



# Can a twelve-week intervention reduce barriers to bicycling among overweight adults in low-income Latino and Black communities?



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## ABSTRACT

This pilot study summarizes perceived barriers to bicycling among overweight adults in two low-income communities of color and evaluates the impact of a bicycling intervention on these perceived barriers. A randomized controlled trial with 38 total participants from one predominantly Latino and one predominantly Black neighborhood in Milwaukee, Wisconsin was conducted during summer 2015. The twelve-week intervention consisted of group bicycle rides and bicycling instruction. Several barriers identified prior to the intervention declined significantly among intervention group members soon after it was completed: not feeling healthy enough to bike, being physically uncomfortable while biking, not having a bicycle to use, not having other people to bicycle with, not knowing the best routes to use, not feeling safe from crime, not feeling safe from car traffic, and worrying that neighbors do not think it is normal for an adult to ride a bike. Eight weeks after completion, the intervention group reported significantly greater reductions than the control group with respect to the barriers of not feeling healthy enough to bike and not feeling safe from car traffic. In addition to decreasing barriers, qualitative analysis suggested that increasing support from family and friends as well as emphasizing personal health benefits could help motivate people to bicycle.

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## 1. Introduction

Bicycling has been found to significantly improve health and reduce the risk of cardiovascular disease (Furie & Desai, 2012; Hamer & Chida, 2008; Oja et al., 2011; Sahlqvist et al., 2013), the leading cause of death in the United States (National Center for Health Statistics, 2015). While bicycle travel is increasing at a national level (Federal Highway Administration, 2009; McKenzie, 2014), people in low-income communities and Latino and Black communities may experience different barriers than other groups, such as access to a working bicycle, bicycle theft, personal security, police harassment, intimidating driver behavior, safety around industrial vehicle traffic, and bicycling being viewed as an indicator of low social status (Community Cycling Center, 2012; Fuller and Beltran, 2010; McCray et al., 2011; McCray, Durden, and Schaubert, 2013; Barajas, Chatman, and Agrawal, 2016; Brown & Sinclair, 2017). Working-class Latino immigrants may face

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additional barriers, such as not knowing their legal rights as a bicyclist due to not understanding English (Fuller & Beltran, 2010). To address these barriers and support bicycling policies and programs that serve all people, national bicycling organizations have established equity initiatives (Lugo, 2015). Efforts to overcome barriers to bicycling could have transportation and health benefits for people in communities of color.

Milwaukee, Wisconsin exemplifies bicycling and health disparities. Bicycling to work is four times more common in Milwaukee neighborhoods that have a majority of White residents and median annual households of more than \$50,000 (1.2% commute regularly by bicycle) than in city neighborhoods that have a majority of residents of color and median annual household incomes of less than \$50,000 (0.3% commute regularly to work by bicycle) (US Census Bureau, 2014). These neighborhoods with low rates of bicycling correspond closely with zip codes characterized as lower socioeconomic status (measured by income and education), which have higher rates of obesity, lower rates of physical activity, and lower life expectancy than other Milwaukee zip codes (Greer et al., 2013).

To address this challenge, a multi-disciplinary academic-community partnership was formed between the Medical College of Wisconsin, the University of Wisconsin-Milwaukee, the Wisconsin Bicycle Federation, Sixteenth Street Community Health Centers, and Silver Spring Neighborhood Center to implement a small-scale intervention to encourage bicycling in a predominantly Latino neighborhood on the south side and a predominantly Black neighborhood on the north side of Milwaukee. The twelve-week intervention involved group bicycle rides and bicycle instruction and was evaluated using a randomized controlled trial. All participants in the intervention and control groups were physically inactive and overweight at the beginning of the pilot study. Information about perceived barriers to bicycling was gathered from a bicycle attitudes survey at the start of the study, immediately after the intervention was completed (Week 12), and eight weeks after the intervention was completed (Week 20).

Theories such as the Transtheoretical Model (TTM) (Prochaska and DiClemente, 1986) and the Theory of Planned Behavior (TPB) (Ajzen, 1991) suggest that overcoming barriers is an important step in the behavioral change process. TTM considers behavioral change as a process in which people go through multiple stages, including “precontemplation,” “contemplation,” “preparation,” “action,” and “maintenance.” Overcoming barriers to an activity is a key aspect of moving from one stage to another in this process. Gatersleben and Appleton (2007) provide evidence that people in the earliest, “precontemplation” stage perceive more personal barriers to bicycling (e.g., not feeling physically fit to bicycle, worrying that others would look at them strangely for bicycling) than other people who are bicycling or are nearly ready to start bicycling. People who were still in the “contemplation” stage perceive more structural barriers to bicycling (e.g., unsafe streets, inadequate bicycle facilities) than other people in later stages. TPB suggests that behavior is influenced by three categories of factors: personal attitudes towards a behavior, subjective norms about a behavior, and an individual's perceived control over the behavior. Perceived barriers are an important component of the third category, called perceived behavioral control (PBC). Dill, Mohr, and Ma (2014) summarize findings from several recent studies of bicycling behavior and emphasize that barriers such as lack of confidence bicycling in traffic, lack of personal fitness, and inconvenience of bicycling relative to driving likely prevent bicycling because they reduce PBC. Therefore, both the TTM and TPB suggest that reducing perceived barriers can increase bicycling activity.

This paper answers the following question: can a twelve-week intervention reduce barriers to bicycling among participants in low-income Latino and Black communities? First, we identify environmental, socioeconomic, and psychological barriers that may prevent overweight adults in these types of communities from bicycling. Second, we determine which barriers, if any, were reduced by the bicycle group rides and instruction.

## 2. Literature review

General categories of barriers to bicycling include built environment, natural environment, socioeconomic, and psychological factors (Heinen, van Wee, & Maat, 2010). Barriers related to the built environment include long trip distances and travel times (Buehler, 2012; Cervero & Duncan, 2003; Fraser & Lock, 2010; Handy, van Wee, and Kroesen, 2014; Handy et al., 2010; Heinen, Maat, & van Wee, 2011; Sears, Flynn, Aultman-Hall, & Dana, 2012), high-speed and high-volume traffic (Dill et al., 2014; Fishman, Washington, & Haworth, 2012; Fraser & Lock, 2010; Wahlgren & Schantz, 2014; Winters, Davidson, Kao, & Teschke, 2010), a lack of designated and connected bicycle facilities (Dill & Carr, 2003; Titze et al., 2008; Fishman et al., 2012; Fraser & Lock, 2010; Handy, van Wee and Kroesen, 2014; Heinen et al., 2010; Winters et al., 2010), and a lack of bicycle parking and showers (Buehler, 2012). Bicycling can be deterred by natural environment characteristics such as bad weather (Heinen et al., 2011; Schneider & Hu, 2015; Sears et al., 2012; Winters et al., 2010), steep slopes (Cervero & Duncan, 2003; Fraser & Lock, 2010; Winters et al., 2010), and darkness (Cervero & Duncan, 2003; Heinen et al., 2011; Winters et al., 2010). Socioeconomic characteristics such as not owning a bicycle (Handy, van Wee, and Kroesen, 2014; Heinen et al., 2010) and owning an automobile (Cervero & Duncan, 2003; Heinen et al., 2010) make bicycling less probable. An individual's job or personal relationships may require traveling with packages or wearing business attire, both of which are barriers to bicycling (Heinen et al., 2011). Traveling with young children may also be a barrier to bicycling (Heinen et al., 2010).

Psychological barriers to bicycling include not enjoying the activity of bicycling (Dill et al., 2014; Handy et al., 2010; Schneider, 2013), not having pro-environmental attitudes (de Geus, De Bourdeaudhuij, Jannes, & Meeusen, 2008), and not having social supports for bicycling (Titze et al., 2008; Campbell & Bopp, 2013; de Geus et al., 2008; Spotswood,

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