

Promoting stair usage through motivational signage: a study in a predominantly african american municipal building.

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Abstract:

Background: Stair climbing, a recognized form of physical activity, offers substantial health benefits and holds potential for promoting an active lifestyle. Motivational signage has proven effective in encouraging stair use across various contexts. **Purpose:** This study aimed to assess the influence of motivational signage on stair usage within a predominantly African American community. **Methods:** Over a six-week period, stair usage was observed during two phases (baseline and intervention) across five stories of a municipal building. Motivational signage was strategically placed throughout the building during the intervention phase. Stair usage data were analyzed based on participants' gender and race. **Results:** The study included 7,408 participants, with 45.4% being male. Among the participants, 64.1% identified as African American, 34.3% as White, and 1.5% as belonging to other racial backgrounds. Baseline stair usage stood at 89.5%. Despite the intervention, no statistically significant changes in stair usage were observed across gender and racial categories. The findings indicate that the introduction of motivational signage did not yield a significant increase in stair usage within the five-story municipal building. **Conclusions:** Potential contributing factors to this outcome could explain the study's finding. Several factors may explain the study's findings. Firstly, the building's height, spanning five stories, may have led to lower stair usage, as research suggests people are less likely to use stairs in taller buildings. Secondly, the majority of participants were older adults, and younger adults tend to use stairs more, which could explain the initial low stair usage rate. Moreover, the effectiveness of motivational signage may have been limited because many participants were one-time visitors, unlike those in busier places who see such signs regularly. Repeated exposure to these signs can reinforce their impact, but this wasn't the case here due to the observation hours and visitor patterns. These factors may have limited the efficacy of motivational signage in promoting stair use. Further research is warranted to explore alternative strategies for encouraging physical activity in similar settings.

Keywords: physical activity, health behavior, health promotion, active lifestyle

Introduction

Engaging in regular exercise and physical activities offers a multitude of benefits, ranging from enhanced fitness to the prevention of chronic ailments such as cardiovascular disease, diabetes, cancer, hypertension, obesity, depression, and osteoporosis (Gebel et al., 2015; Sabia et al., 2012; Warburton, Nicol, & Bredin, 2006). Current guidelines stipulate that American adults should aim for 150 minutes of moderate-intensity aerobic activities along with muscle-strengthening exercises at least two days a week to reap health advantages (Piercy et al., 2018). The American College of Sports Medicine (ACSM) echoes these recommendations, suggesting either 30 minutes of moderate-intensity aerobic activity for five days weekly or 20 minutes of vigorous aerobic activity for three days to foster and sustain health (Haskell et al., 2007). However, merely 20.6% of adults meet both aerobic and muscle-strengthening guidelines (23.4% among males and 17.9% among females) as of 2011 (Harris et al., 2013). Disparities are evident among racial/ethnic groups, with Hispanic adults (18.4%) lagging behind non-Hispanic blacks (21.2%), non-Hispanic whites (20.7%), and other racial categories (22.8%).

The endeavor to encourage consistent exercise faces challenges, with dropout rates reaching up to 63% within three months and less than 4% remains for more than twelve months of continuous activity in an unsupervised setting (Sperandei, Vieira, & Reis, 2016). The persistence and maintenance of high levels of physical activity prove to be formidable tasks. Hence, a viable strategy to bolster activity levels revolves around gradual lifestyle modifications that steadily increase physical engagement.

Among the accessible and straightforward methods to amplify physical activity, daily walking stands out. Activities like walking and stair climbing provide routine opportunities to elevate physical exertion and energy expenditure, constituting convenient yet effective means to attain health benefits (Ruff et al., 2014). These activities can be seamlessly integrated into daily routines (J. Kerr, Eves, & Carroll, 2001).

Stair climbing, akin to walking, represents an economical and widely available physical activity that necessitates no specialized equipment. Its moderate to vigorous intensity demands more energy compared to regular walking, rendering it an excellent fitness pursuit (Teh & Aziz, 2002). Multiple studies have illuminated the health advantages of stair climbing (Dunford et al., 2021; Hongu et al., 2019; Rey-Lopez, Stamatakis, Mackey, Sesso, & Lee, 2019; Whittaker et al., 2021), and diverse interventions have been designed to incentivize stair usage.

Previous interventions have involved the placement of motivational signage, posters, or banners conveying health, calorie, or weight-related messages at the decision point between stairs and elevators or escalators. These initiatives have been implemented across various settings, including workplaces (Auweele, Boen, Schapendonk, & Dornez, 2005; Eves & Webb, 2006; Eves, Webb, & Mutrie, 2006; Houweling, Stoopendaal, Kleefstra, Meyboom-de Jong, & Bilo, 2005; N. A. Kerr, Yore, Ham, & Dietz, 2004; Kwak, Kremers, van Baak, & Brug, 2007) and community environments (Boen, Maurissen, & Opdenacker, 2010; Coleman & Gonzalez, 2001; Iversen, Handel, Jensen, Frederiksen, & Heitmann, 2007; Ryan, Lyon, Webb, Eves, & Ryan, 2011; Webb, Eves, & Smith, 2011). The implementation of motivational signage has consistently yielded notable increases in stair usage, with observed improvements ranging from 2% to 16% compared to baseline (Grimstvedt et al., 2010). However, limited attention has been given to evaluating the impact of motivational signage within minority communities such as Hispanics (Iversen et al., 2007; Yoon et al., 2020) or African Americans. In the United States, African Americans have one of the highest obesity rates at 49.9%, followed by Hispanics at 45.6%, non-Hispanic white at 41.4%, and non-Hispanic Asians at 16.1% (Stierman et al., 2021). In the southeastern United States, where the study is conducted, obesity rates are notably high. In Georgia, obesity rates stand at 44.3% for African Americans, 32.5% for Caucasians, and 32.6% for Hispanics (Center for Disease Control and Prevention [CDC], 2022). Physical inactivity is a significant health concern in the United States, affecting people of all racial and ethnic backgrounds, including African Americans. The lack of physical activity is associated with various health problems, and African Americans may face unique challenges related to physical inactivity. Therefore, there is a need to explore methods for naturally boosting daily physical activity levels, and incorporating stair usage could be a valuable approach. Furthermore, it is crucial to investigate whether this strategy could help mitigate the elevated obesity rates among African Americans. Despite the elevated prevalence of obesity in African American populations, studies assessing the influence of motivational signage in such communities remain scarce. This study aims to investigate the impact of motivational signage on stair usage, considering gender (male or female) and race (African American, Caucasian, and others), within a municipal building situated in a predominantly African American community.

Material & methods

Participants and Training:

The primary target demographic of this study comprised individuals visiting the designated municipal building. To ensure consistent and reliable data collection, trained observers underwent a comprehensive training session encompassing data collection protocols and predefined criteria.

Data Collection:

The study encompassed two distinct phases: 1) the baseline phase and 2) the intervention phase. Data collection occurred during designated time frames: 9 am to 11 am and 1 pm to 3 pm on weekdays (Monday to Friday). The observation focused on individuals' choices between using stairs and elevators within a 5-story municipal building.

- 1) Baseline Phase (3 weeks): The initial phase entailed the collection of stair and elevator usage data without any interventions. This phase served as a reference point for subsequent analysis.
- 2) Intervention Phase (3 weeks): During the subsequent phase, motivational interventions were implemented. Specifically, motivational signages were strategically placed at key locations, including stairwell walls, elevator interiors and exteriors, and choice points between stairs and elevators (as depicted in Figure 1).

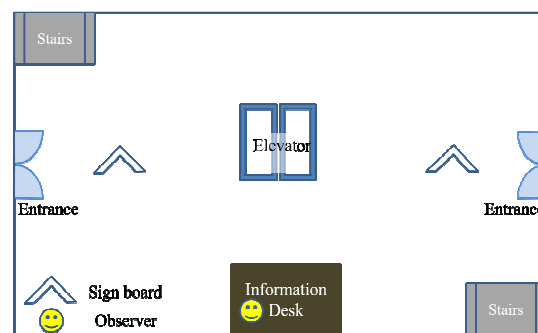


Figure 1. Layout of the motivational signage setting in the municipal building.

The motivational signages conveyed information such as calorie expenditure associated with stair climbing, health-related insights, average elevator door-opening time, motivational quotes, visual aids, and interactive Q&A elements.

Data Analysis:

Descriptive statistics were computed for gender and race, both of which could influence an individual's choice between stairs and elevators, during each intervention phase. Chi-square tests were employed to assess the relationship between stair usage and gender, as well as race, within each intervention phase. Additionally, the percentage change in stair usage was calculated for each subgroup by subtracting baseline phase values from those of the intervention phase.

All statistical analyses were performed using SPSS software, version 20. SPSS is a recognized tool for comprehensive data analysis and interpretation. Statistical significance was determined using an alpha level of .05, following established conventions within the field.

Results

A total of 7,408 participants were observed throughout all study phases, encompassing both the baseline and intervention periods. Among these participants, 46.8% (n=3,465) were identified as males, while 53.2% (n=3,946) were females. Within the cohort, 62.5% (n=4,631) self-identified as African American, 36.0% (n=2,667) as Caucasian, and 1.5% (n=110) fell into the "others" category.

Notably, stair users constituted a minority, accounting for only 10.6% (n=782) of the observed participants. Comprehensive descriptive statistics regarding the participant demographics are furnished in Table 1. Table 2 offers an insightful breakdown of stair usage percentages across diverse subgroups during each intervention phase.

Table I. Descriptive statistics of the participants in this study.

		Baseline	Intervention
Total participants (N = 7,408)		4,020	3,388
Gender	Male	1,725 (42.9%)	1,742 (51.4%)
	Female	2,295 (57.1%)	1,646 (48.6%)
Race	African American	2,679 (66.6%)	1,952 (57.6%)
	White American	1,266 (31.5%)	1,401 (41.4%)
	Latino American and Others	75 (1.9%)	35 (1.0%)

Table II. Participants' stair use percentage across intervention phases.

		Baseline		Intervention	
		Stairs	Elevator	Stairs	Elevator
Gender	Male	15.3%	84.7%	11.7%	88.3%
	Female	7.1%	92.9%	9.3%	90.7%
Race	African American	11.0%	89.0%	10.9%	89.1%
	White American	10.2%	89.8%	9.6%	90.4%
	Latino American and Others	4.0%	96.0%	25.7%	74.3%

In aggregate, the overall stair usage for all participants exhibited marginal change during the intervention phase (10.6%) in comparison to the baseline phase (10.5%). This modest difference did not reveal any noteworthy increase in stair usage. Notably, stair usage patterns remained relatively stable across various subgroups, including gender and race. The introduction of motivational interventions did not yield a significant shift in stair usage rates among these distinct demographic categories.

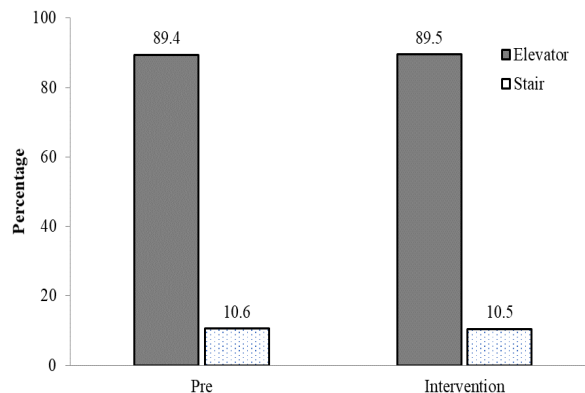


Figure 2. Total Stair/Elevator usage.

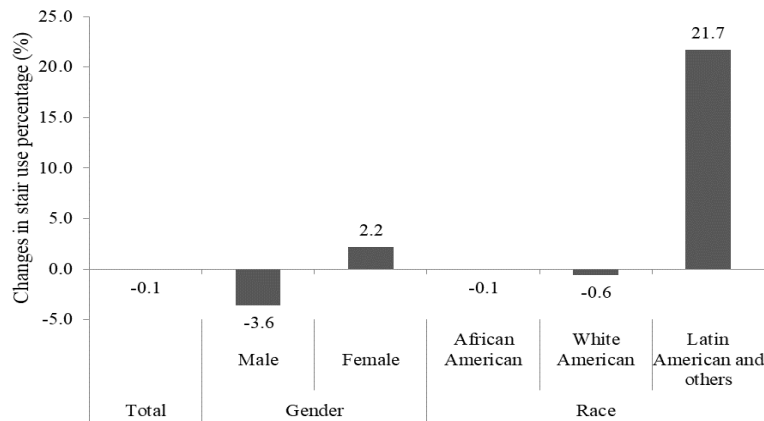


Figure 3. Changes in stair use percentage during intervention phases for each subgroup (Note. Changes in stair use percentage was computed by subtracting stairs use % during pre-intervention.)

Discussion

The primary objective of this study was to assess the impact of motivational signage on stair usage based on gender and ethnicity within a municipal building. A unique aspect of our investigation was its focus on a predominantly African American community, an area where this type of study was notably lacking. Given the demographics of the city, which consists of 71.7% African American, 25.3% Caucasian, and 3.0% other ethnicities, our study holds particular significance (U.S. Census Bureau, 2020). The potential to alter participants' unhealthy habits and behaviors through motivational interventions, especially within the context of the African American community – characterized by the highest obesity rates in the US – carried important implications. Despite these objectives, our motivational signage initiatives did not yield the anticipated impact on stair usage within the municipal building.

In this study, there were no significant differences in stair usage rates based on gender or ethnicity. While there was a relatively large observed increase of 21% in stair usage among the Latin American and other ethnic groups, it cannot be attributed to ethnic differences due to the small sample size. We have identified several key factors that likely contributed to this outcome.

Firstly, our study's baseline stair usage rate of 10.6% was comparatively lower than that reported in previous researches (Auweele et al., 2005; Boen et al., 2010; Iversen et al., 2007; J. Kerr et al., 2001; Marshall, Bauman, Patch, Wilson, & Chen, 2002; Ryan et al., 2011). This discrepancy might be attributed to the age distribution of our participants, a majority of whom were older adults. The participants in this study mainly comprised individuals who visited government buildings for administrative purposes, with a predominant representation of middle-aged and older age groups. Increasing stair use in office buildings when competing against elevators is challenging (Moloughney, Bursey, Fortin, Morais, & Dang, 2019). In line with prior research conducted among university students within 4 or 5-story buildings, the baseline stair usage rate usually hovers around 40% (Yoon et al., 2020). However, a significant contrast emerged when comparing our findings to this established benchmark, as the observed rate in our study proved notably higher. This variance can be attributed to the inherent disparity in physical activity levels between younger adults and their middle-aged and older counterparts. This distinction serves to elucidate the lower initial stair usage rate recorded within the scope of our study.

An additional factor influencing lower stair usage rates could be attributed to the number of building floor levels. Height of the building negatively related to the stair usage. Research suggests that stair usage tends to decrease with an increase in floor levels (Ruff et al., 2014). In this context, the 5-story configuration of our building could have contributed to the observed lower stair usage when compared to buildings with fewer than 4 stories.

Furthermore, the impact of motivational signage could have been limited by the participants' lack of repeated exposure. Unlike pedestrians in bustling environments such as shopping malls or transport terminals, our participants did not encounter the motivational signage on a daily basis. Prior research has shown that repeated exposure reinforces the influence of such signage, potentially leading to sustained behavioral change even after signage removal (Boen et al., 2010). The specific observation hours of 9 am to 11 am and 1 pm to 4 pm, which are not peak rush hours, and the prevalence of visitors during these times might have constrained the participants' exposure to the motivational signage, thus dampening its potential impact on stair usage.

As indicated by prior research, the selection between stairs and escalators may be more a result of social imitation of others' choices rather than a direct effect of the message itself (Webb et al., 2011). This implies that the presence of such messages might not directly induce immediate behavioral changes, particularly among individuals visiting alone. Consequently, this aspect could offer insight into the potential reasons behind the observed absence of significant stair usage increase in our study.

Acknowledging these findings, we recognize several limitations in our study design. The cross-sectional nature of our research precludes us from drawing definitive causal conclusions, and we can only infer potential associations. The study was confined to 5-story buildings within a relatively brief intervention period of four weeks. The presence of direct human observers, while non-interfering, may have unintentionally influenced participants' behavior more subtly than would have been the case with indirect observation methods like motion sensing devices (Marshall et al., 2002).

Conclusions

Our study underscores the challenge of motivating increased stair usage through motivational signage interventions within a predominantly African American community in a municipal building. Despite the initial intent to spur positive behavior change, the effectiveness of these interventions appeared limited. Our findings emphasize the need for further investigations, involving diverse settings and extended durations, to identify more effective and sustainable interventions. Addressing these limitations will be pivotal in developing strategies that can genuinely encourage stair usage over elevator alternatives and potentially contribute to improved public health outcomes.

Conflicts of interest - None

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