.118	0.157	0.172	0.187
	(.119)	(.115)	(.116)	(.139)	(.134)	(.136)	(.214)	(.210)	(.211)
Social Background [b]									
Associate's Degree		-0.002	-0.018		0.001	-0.025		-0.001	0.000
		(.091)	(.092)		(.118)	(.120)		(.142)	(.142)
Bachelor's Degree		0.171 **	0.154 *		0.260 **	0.238 **		0.081	0.087
		(.084)	(.086)		(.107)	(.110)		(.135)	(.136)
Master's Degree		0.851 ***	0.834 ***		0.883 ***	0.869 ***		0.822 ***	0.816 ***
		(.101)	(.103)		(.130)	(.135)		(.159)	(.160)
Doctoral Degree		0.641 ***	0.649 ***		1.485 ***	1.491 ***		0.452 **	0.485 **
		(.173)	(.175)		(.372)	(.376)		(.214)	(.217)
Household Income (log)		-0.002	-0.017		0.033	0.023		-0.055	-0.081
		(.037)	(.037)		(.044)	(.045)		(.067)	(.068)
Social Psychological Predictors									
Autonomy			0.001			0.009			-0.006
			(.011)			(.015)			(.017)
Personal Growth			0.006			0.005			0.007
			(.014)			(.017)			(.021)
Positive Relationships with Others			0.015			0.007			0.024
			(.010)			(.014)			(.016)
Personality									
Extraversion			0.021 *			0.017			0.030 *
			(.012)			(.015)			(.018)
Openness to Change			0.006			0.003			-0.004
			(.013)			(.017)			(.021)
Adjusted R-sq	0.000	0.060	0.064	0.000	0.087	0.085	0.000	0.037	0.042

[a]Ref category is stable normal weight

[b]Ref category is high school degree

Table 3b. Results for Community-Based Associations

	Community-Based Associations			Females			Males		
	Model I	Model II	Model III	Model I	Model II	Model III	Model I	Model II	Model III
Intercept	0.551	0.458	0.000	0.582 ***	-0.078	-0.569	0.479	1.042	0.922
	(.057)	(.443)	(.473)	(.069)	(.568)	(.608)	(.104)	(.739)	(.785)
Weight Change[a]									
Stable, at risk	0.109	0.090	0.062	0.201	0.222	0.173	0.077	0.075	0.044
	(.171)	(.172)	(.171)	(.252)	(.255)	(.255)	(.240)	(.242)	(.241)
Stable, overwt	0.052	0.065	0.107	0.009	0.091	0.084	0.134	0.122	0.189
	(.167)	(.168)	(.167)	(.257)	(.259)	(.259)	(.227)	(.229)	(.227)
Slight Gain	0.046	0.046	0.042	0.114	0.133	0.140	0.047	0.041	0.021
	(.079)	(.079)	(.079)	(.110)	(.110)	(.111)	(.126)	(.127)	(.126)
Subst. Gain	-0.008	0.001	-0.005	-5E-04	0.015	0.030	0.033	0.048	0.019
	(.107)	(.107)	(.107)	(.152)	(.151)	(.152)	(.160)	(.161)	(.160)
Weight Loss	0.076	0.083	0.111	-0.058	-0.024	0.030	0.332	0.319	0.304
	(.127)	(.127)	(.127)	(.160)	(.160)	(.162)	(.212)	(.213)	(.211)
Social Background[b]									
Associate's Degree		0.059	0.020		0.200	0.132		-0.076	-0.088
		(.100)	(.100)		(.142)	(.143)		(.143)	(.142)
Bachelor's Degree		0.122	0.086		0.291 **	0.232 *		-0.047	-0.043
		(.093)	(.094)		(.128)	(.131)		(.137)	(.136)
Master's Degree		0.115	0.067		0.160	0.088		0.080	0.060
		(.112)	(.113)		(.156)	(.161)		(.161)	(.160)
Doctoral Degree		0.302	0.283		0.153	0.117		0.368 *	0.387 *
		(.191)	(.192)		(.446)	(.448)		(.217)	(.217)
Household Income (logged)		0.004	-0.025		0.051	0.028		-0.052	-0.096
		(.041)	(.041)		(.052)	(.053)		(.068)	(.068)
Social Psychological Predictors									
Autonomy			-0.012			0.003			-0.030 *
			(.012)			(.018)			(.017)
Personal Growth			0.026 *			0.034			0.014
			(.015)			(.021)			(.022)
Positive Relationships with Others			0.003			-0.015			0.015
			(.011)			(.016)			(.016)
Extraversion			0.045 ***			0.034 *			0.055 **
			(.013)			(.018)			(.018)
Openness to Change			0.022			0.024			0.018
			(.014)			(.020)			(.022)
Adjusted R-sq	0.000	0.000	0.016	0.000	0.000	0.012	0.000	0.000	0.019

[a]Ref category is stable normal weight

[b]Ref category is high school degree

Table 3c. Results for Workplace-Related Associations

	Workplace-Related Associations			Females			Males		
	Model I	Model II	Model III	Model I	Model II	Model III	Model I	Model II	Model III
Intercept	1.707	-2.559 ***	-3.548 ***	1.574	-1.784 **	-2.692	2.026	-3.408 ***	-4.582 ***
	(.100)	(.713)	(.753)	(.113)	(.825)	(.869)	(.189)	(1.291)	(1.362)
Weight Change [a]									
Stable, at risk	0.593 **	0.464 *	0.488 *	0.208	0.390	0.346	0.715	0.471	0.452
	(.298)	(.277)	(.273)	(.412)	(.370)	(.364)	(.437)		(.418)
Stable, overwt	-0.235	-0.033	0.053	-0.529	0.036	0.078	-0.251	0.422	-0.189
	(.291)	(.270)	(.266)	(.420)	(.376)	(.370)	(.413)	(.400)	(.394)
Slight Gain	-0.027	0.014	0.040	-0.292	-0.088	-0.042	-0.057	-0.122	-0.139
	(.138)	(.128)	(.126)	(.180)	(.160)	(.159)	(.229)	(.221)	(.218)
Subst. Gain	0.093	0.207	0.215	-0.21	-0.077	-0.024	0.149	0.229	0.174
	(.186)	(.173)	(.170)	(.248)	(.220)	(.218)	(.290)	(.281)	(.278)
Weight Loss	-0.344	-0.197	-0.081	-0.482 *	-0.257	-0.071	-0.188	-0.185	-0.187
	(.221)	(.205)	(.201)	(.261)	(.233)	(.231)	(.386)	(.372)	(.367)
Social Background [b]									
Associate's Degree		0.189	0.056		0.400 *	0.230		-0.207	-0.256
		(.162)	(.160)		(.206)	(.205)		(.250)	(.247)
Bachelor's Degree		0.911 ***	0.756 ***		1.369 ***	1.155 ***		0.266	0.231
		(.150)	(.149)		(.186)	(.188)		(.239)	(.236)
Master's Degree		1.848 ***	1.654 ***		2.384 ***	2.139 ***		1.143 ***	1.066 ***
		(.180)	(.179)		(.227)	(.230)		(.282)	(.278)
Doctoral Degree		1.690 ***	1.507 ***		2.885 ***	2.730 ***		0.937 **	0.884 **
		(.307)	(.305)		(.648)	(.641)		(.378)	(.376)
Household Income (logged)		0.348 ***	0.273 ***		0.249 ***	0.190 **		0.478 ***	0.391 ***
		(.066)	(.065)		(.076)	(.076)		(.119)	(.118)
Social Psychological Predictors									
Autonomy			-0.027			-0.016			-0.024
			(.020)			(.026)			(.030)
Personal Growth			0.028			0.027			0.041
			(.024)			(.029)			(.037)
Positive Relationships with Others			0.028			0.001			0.071 ***
			(.018)			(.023)			(.027)
Extraversion			0.045 **			0.056 **			0.053 *
			(.020)			(.026)			(.032)
Openness to Change			0.122 ***			0.109 ***			0.079 **
			(.022)			(.028)			(.037)
Adjusted R-sq	0.003	0.146	0.183		0.218	0.250	0.000	0.078	0.111

[a]Ref category is stable normal weight

[b]Ref category is high school degree

Table 3d. Results for Political and Specialty Associations

	Politically-Related Associations			Females			Males		
	Model I	Model II	Model III	Model I	Model II	Model III	Model I	Model II	Model III
Intercept	0.654 ***	-0.447	-0.910	0.652 ***	-0.063	-0.679	0.6581 ***	-0.606	-0.539
	(.076)	(.585)	(.626)	(.079)	(.645)	(.688)	(.157)	(1.118)	(1.187)
Weight Change [a]									
Stable, at risk	0.766 ***	0.736 ***	0.715 ***	0.521 *	0.599 **	0.554	0.9715 ***	0.963 ***	0.881 **
	(.227)	(.227)	(.227)	(.286)	(.289)	(.288)	(.362)	(.365)	(.364)
Stable, overwt	0.440 **	0.466 **	0.516 **	0.348	0.455	0.466 *	0.5032	0.482	0.582 *
	(.221)	(.222)	(.221)	(.292)	(.294)	(.293)	(.342)	(.346)	(.344)
Slight Gain	0.302 ***	0.305 ***	0.298 ***	0.103	0.144	0.159	0.4447 **	0.415 **	0.387 **
	(.105)	(.105)	(.105)	(.125)	(.125)	(.126)	(.189)	(.191)	(.190)
Subst. Gain	0.365 ***	0.377 ***	0.360 **	-0.058	-0.026	-0.011	0.7256 ***	0.719 ***	0.677 ***
	(.141)	(.142)	(.141)	(.173)	(.172)	(.172)	(.241)	(.243)	(.242)
Weight Loss	0.130	0.153	0.191	0.024	0.082	0.171	0.3149	0.286	0.308
	(.168)	(.168)	(.167)	(.182)	(.182)	(.183)	(.320)	(.322)	(.320)
Social Background [b]									
Associate's Degree		0.063	0.014		0.191	0.098		-0.158	-0.149
		(.133)	(.133)		(.161)	(.162)		(.217)	(.215)
Bachelor's Degree		0.068	0.016		0.238	0.132		-0.167	-0.136
		(.123)	(.124)		(.146)	(.149)		(.207)	(.206)
Master's Degree		0.250 *	0.197		0.502 ***	0.390 **		-0.093	-0.084
		(.148)	(.149)		(.177)	(.182)		(.244)	(.242)
Doctoral Degree		0.204	0.198		0.000	-0.048		0.054	0.173
		(.252)	(.253)		(.506)	(.507)		(.328)	(.328)
Household Income (logged)		0.096 *	0.064		0.053	0.021		0.122	0.066
		(.054)	(.054)		(.059)	(.060)		(.103)	(.103)
Social Psychological Predictors									
Autonomy			-0.018			-0.002			-0.030
			(.016)			(.020)			(.026)
Personal Growth			0.005			0.020			-0.006
			(.020)			(.023)			(.033)
Positive Relationships with Others			0.013			-0.001			0.041 *
			(.015)			(.019)			(.024)
Extraversion			0.061 ***			0.044 **			0.090 ***
			(.017)			(.020)			(.028)
Openness to Change			0.035 *			0.047 **			-0.023
			(.019)			(.022)			(.033)
Adjusted R-sq	0.012	0.014	0.031	0.000	0.011	0.028	0.015	0.009	0.032

[a]Ref category is stable normal weight

[b]Ref category is high school degree