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Perceived Neighborhood Environmental Factors That Maximize the Effectiveness of a Multilevel Intervention Promoting Physical Activity Among Latinas

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Abstract

Purpose: This study tested whether a multilevel physical activity (PA) intervention had differential effects on PA according to participants' perceptions of their neighborhood environment.

Design: Two-group cluster randomized controlled trial.

Setting: San Diego, California.

Subjects: Analytical sample included 319 Latinas (18–65 years) from churches randomized to the following conditions: PA (n = 8 churches, n = 157 participants) or attention control (n = 8 churches, n = 162 participants).

Intervention: Over 12 months, PA participants were offered free PA classes (6/wk), while attention control participants were offered cancer prevention workshops.

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Measures: Baseline and 12-month follow-up measures included self-report and accelerometer-based moderate to vigorous physical activity (MVPA), sociodemographics, and perceived neighborhood environment variables.

Analysis: Mixed-effects models examined each PA outcome at 12-month follow-up, adjusted for church clustering, baseline PA, and sociodemographics. We tested interactions between 7 baseline perceived environment variables and study condition.

Results: Neighborhood esthetics was the only significant moderator of intervention effects on accelerometer-based MVPA and self-report leisure-time MVPA. Participants in the PA intervention had significantly higher PA at follow-up than attention control participants, only when participants evaluated their neighborhood esthetics favorably.

Conclusion: Perceived neighborhood esthetics appeared to maximize the effectiveness of a multilevel PA intervention among Latinas. For sustainable PA behavior change, the environments in which Latinas are encouraged to be active may need to be evaluated prior to implementing an intervention to ensure they support active lifestyles.

Keywords

health promotion; built environment; physical activity; church-based intervention; latinas

Purpose

Physical inactivity is a modifiable risk factor for numerous health conditions,[1] yet 1 in 10 US adults die each year due to insufficient activity.[2] Given Latinos are the largest and one of the fastest growing racial/ethnic minority groups in the United States[3] and only 42% meet national recommendations for physical activity (PA),[4] effective interventions to increase their PA are needed. Most PA interventions with Latinos have targeted women due to their disproportionately lower prevalence of PA compared to men.[5] Such interventions have focused on motivating individuals, such as by increasing social support and self-management strategies like goal setting and problem-solving.[6] Although individual-level approaches (ie, that target inter-/intrapersonal factors) have shown promise in increasing Latinos' PA,[6] little is known about whether the environments in which individuals are encouraged to be active moderate the effects of health promotion efforts. In particular, residential neighborhoods may be important for sustainable PA behavior change because they can provide convenient opportunities for PA (eg, parks/recreational facilities within walking distance of the home) and have the potential to shape social norms regarding walking/PA.[7] When neighborhood environments are not conducive to PA, due to limited access to recreational facilities or low safety, for example,[8,9] individuals may be less likely to be active even if they are highly motivated.

Ecological models of health behavior underscore the influence of the environment on PA behaviors, along with individual (eg, biological), psychosocial (eg, social support), and policy-level factors.[10] Such models posit that factors across levels interact with one another to influence behavior and that interventions targeting multiple levels may be more effective at changing behavior than those targeting only 1 level.[10] For example, interactions between individual (sociodemographic) and neighborhood environmental factors[11] suggest that

environment-PA associations vary across subgroups of a population and that PA interventions targeting the neighborhood environment to make it more activity supportive may have differential impacts on these groups.

A few PA intervention studies involving Latino and non-Latino samples have tested interactions between neighborhood environmental factors and intervention allocation (ie, intervention versus control) to assess whether PA behavior change among intervention participants depends on the physical (built) and/or social environmental features of their neighborhoods.[12–17] Some studies report greater intervention benefits (ie, increases in PA) among participants living in neighborhoods with characteristics favorable to PA—such as greater safety from traffic and better neighborhood esthetics—compared to those living in neighborhoods with less favorable characteristics.[12–15] However, 1 study found that among overweight men in a lifestyle intervention, those living in less walkable neighborhoods had greater increases in walking compared to those in more walkable areas.[13] The latter study suggests that the intervention may have helped men overcome environmental barriers to PA. Other studies have reported no differential intervention impacts on PA by neighborhood environmental characteristics.[16,17] Overall, the mixed evidence on the moderating effects of neighborhood environments on intervention effects on PA suggest additional research is needed on this topic. In particular, evidence from PA intervention studies involving immigrant groups is warranted, given predominantly immigrant neighborhoods often have less favorable environmental characteristics for PA (eg, low perceptions of safety among residents).[18,19]

Among PA intervention studies targeting Latinos, group-based interventions and others targeting social support and other interpersonal processes have shown promise in increasing PA.[20] Interventions that have relied on *promotores* (community health workers) to educate and lead community members in changing PA behaviors have also been successful at promoting PA and social cohesion among Latino participants.[20–22] To our knowledge, no study has examined whether participants' perceptions of their neighborhood environments have moderating effects on *promotora*-led interventions to promote Latinas' PA. Evidence of differential intervention impacts by perceived neighborhood environmental factors may help us understand the environmental factors that maximize or impede intervention effectiveness.

The purpose of the current study was to test whether the effects of a *promotora*-led intervention on changing PA, assessed objectively and with self-report, varied according to participants' perceptions of their home neighborhood environments. Using data from a 2-group randomized controlled trial, we investigated whether changes to PA at 12-month follow-up differed between intervention and attention control participants with favorable versus less favorable perceptions of their neighborhood environment. We hypothesized higher PA levels at 12-month follow-up among intervention participants compared to attention control participants, with greater differences among those with favorable neighborhood environment scores compared to those with less favorable scores. Such results would suggest favorable perceptions of the neighborhood environment support positive PA behavior change in response to an intervention.

Methods

Design and Sample

This study used data collected among 319 churchgoing Latinas (18–65 years old) participating in a 2-group randomized controlled trial to promote PA (primary aim) or cancer screening (attention control) among Latinas in San Diego, CA—*Fe en Acción*/Faith in Action. The intervention lasted 2 years but for the present analyses, we only used baseline and 12-month follow-up data collected between 2011 and 2014. Sampling, recruitment, data collection, and intervention activities are described in detail elsewhere.[23]

The study recruited 16 eligible churches and 436 eligible participants from these churches (approximately 27 women/church). Sample size calculations were based on a comparison between conditions across the 2 follow-up periods as a vector of repeated measures on moderate to vigorous physical activity (MVPA) min/d. A staggered recruitment strategy was used to recruit churches in waves from January 2011 through March 2013. Church eligibility criteria were to have a minimum of 200 Latino families, be willing to be randomized to study condition, and be able to commit space for program activities. To minimize the possibility of contamination, churches had to be at least 1 mile apart, and participants could attend only 1 of the participating churches. Following recruitment, churches were stratified by size and then randomized to study condition, with 8 churches allocated to each condition.

Women were recruited using fliers, word of mouth, and printed and oral announcements at the participating churches. Participants were blinded to condition during recruitment. Participant eligibility criteria included self-identifying as Latina/Hispanic, being between 18 and 65 years of age, attending the church at least 4 times/month, residing within 15 minutes driving distance to the church, planning on attending the church for the next 24 months, reporting no health condition that would interfere with their ability to be physically active, and reporting no or mostly light-intensity PA on 2 screeners.[24,25] Women who met the aforementioned criteria were then asked to wear an accelerometer for 7 days, with those accruing <250 min/wk of MVPA being eligible to participate. Although national guidelines recommend 150 min/wk of MVPA for adults, this amount is largely based on epidemiological studies focused on self-report leisure-time PA. However, the accelerometer measures activity from many domains (eg, work and active transportation) in addition to leisure-time activity. As such, we modified the accelerometer threshold for study inclusion to <250 min/wk. The accelerometer threshold allowed for inclusion of women with lower activity levels who could benefit most from a PA intervention. For the purposes of the present study, only participants with complete baseline and 12-month follow-up data were included in the analyses (n = 319). The San Diego State University Institutional Review Board approved this study, and participants provided written informed consent.

Intervention

The ecological model informed the design of *Fe en Acción,* with intervention activities designed to target individual, interpersonal, organizational, and environmental influences of PA (primary intervention) or cancer screening (attention control condition). Program

evaluation staff, including data collectors, were blinded to condition throughout the intervention period.

Participants in the PA intervention were offered free PA classes led by 2 to 3 bilingual Latina *promotoras* (community health agents) recruited from each of the 8 intervention churches. The intervention churches provided space for the classes and allowed their schedules to be advertised in the church bulletins and at church fairs. Throughout the intervention year, approximately 6 classes were offered each week—including 2 walking groups, 2 cardio dance classes, and 2 strength-training classes—at or near the church at different days/times. Each class started with a 10-minute warm-up period, followed by 30 to 40 minutes of moderate to vigorous intensity activities and concluded with a 10-minute cool-down period and brief review of a relevant health handout. Each month, study staff mailed intervention participants' educational handouts related to PA such as the benefits of PA, over-coming barriers to PA (eg, lack of time, low energy, and lack of support) and incorporating nonleisure activities like active transportation in the day. In the handouts, participants could list small goals for increasing PA such as going on walks in their neighborhood, exercising with family members, and walking to destinations (eg, church, park, or grocery store) instead of driving. In addition, study staff trained the *promotoras* on conducting motivational interviewing (MI) calls with participants. These calls were conducted every 3 to 4 months over the year. The MI script allowed the *promotoras* to ask participants about barriers to PA, ways to incorporate PA outside of classes, and social support for PA. Each MI call took approximately 30 minutes. Participants received up to 3 calls over the year. The *promotoras* were also trained by the environmental advocacy group Circulate San Diego[26] on conducting environmental audits of their church grounds and surrounding neighborhoods. The audits helped identify targets for improvement that the *promotoras* and community members could address via local projects such as trash pickup. Because the environmental projects were implemented at various times throughout the intervention, we did not evaluate changes in the environment in the present study. Preliminary analyses also did not find significant changes in the perceived environment variables during the first 12 months of the intervention, so we focused on baseline perceptions as a moderator.

Participants from the 8 attention control churches were invited to a series of workshops on breast, cervical, colorectal, and skin cancer prevention led by bilingual Latina *promotoras* recruited from each of the 8 churches. Throughout the intervention year, the *promotoras* conducted a minimum of 6 series of 6-week classes. Participants could attend the same class more than once throughout the intervention. The attention control churches provided space for the classes and allowed *promotoras* to advertise the classes in the church bulletins and church fairs. In addition, *promotoras* conducted up to 3 MI calls over the year addressing barriers to cancer screening and solutions to those barriers and goals for completing recommended screenings. Throughout the intervention, MI calls and incentives were used to maintain cohort retention.

Measures

This study used PA data collected at baseline and 12-month follow-up as well as the baseline data for the perceived environment and covariate variables. At each time point, participants

completed a survey in their preferred language (English or Spanish), had their anthropometric measures taken by a trained research assistant (RA), and were asked to wear an accelerometer for 7 days. Survey measures used in the present study were available in Spanish.

The PA Outcomes

Objective MVPA was assessed using ActiGraph GT3-X or GT3-X+ activity monitors (Actigraph, Pensacola, Florida). Participants were asked to wear the device over the right hip for 7 days and to remove it during water activities (eg, shower) and sleeping. The monitors collected data in 1-second epochs. Minimum wear time was defined as ≥5 valid days (with ≥1 weekend day) and ≥10 valid h/day of data.[23] Nonwear time was defined as ≥60 consecutive minutes of 0 count values. Up to 2 rewears were allowed for those not meeting the wear time criteria. Accelerometer files were converted to 60-second epoch files and processed using ActiLife software version 6 (ActiGraph, Pensacola, Florida). Using the Troiano 2008 cutoff points,[27] time spent in MVPA was determined by summing each minute where the count met the criterion for moderate activity (2020 counts/min or cpm) or vigorous activity (5999 cpm). We estimated average MVPA minutes/week at each time point. The data were normally distributed. Thus, accelerometer-based MVPA was treated as a continuous variable.

Self-reported PA was assessed using the Global Physical Activity Questionnaire (GPAQ).[28] This study used data from the leisure-time MVPA (6 items) and transportation PA (3 items) domains as they are deemed the most relevant to the neighborhood environment.[29] Among Latinas in San Diego, the GPAQ has shown moderate validity for vigorous activity when compared to the accelerometer.[30] The transportation PA data were highly skewed with about 60% of the sample reporting 0 minutes/wk at 12-month follow-up. After attempts to fit a negative binomial distribution failed, we decided to dichotomize the transportation PA data from each time point as 0 = "*none*" or 1 = "*any*" (≥10 minutes), similar to other studies.[9,11] The leisure-time MVPA data were also highly skewed with about 45% reporting 0 minutes/wk at 12-month follow-up. A negative binomial distribution fit the data and was thus used for subsequent analyses, similar to another publication using data from this intervention.[22]

Perceived Home Neighborhood Environment

The most relevant environmental factors identified in a previous focus group study with churchgoing Latinas in San Diego were used in the *Fe en Acción* survey.[8] Items assessing perceived safety from crime, safety from traffic, and neighborhood esthetics were taken from the abbreviated Neighborhood Environment Walkability Scale (NEWS-A).[31] Response options for these items ranged from 1 = *strongly disagree* to 5 = *strongly agree*. Following standard protocol, we reverse-coded negative statements and averaged scores on the 2 items for safety from crime and the 4 items for neighborhood esthetics (eg, there are many interesting things to look at while walking in my neighborhood").[32] The subscales demonstrated good reliability among a sample of Latinas in San Diego (traffic and crime safety intraclass correlation = 0.61 and esthetics α = .78).

Items assessing perceived access to destinations near the home (eg, businesses; yes/no), access to recreational facilities near the home (yes/no), and sidewalk maintenance were taken from the US Determinants of Exercise in Women Phone Survey.[33] Respondents reporting having sidewalks in their immediate home neighborhood were asked to evaluate sidewalk maintenance with 1 item that had response options ranging from 1 = *not at all maintained* to 4 = *very well maintained*.

Both environment scales have demonstrated moderate to high test–retest reliability with samples including Latinas.[34] All continuous perceived neighborhood environment scores were standardized (mean = 0 and SD = 1) for ease of interpretation.

Neighborhood social cohesion was assessed using the Neighborhood Social Cohesion Scale.[35] Participants were asked to rate 6 statements on psychological sense of community, attraction to the neighborhood, and social interactions with neighbors on a scale from 1 = *not at all true* to 3 = *very true*. An example statement included "I feel like I belong to this neighborhood." Negative statements were reverse coded. The average score of the 6 statements was used, and higher scores indicated higher levels of neighborhood social cohesion. The scale had moderate internal consistency in our sample (α = .67).

Demographics

Age, years living in the United States, country of birth, marital status, education, and monthly household income were assessed using questions from the 2005 Behavioral Risk Factor Surveillance System (BRFSS) questionnaire.[36] We dichotomized household income based on a median split of $2000/month. Income was based on ranges, so we could not properly calculate poverty level.

Analysis

We used mixed or generalized linear mixed-effects models (with binary or negative binomial distributions), adjusted for church clustering, to examine differences in key variables across the study conditions. To identify the environmental correlates of each of the 3 PA outcomes, we examined the bivariate relations between each perceived environment and PA variable at baseline. All variables were checked for outliers and nonnormal distributions prior to analyses. For the main analyses, we used analysis of covariance (ANCOVA) models for each PA outcome, entering the intervention or attention control designation as the "condition" variable and baseline PA, age, marital status, vehicle access, and employment status entered as covariates. Within these models, we tested for environmental moderators separately. That is, we included each of the 7 perceived environment variables and their interaction with study condition in separate models (7 models per outcome). These models tested whether PA levels at 12-month follow-up differed between intervention and attention control participants with favorable versus less favorable perceptions on each environment variable. Favorable perceptions included *yes* responses on the binary variables or scores 1 SD above the mean for continuous variables. Less favorable perceptions included *no* responses for binary variables or scores 1 SD below the mean for continuous variables. Interactions significant at the 0.10 level from the separate models were then tested simultaneously in a full model. The least significant terms were removed one by one so that only those significant at the 0.05

level remained in the final model. Significant moderators were plotted to show the intervention effects at each level of the environment variable.

Results

Baseline and 12-month follow-up PA data and baseline environment scores were available for 73% of the sample. Chi-square or *t* tests found no significant differences in baseline sociodemographic characteristics for those with and without available data. Table 1 shows characteristics of the sample with complete data stratified by study condition. The majority of participants were immigrants from Mexico (90%) and of low socioeconomic status as noted by the low income and education levels. There were no significant baseline differences in the means and percentages for sociodemographic, PA, and perceived environment variables by study condition.

Among the overall sample, we found domain-specific bivariate associations between the perceived environment and self-reported PA variables at baseline (Table 2). Perceived safety from crime was positively associated with self-reported leisure-time MVPA ($\beta = 0.29$, SE = 0.15, $P = .05$). Having access to destinations near the home was also positively related to reporting any transportation PA (odds ratio [OR] = 2.74, 95% confidence interval [CI], 1.22–6.17).

The only significant perceived environment moderator of intervention effects on accelerometer-based MVPA was neighborhood esthetics (interaction $P = .05$; Table 3). Among participants reporting favorable perceived neighborhood esthetics, those in the PA intervention had about 48 more minutes/wk of accelerometer-based MVPA at 12-month follow-up than attention control participants (Figures 1 and 2). Among those reporting less favorable perceived neighborhood esthetics, accelerometer-based MVPA at 12-month follow-up was similar across study conditions.

Perceived neighborhood esthetics was also a significant moderator of intervention effects on self-report leisure-time MVPA (interaction $P = .003$; Table 3). Among those who reported favorable perceived neighborhood esthetics, PA participants had significantly more log leisure-time MVPA minutes/wk (4.6) than attention control participants (4.1). Among those with less favorable perceived neighborhood esthetics, self-reported leisure-time MVPA was similar across study condition. No other interactions were significant at $P < .05$.

Discussion

Among this sample of low-active Latinas participating in a *promotora*-led PA intervention in San Diego County, those reporting more favorable neighborhood esthetics seemed to benefit from the intervention more than those reporting less satisfying neighborhood esthetics. Specifically, reporting more favorable neighborhood esthetics appeared to enhance the intervention's effects of increasing both participants' accelerometer-based MVPA and self-report leisure-time MVPA, independent of sociodemographic characteristics. Because no other built or social environmental moderators of intervention effects were found, our overall findings suggest a *promotora*-led PA intervention may promote PA equitably among Latinas with or without environmental barriers to PA.

Moderating effects of perceived neighborhood esthetics on a PA intervention were found in 2 other studies.[12,37] Gebel et al found favorable perceived neighborhood esthetics combined with having facilities (eg, benches) nearby facilitated the effects of a mass media campaign on self-reported walking among adults, particularly the least active at baseline.[12] That is, study participants who reported favorable neighborhood esthetics/having facilities had about 45 minutes/wk more of walking at 3-month follow-up than those reporting less favorable esthetics/lack of facilities.[12] This finding is consistent with our results. Merom et al also found perceived neighborhood esthetics moderated the effects of a self-help walking program on self-reported walking among low-active adults.[37] However, the authors found that the intervention seemed to benefit more participants with *less* favorable neighborhood esthetics. The authors of that study suggested the intervention could help those with perceived environmental barriers to become more physically active.

One possible explanation for our findings is that participants reporting less favorable neighborhood esthetics (based on the presence of trees, attractive buildings/homes in the neighborhood, etc.) lived in areas with greater neighborhood poverty and disorder (crime, vandalism, graffiti, etc.), which may hinder participants' motivation to perform PA in the neighborhood.[8,18] Although we did not measure neighborhood income or indicators of neighborhood disorder, studies suggest predominantly Latino neighborhoods are likely to have more physical disorder, disrepair (eg, worse sidewalk conditions), and vacant lots/houses than predominantly white neighborhoods.[18] Perceived neighborhood disorder has been linked to feelings of mistrust and fear of victimization.[38] Perceived neighborhood social cohesion and safety from crime did not moderate intervention effects in our sample. Thus, other social environmental barriers not measured in our study may have impeded participants with less satisfying neighborhood esthetics from increasing their PA to the same extent as their peers reporting more favorable neighborhood esthetics.

We also observed that among attention control participants, those with favorable perceived neighborhood esthetics scores had lower accelerometer-based MVPA and self-report leisure-time MVPA at 12 months than those reporting less favorable evaluations. A possible explanation for this finding is that compared to those reporting high neighborhood esthetics scores, participants reporting low scores may have walked more in their neighborhoods for exercise or out of necessity (eg, to get to/from destinations) and greater exposure to their neighborhood surroundings may have led to more biased (eg, critical) evaluations of their neighborhood esthetics.

Possible explanations for the lack of moderating effects by other perceived environmental factors include weak associations between the home environment perceptions and PA that occurred outside of the home environment. Although the intervention distributed handouts that encouraged participants to perform PA (leisure and transportation related) outside of classes such as walking in their neighborhoods, the focus of the intervention was on PA classes that occurred in or around the church. Thus, it is not surprising that most home neighborhood environment perceptions did not have significant moderating effects on the intervention. To more accurately examine PA in or outside the home neighborhood, global positioning system–based assessments are recommended.[39,40] It is possible that participants who had less favorable evaluations of their neighborhood environments found alternative

locations for PA. Other reasons for the lack of moderating effects include lack of statistical power to test interactions and lack of environmental variability. At baseline, perceived neighborhood esthetics showed the most difference between study conditions, with the PA condition reporting a much lower mean score on neighborhood esthetics compared to the attention control condition. Further, favorable perceptions of neighborhood esthetics (the most subjective environmental factor in this battery) may reflect other participant-related constructs such as positive attitude or optimism.

Despite the limited number of moderating effects found by perceived neighborhood environmental factors, our finding for neighborhood esthetics can help inform future *promotora*-led PA interventions. A *promotora*-led intervention that encourages Latinas to be active in their neighborhoods may target esthetics-related factors such as the attractiveness of the neighborhood as part of environmental advocacy efforts with remedial actions taken to address those factors that could potentially discourage PA. Further, our overall findings suggest a *promotora*-led PA intervention may equitably enhance PA among Latinas with varying perceptions of their home neighborhood environment. Understanding the mechanisms by which this type of intervention promoted PA among participants regardless of their perceived environment is beyond the scope of this article and could be a topic for future studies. We hypothesize PA programs that build interpersonal relationships and enhance social support for PA may be particularly effective at promoting Latinas' PA even when neighborhood environments are not conducive to activity. However, for sustainable PA behavior change, efforts may be needed to ensure the environments in which participants are to be active continue to support active lifestyles when the intervention is removed.

Strengths and Limitations

Strengths of this study included the use of both accelerometer and self-report measures of PA. In contrast to most studies of PA, which use only cross-sectional data, we included longitudinal data. Because we did not recruit participants to purposively maximize variability in neighborhood environmental characteristics, the environmental effects on PA behavior change may be underestimated. Our findings may not be generalizable to other populations or geographical contexts. We only used perceived environment measures; thus, findings using objective environment measures could supplement our findings. Although multiple hypothesis testing (7 interactions tested per outcome) can increase the type I error rate, we made no adjustments to our analyses because it was exploratory in nature. Given the limited and inconsistent evidence from studies testing environmental moderators of PA intervention effects, we did not have any a priori hypotheses for how participant perceptions might impact the effects of the intervention. *Fe en Acción* was not powered to detect subgroup differences in intervention effects by participant perceived environmental factors. Therefore, our findings should be interpreted with caution and need to be replicated in other studies. Future studies would need to sample from geographically diverse neighborhoods to achieve greater variation in environmental characteristics, enhancing statistical power. In addition, other possible confounders not measured in the present study may have influenced our results such as knowledge about the health benefits of PA and PA goal setting. We also did not examine specific intervention components such as MI calls and class attendance as such analyses were beyond the scope of the present article.

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SO WHAT?

What is already known on this topic?

Although *promotora*-led interventions have shown promise in promoting Latinos' physical activity (PA), few studies have examined whether participants' perceptions of their neighborhood environments moderate the effects of such interventions on PA behavior change. Evidence from studies examining environmental moderators of PA intervention effects has varied with respect to which environmental characteristics are more likely to maximize intervention effects.

What does this article add?

This prospective study involving a low-active sample of Latina women showed that favorable perceptions of neighborhood esthetics maximized the effects of a *promotora*-led intervention on increasing accelerometer-based moderate to vigorous physical activity (MVPA) and self-report leisure-time MVPA levels, independent of sociodemographic factors. Specifically, intervention participants had higher activity levels at 12-month follow-up compared to attention control participants only when neighborhood esthetics were evaluated favorably (ie, more conducive to activity). No differences in activity levels by study condition were observed among those with less favorable perceived neighborhood esthetics. These findings suggest that neighborhood esthetics may be an important facilitator for PA behavior change among Latinas in interventions that promote leisure-time PA.

What are the implications for health promotion practice or research?

Our findings suggest better neighborhood esthetics may maximize the effectiveness of a *promotora*-led intervention promoting active lifestyles among Latinas. Overall, lack of evidence for other environmental moderators suggests a *promotora*-led PA intervention may promote Latinas' PA regardless of how participants perceive their neighborhood environments. Nevertheless, because predominantly-Latino neighborhoods are characterized by poor perceptions of safety, physical disorder, and unfavorable esthetics, [18] it is important that PA interventions and policies identify ways of reducing environmental disparities that may be placing Latinos at risk for inactive lifestyles and consequently, obesity and chronic health conditions. In addition, for sustainable PA behavior change, efforts are needed to ensure the environments in which Latinos are encouraged to be active support active lifestyles following participation in an intervention.

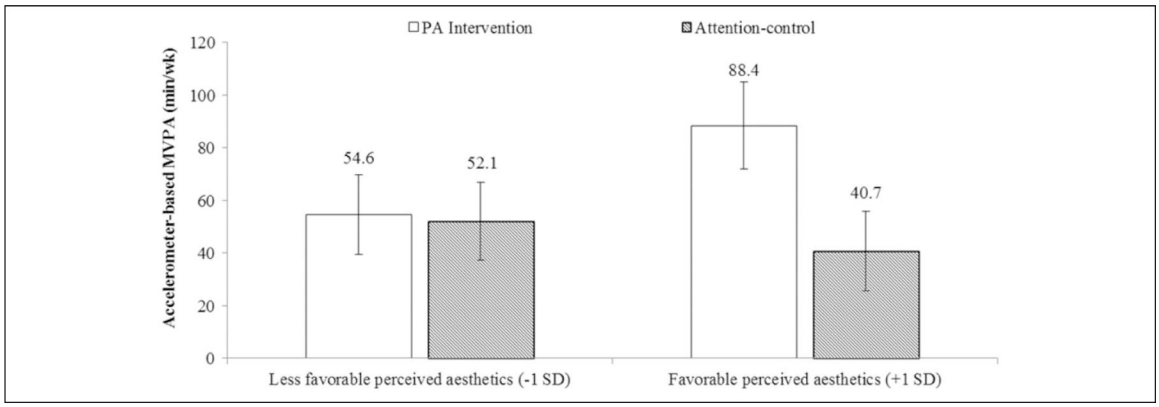

Figure 1.

Perceived neighborhood esthetics moderated the intervention effects on participants' accelerometer-based moderate to vigorous physical activity (MVPA) at 12-month follow-up. *Fe en Acción*/Faith in Action, 2011–2014, San Diego, CA.

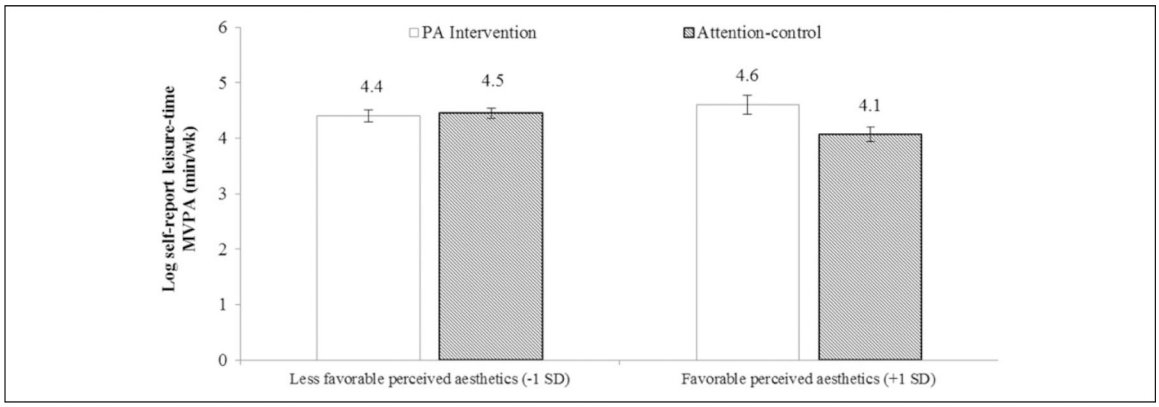

Figure 2.

Perceived neighborhood esthetics moderated the intervention effects on participants' self-reported leisure-time moderate to vigorous physical activity (MVPA) at 12-month follow-up. *Fe en Acción*/Faith in Action, 2011–2014, San Diego, CA.

Table 1.

Baseline Characteristics of Latinas (18–65 Years) by Study Condition.[a]

	Study Condition[b]			
Characteristic	**Physical Activity (n = 157)**		**Attention Control (n = 162)**	
Sociodemographic	**Mean**	**SE**	**Mean**	**SE**
Age in years	45.26	1.00	44.27	0.99
Years living in the United States	22.43	1.07	19.77	1.06
Number of vehicles in household	2.04	0.08	1.85	0.08
Number of adults in household	3.00	0.12	2.89	0.12
	n	%	n	%
Born in Mexico	140	89.17	148	91.93
Married/living as married	125	80.13	122	76.25
Monthly household income <$2000	84	54.90	93	62.42
Completed less than high school	80	51.28	88	54.66
Employed	112	72.73	104	64.20
Physical activity				
Accelerometer-assessed MVPA, minutes/wk	103.44	7.40	106.21	7.37
Log self-reported leisure-time MVPA, minutes/wk[c]	4.30	0.25	4.18	0.25
	n	%	n	%
Self-reported any transportation PA	48	30.57	59	36.42
Perceived neighborhood environment[d]	Mean	SE	Mean	SE
Sidewalk maintenance (range: 1–4)	3.40	0.07	3.39	0.07
Safety from traffic (range: 1–5)	3.69	0.10	3.67	0.10
Safety from crime (range: 1–5)	3.78	0.11	3.77	0.10
Neighborhood esthetics (range: 1–5)	3.06	0.08	3.26	0.08
Neighborhood social cohesion (range: 1–3)	2.49	0.03	2.48	0.03
	n	%	n	%
Has access to destinations (eg, stores) near the home	127	80.89	143	88.27

Characteristic	Study Condition[b]			
	Physical Activity (n = 157)		Attention Control (n = 162)	
Sociodemographic	Mean	SE	Mean	SE
Has access to recreational facilities near the home	133	84.71	146	90.12

Abbreviations: MVPA, moderate to vigorous physical activity; PA, physical activity; SE, standard error.

[a] *Fe en Acción*/Faith in Action, 2011–2014. San Diego, CA.

[b] No significant differences (.05 < *P*) were found between study conditions on any of the baseline characteristics.

[c] Based on negative binomial distribution. Results are in logged units.

[d] Higher scores indicative of more favorable perceptions.

Table 2.

Bivariate Associations of Perceived Neighborhood Environment Variables With Participants' Physical Activity at Baseline.[a,b,c]

	Accelerometer-Based MVPA			Log Self-Reported Leisure-Time MVPA[d]			Self-Reported any Transportation PA		
Perceived Neighborhood Environment Variable	**β**	**SE**	***P***	**β**	**SE**	***P***	**OR**	**95% CI**	***P***
Sidewalk maintenance	−3.2	3.55	.37	0.08	0.11	.29	0.94	0.74–1.20	.62
Safety from traffic	1.06	3.52	.76	0.18	0.10	.07	1.00	0.79–1.27	.99
Safety from crime	1.13	3.54	.75	**0.29**	**0.15**	**.05**	0.98	0.77–1.25	.88
Neighborhood esthetics	5.18	3.53	.14	0.10	0.07	.18	1.10	0.87–1.40	.43
Neighborhood social cohesion	−1.44	3.53	.68	0.02	0.09	.81	1.05	0.82–1.33	.71
Has access to destinations near the home	18.45	9.79	.06	−0.03	0.21	.88	**2.74**	**1.22–6.17**	**.02**
Has access to recreational facilities near the home	−0.04	10.64	.99	−0.02	0.35	.96	0.72	0.36–1.46	.36

Abbreviations: MVPA, moderate to vigorous physical activity; PA, physical activity; SE, standard error; CI, confidence interval.

[a] Boldface values are significant at 0.05 level.

[b] *Fe en Acción*/Faith in Action, 2011–2014. San Diego, CA.

[c] Mixed-effects or generalized linear mixed models used to control for clustering effects of the churches.

[d] Model used a negative binomial distribution.

Table 3.

Significant Perceived Environment Moderators of Intervention Effects on Participants' Physical Activity at 12-Month Follow-Up.[a]

Physical Activity Model	β[b]	SE	*P*-Value
Accelerometer-based MVPA			
Baseline accelerometer-based MVPA	0.73	0.09	<.0001
Neighborhood esthetics	−5.67	7.77	.47
Condition (ref: Attention control)	25.11	11.49	.03
Neighborhood esthetics × condition	22.56	11.62	.05
Log self-reported leisure-time MVP[c]			
Baseline self-reported leisure-time MVPA	0.003	0.00 I	<.0001
Neighborhood esthetics	−0.19	0.03	<.0001
Condition (ref: Attention control)	0.25	0.14	.08
Neighborhood esthetics × condition	0.29	0.10	.003

Abbreviations: MVPA, moderate to vigorous physical activity; PA, physical activity; SE, standard error.

[a] *Fe en Acción*/Faith in Action, 2011–2014. San Diego, CA.

[b] Mixed-effects or generalized linear mixed models used to adjust for clustering effects of the churches. Models controlled for baseline PA, age, marital status, vehicle access, and employment.

[c] Model used a negative binomial distribution.