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Leisure-time physical activity and characteristics of social network support for exercise among Latinas

Sandra H. Soto, MPH, BSN,
Doctoral Candidate, San Diego State University/University of California, San Diego Joint Doctoral Program in Public Health (Health Behavior); San Diego, California. 5500 Campanile Drive, San Diego, CA 92182, USA (SDSU) and 9500 Gilman Drive, La Jolla, CA 92093, USA (UCSD). Institute for Behavioral and Community Health, 9245 Sky Park Court, Suite 221 San Diego, CA 92123, USA, (813) 451-3342

Holly Shakya, PhD,
Assistant Professor, University of California, San Diego, Department of Medicine, Division of Global Health. 9500 Gilman Drive, La Jolla, CA 92093, USA, (858) 822-6468

Jessica Haughton, MPH, MA, and
Project Manager, Institute for Behavioral and Community Health; San Diego, California, 9245 Sky Park Court, Suite 221 San Diego, CA 92123, USA, (619) 594-6302

Elva M. Arredondo, PhD
Professor, San Diego State University, Graduate School of Public Health, Division of Health Promotion and Behavioral Science; San Diego, California. 5500 Campanile Drive, San Diego, CA 92182, USA. Institute for Behavioral and Community Health, 9245 Sky Park Court, Suite 221 San Diego, CA 92123, USA, (619) 594-3481

Abstract

Purpose—To examine the association between characteristics of social support for exercise and moderate-to-vigorous leisure-time physical activity (LTPA) among Latinas.

Design—This cross-sectional study used baseline data from a cluster randomized controlled trial.

Setting—The study was conducted in 16 churches located in San Diego County.

Subjects—Participants (N=436) were Latinas between 18–65 years old who did not self-report > 150 minutes or did not exceed 250 minutes of moderate-to-vigorous PA per week measured by accelerometer.

Measures—Latinas listed up to six individuals who had provided support for exercise within the past six months, including their gender, relationship to the respondent, types of support provided, and respondent's satisfaction with support. Self-reported LTPA was dichotomized (none versus any).

Corresponding author: Sandra Soto, MPH, 9245 Sky Park Court, Suite 221, San Diego, CA 92123, Telephone: (813) 451-3342, Fax: 619-594-2998, sandra.soto@mail.sdsu.edu.

Analyses—We generated dyads between Latinas who named   one supporter (n=323) and each supporter they named (n=569 dyads). Logistic regression analyses were conducted using generalized estimating equations to adjust for multiple observations per participant.

Results—Having an exercise partner (OR: 2.16; 95% CI: 1.01, 4.62), help with household duties (OR: 2.70; 95% CI: 1.35, 3.38), being "very much" satisfied with support (OR: 2.33; 95% CI: 1.26, 4.30), and naming > 2 supporters (OR: 2.57; 95% CI: 1.06, 6.25) was positively associated with LTPA.

Conclusions—Findings suggest specific aspects of support for exercise that should be targeted in future interventions to promote LTPA.

Keywords

Latinos; physical activity; social networks; social support; women

INDEX KEY WORDS

Manuscript format: research; Research purpose: modeling/relationship testing; Study design: non-experimental; Outcome measure: behavioral; Setting: local community; Health focus: physical activity; Strategy: behavior change; Target population age: adults; Target population circumstances: race/ethnicity

INTRODUCTION

Leisure-time physical activity (LTPA) is important for both mental and physical health.[1] The health benefits of LTPA may be more pronounced for women than for men,[2,3] however, women consistently engage in LTPA less frequently than men.[4] Research also shows that Latinas are less likely to engage in LTPA than non-Latina whites.[5–7]

Among minorities, social support is the most consistent interpersonal determinant of engaging in physical activity.[8,9] While the majority of research shows that social support for exercise is important, studies tend to limit the operationalization of social support to either the size of one's proximal social network or to the amount of encouragement for exercise.[10] This limited characterization of social support means that we do not know what aspects of support from social network members drive the association with LTPA. For example, family members are typically grouped into one category.[10–12] Grouping potentially influential members of the social network together may obscure the unique associations between the different types of individuals who provide support for exercise and engagement in LTPA. Furthermore, although gender roles may be important determinants of PA among Latinas,[13] little is known about the influence of support from the same or opposite gender on LTPA. This could be especially salient for adult Latinas who often rely on spousal support and approval in their decision to engage in LTPA.[14] Finally, while social support may be intended as a positive experience,[15] recipients of support may not perceive it in a positive manner,[16] possibly resulting in a decrease in LTPA. Measures that capture subjective assessments of satisfaction with support from network members are more precise and can offer a better understanding of the distinct support characteristics that are predictive of LTPA.

Social network interactions can facilitate the transfer of knowledge specific to LTPA, create norms and values by modeling and reinforcing LTPA, inspire or impede LTPA through normative self-comparison[17] and facilitate LTPA through shared resources.[18] Behaviors can spread through a network through a process of social learning, by which individuals observe others engaging in a behavior.[19,20] Conversely, behaviors can spread through social influence, which occurs when network members actively attempt to change the behaviors of others through overt social pressure, which can include negative sanctions such as disapproval for failing to comply.[19] Social network analysis can identify the flow of resources that predict behaviors such as LTPA,[21] and is an important tool for measuring the various domains of social support, including a detailed census of network members and their characteristics. One of the basic units of social network analysis is the dyad, or a pair of individuals.[22] By investigating the dyadic relationships between individuals and those who provide them with support for exercise, researchers can identify the support characteristics that are associated with LTPA.

In an effort to build an understanding of social network support for exercise, the purpose of this study was to examine the social network characteristics of support for exercise that are associated with engaging in moderate-to-vigorous LTPA among Latinas. Specifically, we sought to examine whether having a larger social network for exercise support; receiving support from specific types of individuals (e.g., spouses); receiving support from individuals of a specific gender (e.g., females); receiving certain types of support (e.g., by having an activity partner); and the degree of satisfaction with the support received increased the likelihood of engaging in LTPA. We used cross-sectional data from 323 adult Latinas who reported receiving support for exercise, including 569 participant/supporter dyads, to evaluate the social network predictors of engaging in any versus no moderate-to-vigorous LTPA.

METHODS

Study design and sample

This cross-sectional study used baseline data collected in the group randomized controlled trial, Faith in Action (*Fe en Acción*), designed to promote PA among Latina adults.[23] Data were collected from 436 participants attending 16 Catholic churches (approximately 27 participants per church) in San Diego County between 2011–2013. Churches were eligible if they had at least 200 Spanish-speaking families, offered at least one mass in Spanish, and were willing to be randomized to either an intervention or control condition. Participants were blinded to the condition of the church during recruitment. Recruitment efforts consisted of verbal announcements during Spanish-language masses and other ministry group meetings targeting Latinas, printed announcements in church bulletins, fliers, and word of mouth. Latinas were eligible to participate if they were between 18–65 years old, attended church at least four times per month, lived within 15 minutes of the church, did not have a chronic condition that would preclude PA, and were low-active (either did not self-report exceeding 150 minutes or did not exceed 250 minutes of moderate-to-vigorous PA per week measured by accelerometer). The San Diego State University Institutional Review Board approved all protocols.

Measures

Bilingual and bicultural research assistants collected paper-and-pencil surveys from participants at churches. Surveys were usually completed within 45–60 minutes.

Leisure-time physical activity

Although accelerometer data was available, we chose to examine self-reported LTPA because the social network measure was specific to exercise, not to other domains of PA (e.g., transportation or occupational PA). The 16-item Global Physical Activity Questionnaire (GPAQ) assessed PA frequency, duration, and intensity levels in leisure-time (Armstrong, 2006). The GPAQ has previously been validated against accelerometer-measured PA among church-going Latinas.[24] Vigorous self-reported LTPA was strongly correlated with accelerometer-measured vigorous PA in the validation study ($r = 0.40$, $p < 0.001$). LTPA was dichotomized into none versus any because 55.4% of participants reported no LTPA.

Characteristics of supporters and the support they provide for exercise

We collected egocentric network data for each participant.[25] Participants were asked to list up to six individuals who had provided them with support for exercise in the past six months. For each supporter, participants reported a) their gender; b) the supporter's relationship with the participant; and c) the type of support for exercise received from the supporter. Participants were also asked to rate their satisfaction with the support they received from each supporter (1=*not at all*, 4=*very much*).

Because most participants named 1–2 supporters (66.4%), this variable was dichotomized into 1–2 versus >2 supporters. Due to low frequencies, the relationship types with supporters were collapsed into *spouse/partner*, *child*, *other relative* (i.e., parent, sibling, or other relative), and *friend*. The other relationships (e.g., coworker) were dropped from the analyses due to a low combined frequency of 2.3%. To improve interpretability, the types of support participants received were reduced to four categories. A hierarchical clustering algorithm based on highly correlated types of support was conducted using the corrplot package in R v3.2.1.[26] Four categories were identified: a) emotional support ("*reminds you to exercise*", "*encourages you*", or "*plans around your exercise schedule*"); b) activity partner support ("*finds ways for you to be active together*" or "*exercises with you*"); c) household activities support ("*takes over chores so you can exercise*" or "*takes care of your children while you exercise*"); and d) equipment/transportation support ("*provides you transportation*" or "*buys equipment that you can use*"; Figure 1). The types of support within each cluster were combined so that individuals who named any or all types of support within a cluster were coded as receiving support from that category. Finally, satisfaction with support yielded little variability with most participants reporting on the higher end of the scale, therefore this item was dichotomized ("*very much*" versus "< *very much*").

Sociodemographic characteristics

Participants responded to sociodemographic descriptive questions including age, education level (< than high school vs. ≥ high school), employment status (employed vs. unemployed, retired, or student), marital status (married/living with partner vs. single, separated, divorced,

or widowed), monthly household income (< \$2,000 vs. \$2,000), and the number of children under 18 years old living in the household. Acculturation proxies included country of birth and age when first arrived in the US (if foreign-born).

Data analyses

We generated unique observations for each participant and supporter (n=569 dyads), and used logistic regression analyses to assess the relation between social network characteristics and engaging in any versus no LTPA. To correct for multiple observations of respondents, we clustered the standard errors at the individual level using a generalized estimating equation (GEE). We used the results of bivariate analyses between each social network characteristic and LTPA to determine which social network characteristics would be entered in the multivariate model; only those that were at least marginally significant ($p < .10$) were retained. Multivariate analyses included all sociodemographic covariates as controls, and all models (including bivariate models) adjusted for church fixed effects. Statistical significance was set at $p < .05$. All analyses were conducted in R v3.2.1.

RESULTS

One participant was removed from the analyses because she did not respond to the social network items on the survey, resulting in a total sample size of 435. Three-quarters of participants named at least one supporter (Table 1).

Table 2 describes the characteristics of support by whether or not participants engaged in LTPA using dyadic data (n = 569 total dyads, n = 267 engaged in no LTPA, n = 302 engaged in any LTPA). Except for spousal relationships, the majority of dyads consisted of relationships between participants and other females, so that approximately half of dyads were between two women. Over 40% of participant-supporter dyads consisted of mother-child relationships, followed by spousal relationships ($\approx 30\%$). Less common dyadic relationships were between other relatives and friends. The most common type of support reported by both women who were active and inactive was emotional support followed by activity partner support. To a lesser degree, women also received household duties and equipment/transportation support. While the proportion of overall support that was categorized as emotional was similar across groups, women who engaged in LTPA versus no LTPA received significantly more activity partner support by all types of supporters except friends. Active women also received significantly more household duties support from all types of supporters. With the exception of children, all supporters provided more frequent equipment/transportation support to active than inactive participants. Finally, women who engaged in LTPA versus no LTPA reported more satisfaction with the support they received and named more supporters for exercise.

First, we used logistic regression with the total sample (N=435) to examine whether having any support for exercise (0=no supporters, 1=any supporters) was associated with increased odds of engaging in LTPA. Naming any supporters was positively associated with the likelihood of engaging in LTPA (OR: 2.25; 95% CI: 1.35–3.76), after adjusting for church fixed effects, and sociodemographic variables (data not shown). We then shifted to dyadic analyses to determine which characteristics of support were most predictive of LTPA (Table

3). In the multivariate model, all characteristics significant in bivariate models remained significant except the total number of support categories that participants received (OR: 0.91; 95% CI: 0.59,1.40). Activity partner support (OR: 2.16; 95% CI: 1.01, 4.62), household duties support (OR: 2.70; 95% CI: 1.35, 3.38), "*very much*" satisfied with support (OR: 2.33; 95% CI: 1.26, 4.30), and naming > 2 supporters (OR: 2.57; 95% CI: 1.06, 6.25) were each associated with increased odds of engaging in any LTPA.

Because LTPA was highly skewed with more than half of the sample reporting engaging in no LTPA, the above analyses used LTPA as binary, as previously done using the same variable with this sample.[27] However, to further explore these associations, we conducted the above analyses using linear regression with a Poisson distribution for continuous LTPA. [28] Having more than two supporters was the only characteristic that persisted in the final multivariate model (β = 0.43, p = 0.02; data not shown). However, compared to LTPA modeled as dichotomous, the linear model yielded similar direction and magnitude of effects among the other variables and p was within 0.20, reaffirming the original results and the use of the dichotomous model.

DISCUSSION

While many studies have found that social support is important to engaging in PA, few studies have examined the role of specific characteristics of social network support.[18] We first found that respondents who name supporters are more likely to report LTPA than those who do not name supporters, consistent with previous research that emphasizes the importance of social support for exercise in this population.[8,9] We also found that for those who report support, having a greater number of supporters and being more satisfied with the support received was associated with higher odds of engaging in any LTPA. Findings showed that there was a greater chance of engaging in LTPA when participants had someone to be active with them and someone to help them with their household obligations. On the other hand, the gender of the supporter, the relationship with the supporter, and the total number of support categories were not associated with LTPA.

The association between help with household duties and LTPA is a striking example of how a very specific type of support can be important. Household duties and family responsibilities are common barriers to engaging in PA among Latinas.[14] While receiving support for household duties may have resulted in women engaging in LTPA, it may also be the case that active women create an expectation for support, negotiate support, or find individuals who will support them so they can continue to be active. The ability to negotiate and identify supporters who will assist with household chores may be one explanation for why active versus inactive women in our sample reported significantly more household duties support from all supporters including children, spouses, other relatives, and friends. Future research should more carefully investigate the dynamics behind these associations, and interventions may work to equip Latinas with the skills and self-efficacy to negotiate and find sources of support for accomplishing household duties (e.g., exchanging childcare services or meals with others).[14]

Having someone with whom to engage in PA was associated with higher odds of engaging in LTPA. This is consistent with research showing that having an activity partner is a motivator for PA,[14] possibly because activity partners help with accountability and because they can make PA more enjoyable.[29] Furthermore, health behaviors have been known to be "contagious", spreading throughout social networks.[30,31] Therefore, having members of a social network who are physically active may encourage inactive individuals to engage in PA. As people tend towards homophily, or the tendency to form relationships with similar others, an alternative explanation is that physically active women form relationships with others who are also active.[32] Without temporal data, the direction of the association between having an activity partner and engaging in LTPA will be difficult to determine. However, these results support the notion that health behaviors cluster when social norms are favorable toward that behavior.[33] This social normative effect may occur through social learning, whereby individuals observing and participating in exercise with others encourages LTPA behavior. On the other hand, encouragement and reminders to exercise were not associated with LTPA, suggesting that direct social influence (e.g., encouragement) may not be a particularly effective mechanism for exercise promotion compared to the passive encouragement that occurs through positive modeling of LTPA and the companionship of an exercise partner.[34]

Women were not more likely to engage in LTPA if they reported support for exercise from one gender over the other. Similarly, we did not detect differences in LTPA when support was received from different sources (e.g., spouses, friends). These results suggest that PA interventions that want to integrate social support strategies may not have to match participants by gender or relation. However, we did find indications of how the types of support provided may differ across sources of support. For instance, activity partner support was common across all types of supporters but most prevalent among children of active participants. These findings may inform interventions that want to target naturally occurring social networks for exercise (e.g., mother-daughter dyads). Tangible types of support (i.e., equipment/transportation support) were infrequently provided by all supporters except spouses, over half of which provided this type of support. Future interventions that aim to promote the purchase of a gym membership or plan to offer services in a location that is outside participants' neighborhood may consider implementing strategies that promote spousal support.

Although spouses have been identified as potential barriers to LTPA,[35,36] we did not find that spousal support for exercise was related to LTPA. However because the questions were specific to support rather than asking about barriers, we cannot determine the role of spouses in impeding LTPA within this study population. Similarly, friend support was not associated with LTPA, potentially because the prevalence of support from friends was only 10.5%. While others have found friends to be a valuable source of support for engaging in LTPA among Latinos who have immigrated to the US and left family members behind,[37] our sample is comprised of Latinos who live near the US-Mexico boarder, and therefore likely retained connections with family members.

Our findings should be interpreted in light of the limitations of the study. The results cannot definitively conclude if receiving support for exercise results in increased odds of engaging

in LTPA or if engaging in LTPA increases the odds of creating a social network that is supportive of exercise. Also, participants were not given the option to free-list the types of support they received. However, based on previous experience working with this population, we believe we captured the most prevalent types of support. It is important to note that our sample consisted of low-active women. Therefore, our sample does not represent highly active women who may have different associations with their social networks. Finally, although the number of children in the household was collected, we did not ask women to identify the number of their own children or their children's ages.

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SO WHAT?

What is already known on this topic?

Research shows that social support for exercise is important for minorities to engage in PA.

What does this article add?

Our findings suggest that opportunities for promoting PA among low-active Latinas may lie in building larger networks of social support for exercise that include individuals who will engage in PA together and support each other with household responsibilities in ways that increase satisfaction with support.

What are the implications for health promotion practice or research?

Practitioners can intervene by promoting skills and self-efficacy to obtain support for household duties that enable LTPA and develop methods that encourage group or paired LTPA. Interventions may not need to engage only women or specific family relationships to be effective. However, interventions that want to target the naturally occurring support networks for exercise should engage mother-daughters pairs.
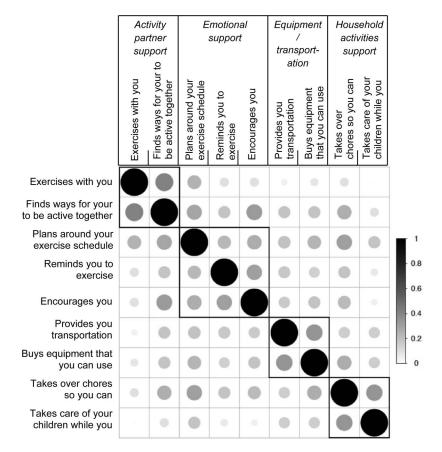
Figure 1.
Correlation plot of ways that supporters provide support. All correlations are positive. Darker/larger circles indicate stronger correlations (e.g., black circles in the center indicate a correlation of 1.0). Squares around a group of circles indicate highly correlated groups that were used to create four categories of support: 1) Activity partner support, 2) Emotional support, 3) Equipment/transportation support, and 4) Household activities support.

Table 1

Descriptive Characteristics of Church-Going Latinas by Engagement in Leisure-Time Moderate-to-Vigorous Physical Activity (N=435)

Characteristic	Total sample (N=435)	0 supporters (n=112)	1 supporters (n=323)
		% or mean ± SD	
Sociodemographics			
Age *	44 ± 10	46 ± 10	44 ± 10
Married or living as married *	77.5	69.4	80.3
Education (< high school)	55.0	50.9	56.4
Employment status (employed)	65.7	71.4	63.8
Monthly household income <$2,000	58.2	61.3	57.1
Number of children (<18 yrs) in the household *	2 ± 1	1 ± 1	2 ± 1
Foreign-born (Mexico or other)	92.6	94.6	89.7
Age when first arrived to the US[a] *	24 ± 10	26 ± 12	23 ± 9
Leisure-time MVPA			
Continuous[b]	151.9 ± 125.6	132.7 ± 109.2	155.8 ± 128.7
Categorized *			
None	55.4	70.5	50.1
Any	44.6	29.5	49.9
Social network			
Named 1 supporter	74.3		
Named 1–2 supporters (vs >2)			66.4

Note: MVPA = moderate-to-vigorous physical activity; SD = standard deviation

[a]Of those who were foreign-born

[b]Sample excludes zeros (n = 194)

*Statistically significant differences between those with no supporters and those with 1 supporter ($p < .05$)

Table 2

Characteristics of Support by Engagement in Leisure-Time Moderate-to-Vigorous Physical Activity (n=569)

Characteristic	No LTMVPA (n=267)		Any LTMVPA (n=302)	
	% or mean ± SD			
Gender of supporter (female)	55.9		51.1	
"Very much" satisfied with female support*		56.1		79.4
"Very much" satisfied with male support*		59.8		80.8
Relationship with supporter				
Child	41.2		41.4	
% female*		71.8		64.0
% gave emotional support		95.5		92.8
% gave activity partner support*		74.5		88.0
% gave household duties support*		27.3		53.6
% gave equipment/transportation support*		29.1		23.2
"Very much" satisfied with child support*		58.2		81.6
Spouse	29.6		31.5	
% female*		0.01		0.00
% gave emotional support		87.3		88.3
% gave activity partner support*		64.6		72.3
% gave household duties support*		44.3		63.8
% gave equipment/transportation support*		54.4		58.5
"Very much" satisfied with spouse support*		59.5		82.1
Other relative	17.2		13.6	
% female*		88.9		85.4
% gave emotional support		97.8		85.4
% gave activity partner support*		67.4		70.7
% gave household duties support*		30.4		31.7
% gave equipment/transportation support*		15.2		24.4
"Very much" satisfied with other relative support*		58.7		80.5
Friend	10.1		10.9	
% female*		96.2		100.0
% gave emotional support		92.6		87.9
% gave activity partner support		77.8		81.8
% gave household duties support*		11.1		21.2
% gave equipment/transportation support*		3.7		18.2
"Very much" satisfied with friend support*		59.3		63.6
Support categories				

Characteristic	No LTMVPA (n=267)		Any LTMVPA (n=302)	
	% or mean ± SD			
Emotional support[a]	93.3		89.7	
"Very much" satisfied with emotional support[*]		60.2		82.2
Activity partner support[b][*]	70.0		79.4	
"Very much" satisfied with activity partner support[*]		66.8		83.3
Household duties support[c][*]	31.1		49.5	
"Very much" satisfied with household duties support[*]		63.9		86.6
Equipment/transportation support[d]	31.5		33.9	
"Very much" satisfied with equipment/transportation support[*]		66.7		91.2
Total number of support categories[*]	2.3 ± 1.0		2.5 ± 1.0	
Satisfaction with support				
"Very much" satisfied[*]	58.0		79.8	
Number of supporters				
>2 supporters[*]	24.0		42.0	

Note: SD = standard deviation, LTMVPA = leisure-time moderate-to-vigorous physical activity

[a]Includes "Encourages you", "Reminds you to exercise ", and Plans around your exercise schedule"

[b]Includes "Exercises with you" and "Finds ways for you to be active together"

[c]Includes "Takes over chores so you can exercise" and "Takes care of your children while you exercise"

[d]Includes "Provides you transportation" and "Buys equipment that you can use"

[*]Statistically significant differences between no versus any LTMVPA groups ($p < 0.05$)

Table 3

Bivariate and Multivariate Results of GEE Logistic Regression Using Dyadic Observations of the Supporter Characteristics on Engaging in Any Leisure-time Moderate-to-Vigorous Physical Activity (n=569 dyads)

	Engaging in any leisure-time physical activity OR (95% CI)	
	Bivariate Models [Ŧ]	Multivariate Model [ŦŦ]
Gender of the supporter (ref=male)	0.75 (0.54, 1.06)	
Relationship with supporter (ref=not this relationship)		
Spouse/partner	1.10 (0.78, 1.56)	
Child	1.05 (0.71, 1.56)	
Other relative	0.70 (0.40, 1.22)	
Friend	1.02 (0.53, 1.94)	
Support categories (ref=support not received in this way)		
Emotional support[a]	0.88 (0.44, 1.76)	
Activity partner support[b]	1.66 (1.01, 2.74)[*]	2.16 (1.01, 4.62)[*]
Household duties support[c]	2.12 (1.37, 3.28)[***]	2.70 (1.35, 3.38)[**]
Equipment/transportation support[d]	1.14 (0.73, 1.76)	
Satisfaction with support received (ref= < very much satisfied)	3.14 (1.96, 5.01)[***]	2.33 (1.26, 4.30)[**]
Number of supporters (ref= 1–2 supporters)	2.52 (1.23, 5.16)[*]	2.57 (1.06, 6.25)[*]
Total number of support categories	1.38 (1.08, 1.76)[**]	0.91 (0.59, 1.40)

Note: OR = odds ratio; CI = confidence interval

[Ŧ] Models are adjusted for church fixed effects

[ŦŦ] Model includes supporter characteristics significant in bivariate models, adjusting for church fixed effects, education level, age, marital status, number of children in the household, employment status, income, and age when first arrived in the US

[a] Includes "Encourages you", "Reminds you to exercise ", and "Plans around your exercise schedule"

[b] Includes "Exercises with you" and "Finds ways for you to be active together"

[c] Includes "Takes over chores so you can exercise" and "Takes care of your children while you exercise"

[d] Includes "Provides you transportation" and "Buys equipment that you can use"

[*] $p < 0.05$;

[**] $p < 0.01$;

[***] $p < 0.001$