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Does a video displaying a stair climbing model increase stair use in a worksite setting?

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ABSTRACT

Objectives: This study evaluated the effects of improving the visibility of the stairwell and of displaying a video with a stair climbing model on climbing and descending stair use in a worksite setting.

Study design: Intervention study.

Methods: Three consecutive one-week intervention phases were implemented: (1) the visibility of the stairs was improved by the attachment of pictograms that indicated the stairwell; (2) a video showing a stair climbing model was sent to the employees by email; and (3) the same video was displayed on a television screen at the point-of-choice (POC) between the stairs and the elevator. The interventions took place in two buildings. The implementation of the interventions varied between these buildings and the sequence was reversed.

Results: Improving the visibility of the stairs increased both stair climbing (+6%) and descending stair use (+7%) compared with baseline. Sending the video by email yielded no additional effect on stair use. By contrast, displaying the video at the POC increased stair climbing in both buildings by 12.5% on average. One week after the intervention, the positive effects on stair climbing remained in one of the buildings, but not in the other.

Conclusions: These findings suggest that improving the visibility of the stairwell and displaying a stair climbing model on a screen at the POC can result in a short-term increase in both climbing and descending stair use.

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Introduction

Due to the technological innovations in the past decades, being physically active has become a choice rather than a necessity to survive.^{1,2} Consequently, a large proportion of the

population does not attain the recommended norms for health-enhancing physical activity.^{2–4} Lack of physical activity has been linked to health problems such as cardiovascular and metabolic diseases.⁵ Therefore, population-based strategies that promote physical activity are needed. One way to

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increase people's physical activity level is to encourage them to regularly use the stairs.

Stair use has four major advantages compared with other forms of physical activity: (1) it is a low-cost activity; (2) public and private stairs are easily available; (3) stair use is a familiar activity; and (4) the vertical movement results in high energy expenditure in a short period, especially in overweight individuals.^{6,7}

Studies on stair-use promotion can be categorised into (1) studies comparing the effectiveness of one or more interventions in a particular setting, and (2) studies comparing the effectiveness of a particular intervention in multiple settings.

Studies comparing the effectiveness of one or more interventions

A first approach within this category is to evaluate the effectiveness of aesthetic improvements, such as adding decorative art posters and playing music in the stairwell.^{8,9} Such aesthetic stair use interventions have been shown to positively affect stair use. In the study of Boutelle et al.,⁸ for example, stair use significantly increased from 11.1% at baseline to 15.5% after implementing signs, music and art in a university building.

A second approach focuses on changing the spatial qualities and accessibility of the stairwell. Previous research has revealed that only very few buildings are designed in a way that stair use is encouraged.⁶ Moreover, Nicoll¹⁰ underscored the importance of the structure of the building relative to the convenience and legibility of stair use. They obtained eight spatial variables associated with stair use, for example, travel distance between stair and elevator.

A third approach focuses on the effects of prompts at the point-of-choice (POC). Prompts refer to physical or environmental events that are located between the stairwell and the elevator/escalator. These events inform individuals about the health benefits of stair use and/or nearby opportunities to use stairs. Prompts aim to motivate and remind people to take action.^{11,12} The most commonly used formats are signs, posters and billboards. They contain motivational messages such as: 'helps to keep you healthy',⁴ 'stay in shape, take the stairs',¹¹ and 'don't let the machines win, take the stairs'.⁹ Each of the abovementioned studies reported positive effects of the applied prompts on stair use.

Studies comparing the effectiveness of a particular intervention in multiple settings

Three types of settings can be distinguished within previous research on stair use: community settings, worksite settings and mixed settings such as university buildings. The specific characteristics of each of these settings should be taken into account when developing interventions. For example, worksite settings and community settings (e.g. public transport stations) usually have rush hours during which many people pass the same spot at the same time. Most of them are hurried to go home or to work. By contrast, visitors of a shopping mall (community setting) are rather in a relaxed mood. In addition, in a worksite setting the passers-by are the same almost every

day, whereas in public settings, a larger variety of people come and go.¹¹ Lee et al.¹³ evaluated the impact of a prompt across different building types such as a health clinic, academic building and housing site. Findings suggest that the prompt was effective, in comparison to baseline measurements, with a stair use increase of 6.4%, 8.7% and 4.4%, respectively. In a review of Bellicha et al.¹⁴ positive stair use results were reported during intervention periods in community, worksite and mixed settings.

Despite the large amount of interventions showing positive effects on stair use, current research within this domain suffers from at least three limitations.

First, interventions that focus on promoting stair climbing have been suggested to be more valuable than interventions that promote descending stair use. This argument is comprehensible because of the higher physiological impact of climbing stair use compared with descending stair use.^{4,11,13,16} However, descending stair use also results in burned calories and can therefore contribute to active habit formation and consequently health improvement.¹⁶ This is especially so because the exposure to a climbing stair use intervention can encourage pedestrians to use stairs on a subsequent occasion, for example, when a descending stair use opportunity occurs. Moreover, this indicates an increased intention toward stair use.¹⁷

Second, most stair use interventions have not considered environmental characteristics or deficiencies that are typical for the particular setting. Nevertheless, previous research has indicated that the specific design of the building plays an important role in the promotion of stair use and thus the successfulness of the intervention.^{6,10} For example Van Nieuw-Amerongen et al.¹⁵ reported a positive influence on stair use by improving the stairwell environment by replacing wooden doors by glass doors that could remain open without blocking the view to the stairwell. This is in line with the ecological model, which postulates that the most powerful interventions are implemented in a safe, attractive and convenient place for physical activity.¹⁸ Making the staircase visible and accessible might thus be essential to encourage stair use. The need to make the staircase visible was illustrated by Moore et al.⁶, who reported that 82% of the buildings in Vancouver had no sign on the stairwell door. Moreover, Eves et al.³ concluded that climbing stair use could be improved by enhancing the visibility, but only when the largest isovist (i.e. the visible scope on a particular place in the room) was used. In a study of Nicoll¹⁰, accessibility of the stairs was one of the variables associated with stair use.

A third limitation refers to the format of the applied prompts to stimulate stair use. Previous research has shown positive effects of displaying motivational messages on stair use.^{4,9,11,12} Furthermore, Webb and Eves⁴ suggested that messages on specific consequences are more persuasive than those providing general descriptions. In previous studies, motivational messages were usually displayed on signs or billboards. However, to our knowledge, the effectiveness of motivational messages displayed as dynamical figures has not yet been studied. Using dynamical figures appear valuable to promote stair use, given the importance of attractive places to participate in physical activity.¹⁸

Moreover, dynamical figures can not only convey motivational messages, but also show role models. Up to now, the

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