KU LEUVEN

GROEP BIOMEDISCHE WETENSCHAPPEN

FACULTEIT BEWEGINGS- EN REVALIDATIEWETENSCHAPPEN

Stair use promotion in a work setting: the effect of visibility and a health promotion video

door Lisa VAN CALSTER
en Arnaud OCTAEF

masterproef aangeboden, tot het behalen van de graad van Master of Science in de lichamelijke opvoeding en bewegingswetenschappen

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Heverlee, 22 mei 2015

L.V.C.

A.O.

SITUERING

Deze masterproef kadert binnen de onderzoeksgroep Fysieke Activiteit, Sport & Gezondheid van het Departement Bewegingswetenschappen, dat behoort tot de Faculteit Bewegings- en Revalidatiewetenschappen (FaBeR) van de KU Leuven. Deze eindverhandeling kan geplaatst worden binnen het onderzoeksdomein van de bewegingspsychologie. Hier tracht men via verschillende interventiestrategieën een gezonde en fitte levensstijl te promoten en dit voornamelijk bij een bevolking die onvoldoende fysiek actief is.

Een manier om de fysieke activiteit bij de sedentaire bevolking te verhogen is het introduceren van een actieve levensstijl en dus het integreren van voldoende fysieke activiteit in het dagelijkse leven (Leavitt, 2008). Zo kan het gebruiken van de trap in plaats van de lift of roltrap een bijdrage leveren aan de verhoging van de dagdagelijkse activiteiten. (Teh and Aziz, 2002). In dit opzicht werd het effect van verscheidene en vaak theoretisch gefundeerde interventies op trappengebruik reeds meermaals onderzocht.

Vanden Auweele *en medewerkers* (Vanden Auweele *et al.,* 2005) benaderde dit thema aan de hand van gezondheidsborden. Zij onderzochten de impact van een interventie in een werkomgeving met vrouwelijke werknemers en vonden positieve resultaten. In een publieke setting werd gelijkaardig onderzoek uitgevoerd door Boen *en medewerkers* (Boen *et al.,* 2010). Voor hun onderzoek werd een selectie van twee stations en een shoppingcenter gemaakt. Ook in deze studie werden positieve resultaten gevonden en dit voor de drie settingen.

Bij Van Hemelen (Van Hemelen, 2009) werd er bijkomend gefocust op de specifieke boodschap van het gezondheidsbord. Deze studie was gebaseerd op de Zelfdeterminatietheorie en maakte een onderscheid tussen twee boodschappen, een autonomie ondersteunende (‘Je kan ook de trap nemen‘) en een gebiedende boodschap (‘Neem de trap!’). Uit de resultaten bleek dat beide borden hetzelfde significante effect hadden ten opzichte van de basismeting. Men vond geen bijkomende invloed van de specifieke autonomie-ondersteunende boodschap op het trapgebruik.

Vervolgens werd er ook nog gewerkt met het gebruik van voetstappen in combinatie met boodschappen. Goes en Merckx (Goes and Merckx, 2010) deden dit in een bedrijfscontext met stijgend trapgebruik tot gevolg. Dit effect werd vastgesteld in de eerste interventie waar alleen voetstappen werden gebruikt. Een bijkomende stijging in trapgebruik was merkbaar wanneer de voetstappen ondersteund werden door een boodschap die expliciet wees op de functie van de voetstappen. Deze studie werd ook uitgevoerd in een publieke context (Verboven and Vermeulen,

2011). In deze context resulteerden de voetstappen alleen in een positief effect wanneer ze in combinatie met een verklarend bord werden aangeboden.

In onderzoek van Boxtaens en Maex (Boxtaens and Maex, 2012), werden er niet alleen bordjes geplaatst maar deze bordjes werden ook gelinkt aan de identiteit van het maritieme bedrijf. Zij kozen voor een sportieve boodschap ("Sportief? Neem dan de trap!") en een ecologische boodschap die gelijkenissen moest vertonen met de waarden van het bedrijf ("Milieubewust? Neem dan de trap!"). Voor beide boodschappen werd er een stijging vastgesteld ten opzichte van de baseline. Tegen de verwachtingen in steeg het trappengebruik niet wanneer de ecologische boodschap werd ingevoerd. Beide boodschappen zorgden voor een zelfde stijging in trapgebruik.

In een van de recentste studies (Duchi and Nevejan, 2013) werd getracht het effect na te gaan van een afgebeelde voorganger, geplaatst op de trap, in combinatie met een bijkomende interventie om de trap te promoten. Daarbij werd er rekening gehouden met verschillende variabelen zoals geslacht en leeftijd. Er werd nagegaan in welke mate de beïnvloedbaarheid van een voorbijganger samenhing met de identificatie van de afgebeelde voorganger. De interventies werden uitgevoerd in het treinstation van Leuven. Het bleek dat het gezondheidsbord op zichzelf geen invloed had ten opzichte van basismeting. Bij het plaatsen van een extra afgebeelde voorbijganger werden echter wel significante effecten gevonden. Bovendien was er een gelijkenis tussen de afgebeelde voorganger en de eigenlijke identificatie. De voorbijgangers werden dus vooral aangespoord om de afgebeelde voorganger te volgen wanneer er een overeenkomst was in leeftijd en geslacht.

De huidige studie is een aanvulling op de hierboven beschreven onderzoeken. De basis van de huidige studie omvat eveneens het geven van een gezondheidsboodschap. Die boodschap wordt in deze studie echter gecommuniceerd via een gezondheidspromotie video, zodat de boodschap aantrekkelijker wordt. De resultaten van Duchi en Nevejan vormden het uitgangspunt van deze video (Duchi and Nevejan, 2013). Zo werd de acteur van de gezondheidspromotie video in overeenkomst gebracht met de gemiddelde leeftijd en het meest voorkomende geslacht van het bedrijf. De video werd verspreid via email en getoond op een TV-scherm zodat de werknemers tweemaal werden blootgesteld aan deze vorm van trappromotie. Op die manier konden we nagaan of er een repetitie-effect plaats zou vinden bij het tonen van de video voor de tweede maal. Verder kozen we ervoor om bijkomend het effect van de zichtbaarheid en de toegankelijkheid van de trappen na te gaan. Dit is vernieuwend ten opzichte van voorgaande studies met betrekking tot trapgebruik.

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Stair use promotion in a work setting:
the effect of visibility and a health promotion video

ABSTRACT

Purpose: The aim of the study was to test the impact of three stair use interventions in a work setting in Flanders, Belgium. More specifically, we studied the effect of visibility and accessibility of the stairs and tested the (additional) influence of a health promotion video on climbing and descending stair use of employees.

Methods: Three successive one-week interventions were implemented in order to increase stair use: (1) Pictograms indicating the stairwell were used and the obstructing door to the stairwell was opened in order to improve the visibility and accessibility of the stairs, respectively; (2) A video promoting stair use for health was provided through email; and (3) The same video was displayed on TV at the point-of-choice between the stairs and elevator. The three interventions took place in two buildings in which intervention two and three were switched.

Results: Results showed that improving the visibility and accessibility of the stairs positively influenced climbing (+6%) and descending stair use (+7%) among the employees. The email intervention had an effect on stair use in none of the buildings. The TV intervention was successful in both buildings with an average increase of 12.5% for climbing stair use. The positive effects of the interventions were not maintained one week after the last intervention except climbing stair use in the first building (+3% compared to baseline).

Conclusion: Improved visibility and a health promotion video can result in an increase of both climbing and descending stair use, at least in the short term.

INTRODUCTION

Nowadays, modern lifestyle has a great impact on physical activity levels. The traditional ways of energy expenditure have disappeared (spending time on the land, harvesting, gathering food, hunting,…) and compensation for this loss in activities fails to occur in our modern life activities. Industrialization and automation discourage people to take the stairs, walk home, ride their bikes or simply entertain their daily exercises. Changing patterns of transport and work, electronic communication, internet shopping, energy-saving devices such as escalators, motorised lawn mowers, washing machines, and remote controls, as well as sedentary entertainment such as television and computer games, make it possible to be virtually inactive but occupied (Kerr *et al.,* 2003). People in the twenty-first century are still living with the hunter-gatherer genes of our forefathers, but have a hard time to maintain the physical activity level. This can result in a sedentary lifestyle (Biddle and Mutrie, 2008).

It is known that sedentary behaviour reduces life expectancy and increases the risk of cardiovascular and metabolic diseases up to 10%. Furthermore, it is a well-known risk factor for stroke, with sedentary individuals being 25 - 30% more likely to have a stroke than their physically active peers (Lee *et al.*, 2012; Goldstien *et al.,* 2012). In addition, there is strong scientific evidence showing that compared with physically active adults, physically inactive adults are at greater risk for developing a number of chronic diseases, including coronary heart disease, type 2 diabetes, colon and breast cancers, depression, and premature death (Leavitt, 2008). Moreover, overweight and obesity contributes to sedentary behaviour and pose significant health problems (Hills *et al.,* 2007). Therefore, a possible solution to health and obesity problems lies in identifying feasible ways to cope with the current environment to be more supportive of healthy lifestyle choices. A physically active lifestyle reduces the risk of all-cause mortality and chronic disease, including stroke (Leavitt, 2008). A daily amount of physical exercise can restore and handle the problems that come with an insufficiency of movement (Moore *et al.,* 2006).

Recommendations made by The World Health Organization (WHO) prescribe 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity activities for adults between 18 and 64 years old. This total amount of time can be spread out during the week, for example 5 sessions of 30 minutes. The prescribed 30 minutes of moderate physical activity per day can be divided into smaller chunks of at least 10 minutes (Biddle and Mutrie, 2008). In addition, physical activity can be accumulated during the day. Therefore it is important to encourage people to integrate small amounts of daily activities to achieve an adequate level of energy expenditure throughout the day (Marschall *et al.,* 2002; Lewis and Eves, 2012; Eves and Webb, 2006).

When we describe physical activity it is important to make a distinction between moderate-intensity and vigorous-intensity activities. Moderate activities are those that can be performed, while still talking during the activity. Moderate activities go together with a slightly increased heart rate and 3 to 6 times more energy expenditure per minute than resting state (3-6 MET's). By contrast, vigorous-intensity activities are activities leading to a clearly increased heart rate (> 6 MET's). Besides, the practitioner is able to talk during the exercise without pausing for breathing (The President and Fellows of Harvard College, 2014; Leavitt, 2008). Although walking is an activity of moderate intensity, stair climbing is a vigorous lifestyle activity that requires 8.6 times more energy expenditure than the resting state. Therefore, and even though its duration is usually less than ten minutes, stair climbing might have important implications for the accumulation of caloric expenditure in daily life (Lewis and Eves, 2012; Eves and Webb, 2006).

Energy expenditure of various activities can be compared on the basis of a specific unit. This unit is called MET – value (Metabolic Equivalent of Task) and refers to the intensity of the concerning activity. Using the definition of one MET as the ratio of work metabolic rate to a standard resting metabolic rate of 1.0 (4.184 kJ)* kg^{-1}*h^{-1}. One MET is considered a resting metabolic rate obtained while sitting down (Ainsworth *et al.,* 2000). In a publication of Teh and Aziz (Teh and Aziz, 2002), the intensity of climbing and descending the stairs corresponds with 9.6 and 4.8 MET, respectively.

Keeping this in mind, stair use can be an excellent contribution to the accumulation of our daily activity. In addition, climbing the stairs has many advantages because of the low-cost, the accessibility, the familiar aspect and the vertical movement. Public-access stairs are accessible to the majority of people. Moreover, stair climbing as an exercise comes with a low cost compared with other traditional exercises. Because taking the stairs can be seen as a daily activity (familiar aspect), most people will have confidence in participating in this activity. In addition, moving in vertical direction involves raising one's weight against gravity; as a result, more energy is expended by overweight individuals. All of these characteristics make it possible to increase physical activity, and consequently the health of sedentary people (Teh and Aziz, 2002; Vanden Auweele, 2005; Moore, 2006; Lewis and Eves, 2012).

The advantages that come with stair use had an impact on many interventions, campaigns and studies. Multifarious interventions were implemented to increase stair use by the use of different approaches: environmental changes, point-of-choice prompts, visibility and accessibility.

In most research a distinction was made between community settings, work settings and mixed worksite/community settings such as university buildings. Some of these settings have similar characteristics. For example, work settings and stations (public setting) have rush hours where many

people often pass the same spot at the same time. Most of the time they are hurried to go home or to work. This is not the case in a shopping mall (public setting) which is not visited every day by the same people. Furthermore, at a worksite the passing employees are almost every day the same. In public settings a more various scale of people comes and goes (Boen *et al.,* 2010). Subsequently, we will describe the most important characteristics of physical activity promotion interventions focusing on stair use.

Environmental changes. Multiple health promotion studies have focused on environmental changes in staircases. More specifically, stair use was promoted by making the environment more attractive. Positive effects were found by hanging decorative art posters and playing music in various research settings. Boutelle *et al*. (Boutelle *et al.,* 2001) found positive effects by adding music and artwork as a supplementary intervention on top of signs in a university setting. There were significant differences between baseline (11.1%) and the music-art intervention (15.5%), leading to a significant increase in stair use of 4.4%. However, there were no significant differences between baseline and the intervention involving signs only (12.7%). Nevertheless, significant results were found between the music-art intervention and the intervention involving signs only. The aesthetic qualities of the stairwell resulted in an increase of 2.8% compared with the sings only intervention. Furthermore, recent studies suggest that the positive impact of environmental modifications on stair use maintained over a longer time period than has been previously demonstrated in short-term studies (Graham *et al.*, 2013).

Point-of-choice prompts. Besides art and music interventions, other studies have used point-of-choice prompts rather than attractiveness of the staircase. These prompts, also named cues-to-action, are physical or environmental events that motivate and remind people to take action (Boen *et al.,* 2010). The formats that are most commonly used are sings, posters and billboards. They are usually placed on the junction point between stairs and elevator/escalator. They contain motivational messages such as: “helps to keep you healthy” (Webb and Eves, 2007), ”stay in shape, take the stairs” (Boen *et al.*, 2010), and “don’t let the machines win - take the stairs”(Graham *et al.,* 2013).

Visibility and architecture. Only few studies have focused on the spatial qualities and accessibility of the stair environment. Moore *et al.* (Moore *et al.,* 2006) characterized the stairwell accessibility in business buildings in the downtown core of Vancouver. Based on their environmental characteristics, very few buildings were set up in a way that encouraged stair use. They evaluated the stairwells based on their visibility from the main entrance, signage, presence of physical door, and interior lighting and space. Only 11% of the buildings, with a total of 83 stairwells, had an accessible

stairwell that met all of the accessibility criteria, 54% had stairwells visible from the main entrance, 33% had locked doors and only 18% had signs on the stairwell doors.

Nicoll (Nicoll, 2007) studied the relationship between stair use and the design and location of stairs in a cross-sectional study. The purpose was to investigate the relationship between stair use and the physical environmental features. Ten three- or four-story academic buildings were observed and various spatial variables were associated with stair use: (1) travel distances from stair to nearest entrance and the elevator, (2) effective area or occupant load of each stair, (3) accessibility of each stair, (4) area of stair isovist (a graphic representation of the horizontal extent of a person's visual field from a specific point of reference within a building floor plan), (5) number of turns required for travel from the stair to closest entrance, and (6) the most integrated path. The results identified ten variables with a statistically significant relationship with stair use, including proximity, accessibility, visibility, stair type, stair width, distribution and intelligibility. These results reflect the importance of spatial characteristics of stair placement and building design that support the convenience and legibility of stair use relative to the movement structure of the building.

Furthermore, stair use interventions need to reduce habitual choices to use the elevator by breaking the automatic link between goal and behaviour. Changes in the environment, such as aesthetics and signs can block this link (Nicoll, 2007; Lewis and Eves, 2012). For example, Van Nieuw-Amerongen *et al.* (Van Nieuw-Amerongen *et al.,* 2011) used prompts, enhanced aesthetics, visibility and accessibility to promote stair use. They investigated the impact of multiple environmental changes to the stairwell of a university building on stair use among university employees and students. In order to promote the accessibility and visibility of the stairwell, wooden doors were replaced by glass doors that could remain open without blocking the view to the stairwell. The findings revealed that total stair use increased significantly by 8.2% from baseline (51.8%) to the last intervention (60%). These effects remain stable over the four-week post-intervention period.

Public settings. It is important to make a distinction between various settings because of their different characteristics. In a study of Boen *et al.* (Boen *et al.,* 2010) two different community settings were used, namely a shopping mall and two train stations. The aim of the study was to test the impact of a simple health promotion sign on stair use in three community settings. The prompt, at the point of choice, was a drawing of a human figure walking up the stairs in combination with the message "stay in shape, take the stairs". People had the possibility to choose between the stairs and the escalator. The health sign in the first intervention phase resulted in a significant increase in all three public settings: 10% in the mall (baseline 1.7%), 8.6% in the first station (baseline 35.2%) and 18% in the second (baseline 9.4%). In this station, the second post-intervention phase was

significantly higher than baseline. In conclusion, a simple health sign had a positive effect on stair use. These positive results were found in different studies with a point-of-choice prompt similar to this study (Graham *et al.,* 2013; Dolan *et al.,* 2005; Lewis and Eves, 2012; Duchi and Nevejan, 2013).

Duchi and Nevejan (Duchi and Nevejan, 2013) applied a supplementary topic by behavioural modelling, based on the chameleon effect. The chameleon effect (Chartrand and Bargh, 1999) refers to non-conscious mimicry of the postures, mannerism, facial expressions and other behaviours of one's interaction partners, such that one's behaviour passively and unintentionally changes to match that of others in one's current social environment. The intervention existed of two elements, one simple health sign and a passer-by picture (life-size). They differentiated on two levels, namely sex and age, and found significant matching results between the passers-by and the pictures of the same age and sex. Therefore, it is important to take into account how people evaluate the different signs and models. The abovementioned interventions took place in public settings. However, a number of studies have reported data that can also be relevant in worksite interventions (Eves and Webb, 2006).

Work settings. Vanden Auweele *et al.* (Vanden Auweele *et al.,* 2005) evaluated the impact of two simple interventions that aimed at promoting stair use among female employees at a five-floor worksite. The first goal was to test the impact of two health signs, one at the top of the staircase ("fit and healthy") and one at the bottom of the staircase ("I take the stairs"). The second goal of this study concerned the possible interplay between two cumulative interventions, involving an additional e-mail sent a week later by the worksite's doctor, pointing out the health benefits of regular stair use. Stair use significantly increased from 69% at baseline to 77% in the first intervention during which the health sings were implemented. In the second intervention, stair use further increased to 85% during the week after the email was sent. The authors concluded that a combined intervention, such as a health sign with an email, can encourage female employees to use the stairs.

In research of Boxstaens and Maex (Boxstaens and Maex, 2012), significant effects of stair use promotion were found in a maritime company. The first aim of this study was to increase stair use by using prompts. The second aim of the study was to match the message with the identity of the firm. Two different conditions were compared: a sportive message ("Sportive? - take the stairs") and an ecological message ("Eco-friendly? - take the stairs"). The ecological message was chosen because of the similarity with the values of the company. The authors reported significant positive effects on stair use for both messages. There was an increase from baseline (42.1%), to the first sportive intervention yielded an increase in stair use from 42.1% at baseline to 52.7%. The second ecological intervention resulted in an increase of stair use from 42.1% to 53.6%. In comparison to the sportive

message, a higher increase in stair use was predicted by implementation of the ecological identity message because of the link with the company and the employees. In contrast to these expectations, the results of both interventions were very similar.

Eves *et al*. (Eves *et al.,* 2012) applied a new approach to worksite interventions by aiming at changing attitudes and hence behaviour. Based on a multi-component campaign, calorific expenditure messages were used in the form of a "poster alone" site and "poster + stairwell messages" site. Feedback from the employees was obtained by post-intervention questionnaires about the campaign. This campaign increased stair climbing, with larger effects at the "poster + stairwell messages" site (+12.3%) than at the "posters alone" site (+7.2%). Follow-up revealed higher agreement of calorific effects in the site where the messages were visible in the stairwell (Eves *et al.,* 2012). Graham *et al*. (Graham *et al.,* 2013) conducted a more extensive research. Environmental modifications have been shown to increase short-term stair use, they assessed a two year effectiveness of an environmental intervention promoting worksite stair use, including six worksites in Minneapolis metropolitan area. They used signs, music, and art posters in stairwells. The stairwell modifications (i.e. signs, art and music) remained in place at the intervention worksites continuously for two years. The intervention had a significant positive effect on stair use measured both objectively via infrared beam counters and self-reports. Examination of predicted values from the generalized estimating equation (GEE) analyses indicated an objective stair use decrease of 124.06 stair passages per day (over time) at the control sites; at the intervention sites, stair use increased by 346.77 stair passages per day. The findings suggested that the positive impact on stair use persist over a longer time period than has been previously demonstrated. Results also indicated that infrequent stair users may be most amenable to the behaviour changes.

Current study. In the current study, we aimed at promoting stair use in a worksite setting by combining and enhancing several characteristics of the abovementioned studies. This resulted in a more innovative approach thereby adding scientific value to the already existing findings.

We selected a worksite setting in Belgium (Flanders), Agfa-Gevaert, and chose two buildings because of their obstructing architectural characteristics that could discourage employees to climb the stairs. These settings were attractive and ostentatious due to break the habitual choices of the employees (Lewis and Eves, 2012). In the first Building (A) the stairwell was hidden behind two doors. On top of that, the door of the stairwell was next to the door of the basement and none of the doors did have a pictogram that indicated what was behind it. The stairwell in de second Building (B) was more within reach but the time recorder was placed next to the elevator, so employees were more likely to take the elevator.

The aim of the study was to test the impact of three stair use interventions and therefore three successive one-week interventions were implemented in order to increase stair use. In the first intervention, pictograms indicating the stairwell were placed and the obstructing door to the stairwell was opened in order to improve the visibility and accessibility of the stairs. In the second intervention a health promotion video was provided through email and the third intervention included the same video displayed on TV at the point-of-choice between the stairs and elevator. The three interventions took place in the abovementioned buildings in which intervention two and three were switched (email vs. TV).

Visibility and accessibility. First of all we focused on the visibility and accessibility of the staircase in Building A. Moore *et al*. (Moore *et al.,* 2006), found that 82% of the buildings in Vancouver had no sign on the stairwell door (which is comparable to the door in Building A). It is important to make the stairwell door visible so employees can see which door they have to take to use the stairs. Furthermore, we wanted to improve the overall accessibility to the stairwell by opening one of the doors. In a study of Nicoll (Nicoll, 2007), accessibility of the stairs was one of the variables associated with stair use. Accessibility was defined as the effort required to reach the stairs (both exterior and interior spaces through the building.

Health promotion video. Second, we decided to use dynamical figures in the form of a video in order to promote stair use. In this health promotion video, we motivated employees to be physically active by notifying the benefits of daily physical activity. Physical activity behaviour was explained by a social-cognitive model, namely The Theory of Planned Behaviour (TPB). In this theory, humans are considered as rational decision makers whose actions can be explained by multiple factors: attitudes towards behaviour, social pressure or subjective norms, and perceived behavioural control. Subjective norms refer to the belief of what "important others" think. In a second way, employees could be affected by the non-conscious mimicry of postures and behaviours, in this case of the actor in the health promotion video (Chameleon effect) (Ajzen, 1991; Hagger *et al.,* 2002; Chartrand and Bargh, 1999).

In our study, the dynamical figures were displayed in combination with specific messages. Webb and Eves (Webb and Eves, 2007) investigated the benefits of specific important (consequence) messages by comparison with general descriptions. Their results suggested that messages focusing on the specific consequences are more persuasive than those providing general descriptions and that validating the information presented in stair climbing interventions may increase their efficiency. The health promotion video was provided in two ways, through a TV-screen at the point-of-choice and by

email. As noted before, Vanden Auweele *et al*. (Vanden Auweele *et al.,* 2005) successfully used an email in their post-intervention and obtained positive results.

Hypotheses. Based on the abovementioned characteristics, we formulated three hypotheses for *climbing stair use*. In Building A, we expected an increase in the stair use by opening the doors to the stairs and by placing pictograms that indicated the stairwell which refer to the improvement of visibility and accessibility of the stairs. Reports by Ruff (Ruff *et al.,* 2014) confirmed that stairwell visibility was significantly associated with increased odds of stair use. Results showed that stair prompts and visibility of the stairs from the lobby were positively associated with stair use. In our study, this intervention only took place in Building A, because the stairwell in Building B was more visible, it was not necessary to place pictograms or improve the accessibility. As a result of this intervention we predicted an increase in stair users and no change in Building B ***(Hypothesis 1).***

In Building A, we expected a further increase of stair use after sending an email in combination with the health promoting video. Previous research found that a subsequent email intervention by a worksite's doctor led to a further increase in stair use (Vanden Auweele *et al*., 2005). In addition we expected a positive influence of the health promotion video in combination with the messages. With this attractive health promotion video we could emphasize the underlying health and fitness message ***(Hypothesis 2A)***.

In Building B, we expected a difference in the proportion of stair users because of the first exposure to the dynamic health promotion video. In this intervention a TV-screen was placed in the hall and the video acted as a point-of-choice prompt. We predicted an increase of stair use from baseline to the TV-intervention ***(Hypothesis 3B).***

As reported earlier (Boen *et al.*, 2010), a repeated exposure to a health sign can result in an increase of stair use. Because of the second exposure to the health promotion video, we expected a further increase in both buildings. The interventions were switched between buildings, so we expected an increase of stair use in Building A by placing a TV-screen at the point-of-choice which reminded the employees of the first video ***(Hypothesis 3A).*** In Building B, the email intervention was used to display the video for the second time. Like in Building A, a further increase was expected due to this email intervention ***(Hypothesis 2B).*** The second exposure to the video would prompt the employees to undertake their healthy stair use behaviour.

METHODS AND MATERIALS

Setting

This intervention study was conducted at the head office of the Agfa-Gevaert Group in Mortsel, Flanders. The Agfa-Gevaert Group develops, produces and distributes an extensive range of analogue and digital imaging systems and IT solutions, mainly for the printing industry and the healthcare sector, as well as for specific industrial applications. This setting counts 3.712 employees and has a surface of 598.923 m². Out of the fifty buildings at the site in Mortsel, we selected three buildings for our research, namely building 550, 076 and 065. For the sake of simplicity, these buildings will be called Building A, B and C. Building C was not involved in the intervention study but acted as a control building for the survey.

Building A and B were selected for the intervention study because they had specific architectural characteristics that could discourage employees to take the stairs. In Building A (550) the main problem occurred at the stairwell. This stairwell was hidden behind two consecutive doors, one being a required fireproof door. In addition, the door of the stairwell was next to the door of the basement (technical room) and none of the doors had a pictogram to indicate what was behind. In Building A, there were two entrances. The employees mostly used the side entrance, while the main entrance was more used by customers. The entrance-hall was split in half through a glass door and the side of the customers was prettier than the side of the employees. On the employees' side, the time recorder was placed close to the stairwell and the elevator. Building A counted two main elevators at one side of the door (costumers side) and a third one on the other side (see Appendix 3 for pictures). During the study, the third elevator was out of order.

In contrast to Building A, the stairwell behind the fireproof door in Building B (076) was easy to reach, but the time recorder was placed opposite to the elevator. Consequently, employees were more likely to take the elevator. There were two entrances, namely a main entrance and a side entrance. The side entrance was the one nearest to the time recorder and the elevator, but the main entrance was used more frequently. The employees had three elevators at their disposal and one stairwell next to the main entrance (see Appendix 3 for pictures).

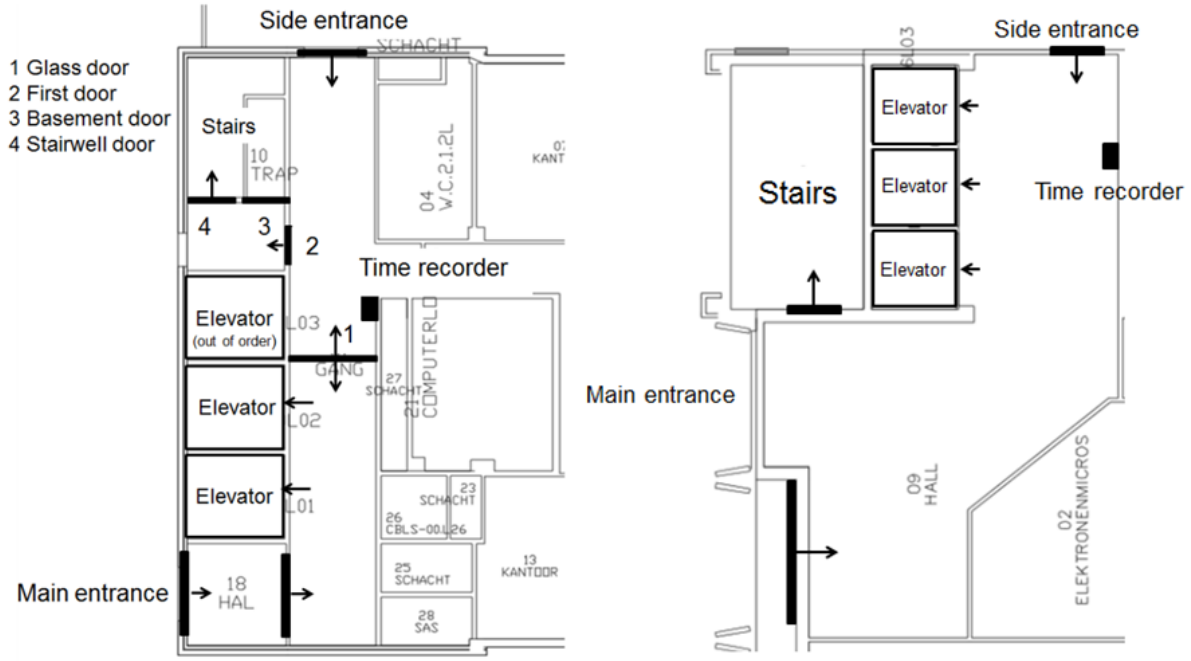


Fig. 1: Floorplan on ground level

Participants

Building A and B counted 298 and 150 employees, respectively. This means that 448 people out of the 3712 employees at the site (12.1%) were included in our research. The mean age of the employees for both buildings was 49 years. In Building A, men were overrepresented with 241 men (81%) and 57 women (19%) being employed. The average age of the male and female employees was 48 (SD=8.7) and 46 (SD=8.4) years, respectively. In Building B, 71 men (47%) and 79 women (53%) were employed. In this building the average age was 52 (SD=5.8) for male and 49 (SD=6.7) for the female employees. All the employees in Building A and B were office workers. As a result, they were likely to lead a more sedentary lifestyle compared with other, more active, factory workers in other buildings.

Study design

Baseline. Baseline measurements were conducted to determine the initial proportional use of the elevators versus the stairs. These baseline measurements took place in the first week (week 47 in November 2014) of the study (see Table 1).

Intervention 1. In week 48, intervention 1 took place in building A. This intervention included the placing of pictograms to indicate the stairwell (i.e. increasing the visibility of the stairs) as well as the opening of the door to the stairwell (i.e. increasing the accessibility of the stairs). Because the

stairwell in Building B was more visible, it was not necessary to place pictograms in this building, and another week of baseline was added. Therefore, the first intervention only took place in Building A.

Intervention 2 and 3. Intervention 2 and 3, which were health promotion interventions, took place immediately after intervention 1. Intervention 2 included a health promotion video sent by email. In the third intervention, the same health promotion video was displayed, but on a TV-screen in the main entrance of the building instead of sent by email. Intervention 2 and 3 took place during the same week (week 49) in Building A and B, respectively. During week 50, the two interventions were switched between buildings, i.e. intervention 3 took place in Building A and intervention 2 took place in Building B. During the post week of the study (week 51), the TV-screen was removed but the pictograms in Building A remained for the sake of security and clarity. As a consequence, the employees remained aware of the stairwell and the difference between the stairwell door and the basement door.

Survey. The last week of the study took place in March 2015 (week 13) and involved a post measurement in combination with a survey. This survey was sent by email to the employees of Building A, B and C. Building C (065) was a control building that has a corresponding number of employees (152) to Building B and the same employees' functions (management staff, employees, …) as in Buildings A and B.

Table 1: Summary of the interventions

Week	Intervention Building A	Intervention Building B
47	Baseline	Baseline
48	**(1)** Visibility/accessibility	Baseline
49	**(2)** Email	**(3)** TV
50	**(3)** TV	**(2)** Email
51	Post	Post

Visibility/accessibility = Placing pictograms and opening the door to the stairwell

Email = Health promotion video sent by email.

TV = Health promotion video displayed on a TV-screen in the main entrance of the building.

Materials

Pictograms

The signs and pictograms used for intervention 1 were standard stairwell indicators placed on the door of the stairwell. In order to indicate the direction to the stairwell, nine pictograms were placed upstream of the stairwell in combination with an arrow or a message about the presence of the staircase (see Appendix 4 for pictures).

Fig. 2: Pictograms used for intervention 1 (from left to right): standard pictogram, "There is a stair next to the elevator", "This door can remain open so that the stair is more accessible".

Health promotion video, TV and email

The (male) nurse of the company performed the leading role in the health promotion video. He was generally well-known by the employees and met the representative standards of the average employee. More specifically, he was male, which corresponded with 70% of the employees, and his age was representative for the mean age of all employees (i.e. 48 years).

Two promotion videos were made, one for each building. In these videos, the main actor had to choose between the elevator and the stairs. He made the decision climb the stairs and in the meantime, stair-use encouraging messages were displayed: "An easy way to move", "x Kcal" each time the actor goes up a step, "Reduce the risk at heart and vascular diseases", "Retrieve energy out of the stairs", "Recapture the stairs at your own workplace", "Start today!". In intervention 2, the employees received the link with the video of their building by email. This email was sent out by the prevention advisor of the company (see Appendix 5 for an image) including an instruction to open the link and a motivational message ("Let this video inspire you"). The health promotion video was made available via the following links: Building A: https://www.youtube.com/watch?v=87qygvtRZYs and Building B: https://www.youtube.com/watch?v=lEJaaXfDqxQ.

In intervention 3, the video was displayed in the main entrance of the building. In Building A, two TV-screens with speakers, were used to display the health promotion video. A screen was placed on

each side of the glass door, which divides the entrance in two parts. The passage was kept free and the screens were placed at an eye-catching location. One screen measured 24 inch and the other screen had a size of 32 inch. In Building B, one 32 inch TV – screen was used (see Appendix 6 for pictures).

Stair-use monitoring

In order to objectively measure the employees' stair use in each building, we used a Spottic SP Infrared System (IR) in Building A and B. By placing two sensors (transmitter and receiver) at each side of the staircase and the elevator, movement actions could be registered (see Appendix 7 for pictures). These actions included both in- (climbing) and out movements (descending) of the employees. Groups of employees were counted as units of one, because the IR-beams were interrupted for a longer time.

The systems were tested and approved by the prevention department of the company. Employees of the intervention service manually collected the data from the IR-systems. Each evening (approximately 07:00 PM), they carefully registered the information and reset the counters for the next day. On 11 and 12 December a technical problem occurred in Building A, these two measurement problems were eliminated in the statistical analysis.

Due to the high cost price, the systems were only placed at ground level, so no distinction could be made between different floors. Four systems were needed each with a cost of €265, resulting in €1060 in total. The equilibration and installation of the systems increased the total cost to €2300 for both intervention buildings.

Survey

During the last week of the study, specific data and information about the employees were collected. The purpose of this survey was to investigate the employees' self-reported stair use, the perceived motives and barriers to stair use, their opinion about the stair use interventions in their building and their self-reported level of physical activity/fitness. This data was collected anonymously through LimeSurvey, a websurvey service made available by the KU Leuven. The email with the survey was sent by the prevention department of the company.

For each of the buildings the survey started with an introduction of the study (see Appendix 8) and general background questions about their age and gender (section 1). In section 2, employees were asked for their function, work building, building floor, and days at the work environment. Section 3

included questions about employees' changes in stair use for the last few months and the difference in climbing and descending stair use. Section 4 included nine questions about motives and eleven questions about barriers to stair use. The questions related to the motives started with the basic sentence "If I take the stairs in Agfa-Gevaert, I do it because…" and included for example: "taking the stairs is faster", "taking the stairs improves my health", "taking the stairs is free exercise", "my colleagues take the stairs", … The questions related to the barriers started with the basic sentence "If I do not take the stairs in Agfa-Gevaert, I do it because…" and included for example: "I start to sweat when I take the stairs", "I do not have a good physical condition to take the stairs", "My physical condition is already good enough", "The time recorder is closer to the elevator", …

Section 5 of the survey consisted of specific questions about the different interventions. This section was available for the employees of Building A and B, but not for the employees of Building C. In the last section, the employees were asked for their current physical activity level. Most of the questions had to be answered on a scale ranging from 0 to 10 scale ranging from 0 = completely disagree to 10 = completely agree or on a scale from -5 to +5 with -5 = very much decreased stair use over 0 = neutral to +5 = very much increased stair use. One open question was added, which was the following: "Do you have suggestions to increase stair use in your work environment?" (see Appendix 9 for the complete survey).

Statistical analyses

The data from the IR-systems was analysed with SAS 9.4 statistical software (SAS Institute Inc., Cary, NC, USA). The χ^2 test was used to test for changes in proportions of stair use during the different interventions. For the survey, SPSS statistics 22.0 (IBM Corporation, NY, USA) was used to test for ANOVA and descriptive statistics. The ANOVA test was used to test for differences between building and building height. The descriptive statistics were used to get an overview of motives and barriers to stair use.

RESULTS

Baseline measurement

In this section we will describe some background characteristics, related to the *baseline measurement*, that will be taken into account in the subsequent analyses.

First, there was a very remarkable difference in stair use between climbing and descending stair use, namely 25.1% vs. 33.9%, $\chi^2(1, N = 8223) = 75.61$, $p < 0.0001$. Therefore, we decided to differentiate between climbing and descending stair use in the statistical analyses.

Second, we differentiated between the buildings because of the specific interventions in each building and the differences between weekdays. During the baseline week, a difference between weekdays, buildings and climbing/descending stair use was found, $\chi^2(4, N = 8223) = 12.11$, $p < 0.05$.

A Tukey-type multiple comparison test was used to test for the differences in stair use between days (Zar, J. (1999) Biostatistical Analysis Fourth Edition, 564.). In Building A, a significant difference for climbing stair use, was found between Monday and Tuesday (i.e. 30.9% vs. 21.9%), as also between Monday and Friday (i.e. 30.9% vs. 21.9%) ($p < 0.05$). For the descending stair use a significant difference was found between Monday and Wednesday (i.e. 33.7% vs. 44.3%) ($p < 0.05$).

In Building B the analyses between days only revealed a difference in climbing stair use between Wednesday and Thursday (i.e. 29.1% vs. 22.7%) ($p < 0.05$). One difference was found for the descending stair use between Wednesday and Thursday (i.e. 32.4% vs 24.1%) ($p < 0.05$).

For each building and the distinction between climbing and descending stair use, a total of ten day comparisons were analysed. In the most cases we found only one significant day difference, except for Building A were two day differences were found (for climbing stair use). Because of the small differences between days and buildings for climbing/descending stair use, we decided to use the average percentage per week to reduce the complexity of the study.

To investigate the possible influence of the specific setting and the specific week of measurement, we considered the possible interaction effects between Building (A and B), week (47 vs. 48) on stair use at baseline.

For climbing stair use, the interaction between buildings and week was significant, $\chi^2(1, N = 7686) = 9.37$, $p < 0.01$.

For descending stair use, the interaction between buildings and week was also significant, $\chi^2(1, N = 8489) = 7.24$, $p < 0.01$.

In Building A, two significant interactions were found, one for week, $\chi^2(1, N = 9008) = 47.46$, $p < 0.0001$, and also for climbing/descending stair use $\chi^2(1, N = 9008) = 203.82$, $p < 0.0001$. The interaction, week*climbing/descending, was nonsignificant, $\chi^2(1, N = 9008) = 0.00$, $p = 0.983$.

In Building B, no significant results were found for week, $\chi^2(1, N = 7167) = 0.84$, $p = 0.3597$, and for climbing/descending stair use, $\chi^2(1, N = 7176) = 3.00$, $p = 0.883$. The interaction, week*climbing/descending was nonsignificant, $\chi^2(1, N = 7176) = 1.36$, $p = 0.244$.

Intervention effects

Hypothesis 1 – Effect of improved visibility and accessibility of the stairs in Building A

The first intervention took place in Building A and focused on the improvement of the visibility and accessibility of the stairwell. Both characteristics were improved by placing pictograms and opening the obstructing door to the stairwell. Because the stairwell was more visible and accessible in Building B, this intervention took only place in Building A. Building B acted as a control group. The improvement of the visibility and accessibility yielded an increase in for both climbing and descending stair use (i.e. +6% and +7%, respectively). It can thus be concluded that intervention 1 had a positive effect on climbing and descending stair use, which confirms *Hypothesis 1*. In Building B, no significant change in climbing or descending stair use was found.

Table 2: Percentages and Chi² for climbing and descending stair use (Hypothesis 1)

	Climbing stair use				**Descending stair use**			
Week	Building A		Building B		Building A		Building B	
	%	χ^2	%	χ^2	%	χ^2	%	χ^2
47	25	26.64***	26	1.96	39	21.14***	29	0.85
48	31		28		46		29	

* = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Hypothesis 2A and 3B – Effect of email and TV intervention on stair use in Building A and B, respectively

In this section, we will describe the effects of the email intervention in Building A and the TV intervention in Building B. Both interventions took place in the same week (week 49).

In Building A, the email intervention took place immediately after the improvement of the accessibility and visibility of the stairwell. In comparison with intervention 1 (open door and pictograms), there was no significant change in climbing stair use, but there was a significant decrease in descending stair use (-10%). Because there was no additional increase in climbing stair use, *Hypothesis 2A* is not confirmed.

Compared to the baseline week (week 47), there was a significant increase in climbing stair use, $\chi^2(1, N = 4736) = 18.71$, $p < 0.0001$. For the descending stair use a nonsignificant decrease was found, $\chi^2(1, N = 4763) = 3.21$, $p = 0.073$.

In Building B, the accessibility and visibility intervention did not take place but another week of baseline was added (week 48). Therefore, the TV intervention was the first one that took place in Building B. In comparison with the additional week of baseline a significant increase for both climbing as descending stair use was found (i.e. 11% vs. 3%). In line with *Hypothesis 3B*, the TV intervention had a positive effect on stair use. Compared to the baseline week (week 47 and 48) a significant increase for both climbing and descending stair use was found. The climbing stair use from 27% to 39%, $\chi^2(1, N = 4791) = 66.92$, $p < 0.0001$. The descending stair use increased from 29% to 32%, $\chi^2(1, N = 6387) = 6.51$, $p < 0.05$.

Table 3: Percentages and Chi² for climbing and descending stair use (Hypothesis 2A/3B)

	Climbing stair use				**Descending stair use**			
Week	Building A		Building B		Building A		Building B	
	%	χ^2	%	χ^2	%	χ^2	%	χ^2
47	25		26		39		29	
48	31	0.86	28	38.98***	46	42.94***	29	4.94*
49	30		39		36		32	

* = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$ (week 48 vs. 49)

Hypothesis 3A and 2B – Effect of TV and email intervention on stair use in Building A and B, respectively

In week 50 and immediately after the email intervention, the TV intervention took place in Building A. In comparison with the email intervention, there was a significant increase for climbing stair use (+8%) and a nonsignificant difference for descending stair use. *Hypothesis 3A*, in which we expected a further increase of stair use after the previous email intervention, is thus confirmed for climbing stair use, considering the earlier decrease in climbing stair use after the email intervention. In comparison to the baseline week, the climbing stair use increased significantly, $\chi^2(1, N = 3735) = 74.97$, $p < 0.0001$. In contrast, the descending stair use significantly decreased, $\chi^2(1, N = 3672) = 6.15$, $p < 0.05$.

In Building B, the email intervention took place immediately after the TV intervention. In comparison with the TV intervention, there was a significant decrease in stair use for both climbing and descending stair use. This decrease was especially prominent for climbing stair use, for the descending stair use it was not as significant (i.e. -6% vs. -4%, respectively). No further increase in stair use was found after the email intervention in Building B and so *Hypothesis 2B* is not confirmed.

In comparison with baseline (week 47 and 48), there was no significant difference in climbing, $\chi^2(1, N = 5198) = 2.30$, $p = 0.129$, or descending stair use, $\chi^2(1, N = 5648) = 0.20$, $p = 0.652$.

Table 4: Percentages and Chi² for climbing and descending stair use (Hypothesis 3A and 2B)

	Climbing stair use				**Descending stair use**			
Week	Building A		Building B		Building A		Building B	
	%	χ^2	%	χ^2	%	χ^2	%	χ^2
47	25		26		39		29	
49	30	24.37***	39	77.24***	36	0.94	32	5.94*
50	38		25		35		28	

* = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$ (week 49 vs. 50)

Post-effect

In the last week, the TV-screens were removed, but the pictograms stayed attached for the sake of security and clarity so the employees were aware of the stairwell and the difference between the stairwell door and the basement door (technical room).

During the post-week in Building A, a strong decrease in climbing stair use was found in comparison with the TV intervention, but the descending stair use still increased slightly (i.e.-10% vs. +4%, respectively). In comparison with baseline levels, only a slight significant increase in climbing stair use was found (+3%), $\chi^2(1, N = 4352) = 7.25$, $p < 0.01$. There was no significant change with respect to descending stair use $\chi^2(1, N = 3383) = 5.36$, $p = 0.021$.

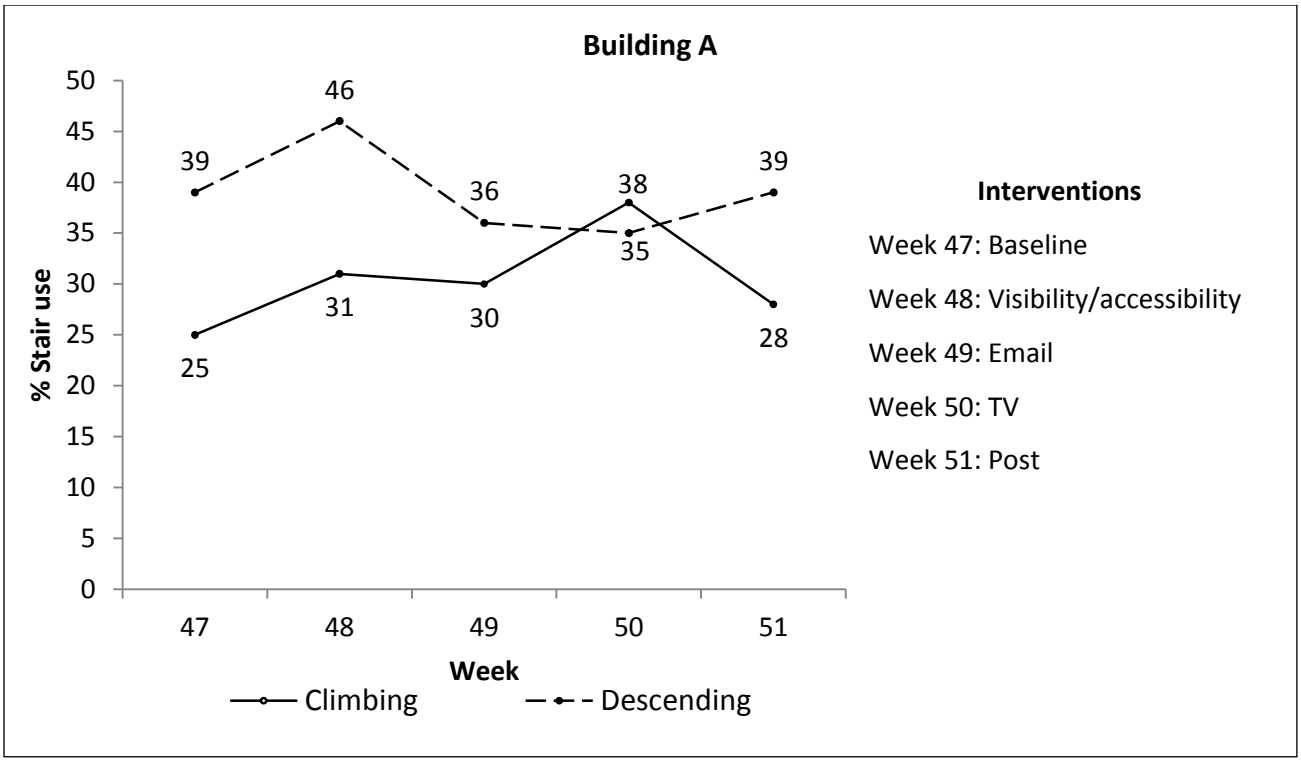
In Building B, the post-week took place after the email intervention. A significant increase was found for the climbing stair use (+5%) and a nonsignificant increase was found for the descending stair use, in comparison with the email intervention. In comparison with baseline week (week 47 and 48), a significant difference was found neither with respect to climbing stair use, $\chi^2(1, N = 4446) = 3.53$, $p = 0.060$, nor with respect to descending stair use, $\chi^2(1, N = 5874) = 0.95$, $p = 0.330$.

Table 5: Percentages and Chi² for climbing and descending stair use (post-effect)

	Climbing stair use				**Descending stair use**			
Week	Building A		Building B		Building A		Building B	
	%	χ^2	%	χ^2	%	χ^2	%	χ^2
47	25		26		39		29	
50	38	37.00***	25	8.90**	35	5.36*	28	1.41
51	28		30		39		30	

* = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$ (week 50 vs. 51)

Fig. 3: Proportions climbing and descending stair use per building and week



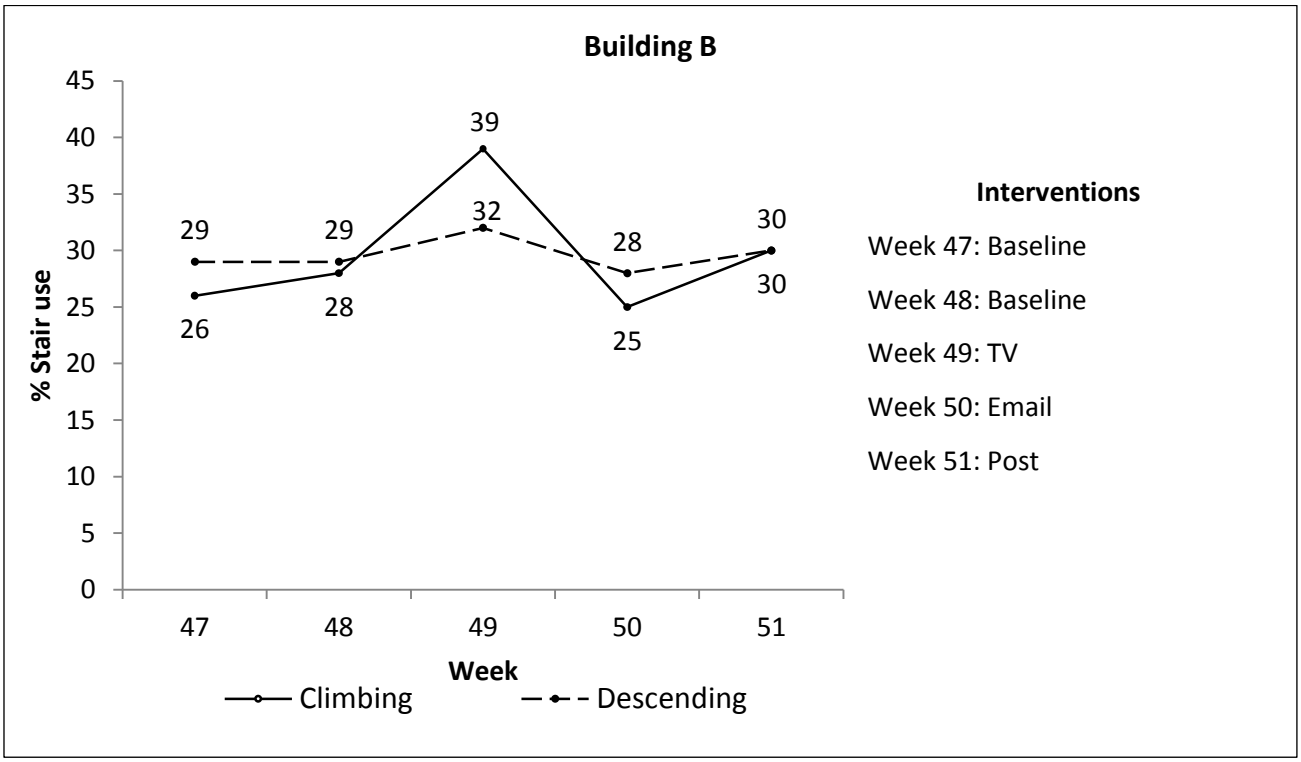


Table 6: Overview proportions and ratios of climbing and descending stair use per setting and week

Climbing/Descending	Building	Intervention	Week	Proportion	Quantity/Total
Climbing	A	Baseline	47	0.25	554/2260
	A	Pictograms/door	48	0.31	724/2308
	A	Email	49	0.30	746/1475
	A	TV	50	0.38	557/1475
	A	Post	51	0.28	588/2092
	B	Baseline	47	0.26	404/1553
	B	Baseline	48	0.28	442/1565
	B	TV	49	0.39	646/1673
	B	Email	50	0.25	525/2080
	B	Post	51	0.30	397/1328
Descending	A	Baseline	47	0.39	856/2212
	A	Pictograms/door	48	0.46	1014/2228
	A	Email	49	0.36	923/2551
	A	TV	50	0.35	506/1460
	A	Post	51	0.39	741/1923
	B	Baseline	47	0.29	640/2198
	B	Baseline	48	0.29	534/1851
	B	TV	49	0.32	749/2338
	B	Email	50	0.28	454/1599
	B	Post	51	0.30	741/1825

Survey

In this section, we will focus on the motives and barriers to stair use as well as the influence of the specific interventions on the self-reported stair use behaviour of the employees. The survey was sent to the employees of Building A, B and C. Building C was used as a control group and was not influenced by any of the interventions. The response rates were respectively 50% (149/298), 53% (80/150) and 44% (67/152) in Building A, B and C.

Influences of the interventions

Table 7: Self-reported influences of the interventions

	Building A (N= 149)		**Building B** (N= 80)	
	M	SD	M	SD
1. How strong did your stair use changed under influence of these interventions? (scale -5 to +5)				
Pictograms	0.34*(1)	1.27	n/a	n/a
Email	0.18	1.16	0.31	0.91
TV	0.28	1.30	0.31	1.00
2. Which of the following interventions might influence you stair use in the future? (scale -5 to +5)				
Pictograms	0.42*(2)	1.37	n/a	n/a
Email	0.21	1.23	0.45	1.04
TV	0.23	1.26	0.54	1.23
Survey	0.19	1.11	0.43	0.94
3. Do you think it is appropriate that a company implements interventions that aim to increase employees' stair use? (scale -5 to +5)	3.00	2.34	2.90	2.60

* = $p < 0.05$ (1) significant with respect to email (F= 4.19), (2) significant with respect to email , TV and survey (F= 5.49; F= 4.32; F= 4.93)

The survey indicated some interesting findings about the employees' opinion on the different interventions. Three questions were asked about the effectiveness and the appropriateness of the interventions. The means for Building A and B are displayed in Table 7. The results show that the employees answered very neutral on the different questions but that the standard deviations can be very high which means the opinions differentiated between employees. All the average means are situated between 0.18 and 0.42.

The employees of Building A reported that the pictograms positively influenced their stair use behaviour in comparison with the email intervention, for the TV intervention a nonsignificant influence was found. Furthermore, significant differences were found between pictograms and the other three interventions (email, TV, survey) regarding implications for the future.
In Building B, no difference between the interventions was reported with respect to employees' experienced influence.
In addition, results of the last question showed that the employees of both Building A and B consider health interventions in a work environment as very appropriate.

Motives and barriers

A three-way ANOVA was used for the analysis of the different statements. Each statement was a dependent variable and we performed a 2 x 2 x 2 ANOVA with three independent variables, namely gender (2 levels: men and females), building (2 levels: A and B) and floor (2 levels: low and high).
The scores were compared between gender, building and floor. We divided the floors into lower floors (floors 0, 1, 2 and 3) and higher floors (floors 4, 5, 6, 7 and 8). Most differences were found between lower and higher floors. We should also mention that the standard deviations can be very high.

In Table 8 the employees of the lower floors were compared with the employees of the higher floors for the statements concerning the motives to take the stairs. The results showed that employees slightly agree that taking the stairs enhances their health (M=6.62) and condition (M=5.91) and that taking the stairs is a free way to exercise (M=5.55). These statements received an average score higher than 5 on the scale of 10. The least important reason to take the stairs is the anxiety for the elevator (M=0.78). We should remark that the employees of the higher floors scored higher for almost every statement than the employees of the lower floors, especially for health, condition and exercise. We conclude that these employees are aware that they have to do more stairs and that they will get a greater benefit from taking them. Four significant differences were found between lower and higher floors: health enhancement, taking the stairs is faster, stair taking as a habit and taking the stairs reduces bodyweight (see Table 8).

Table 8: Motives to take the stairs *(If I take the stairs at Agfa-Gevaert, I do it because…)*

		Total	**Lower floors**	**Higher floors**	
		M	M	M	*F-values*
1.	Taking the stairs enhances my *health*	6.62 (n = 296; SD = 3.66)	5.95 (n = 147; SD = 3.89)	7.28 (n = 149; SD = 3.31)	3.93*
2.	Taking the stairs enhances my *condition*	5.91 (n = 296; SD = 3.69)	5.49 (n = 147; SD = 3.88)	6.32 (n = 149; SD = 3.44)	1.26
3.	Taking the stairs is a free way to *exercise/sport*	5.55 (n = 296; SD = 3.87)	4.89 (n = 147; SD = 3.94)	6.20 (n = 149; SD = 3.70)	3.37
4.	Taking the stairs is *faster*	4.77 (n = 296; SD = 4.03)	3.86 (n = 147; SD = 3.98)	5.66 (n = 149; SD = 3.90)	11.12**
5.	Taking the stairs is a *habit* which I do not reflect about	4.29 (n = 296; SD = 3.99)	2.61 (n = 147; SD = 3.50)	5.95 (n = 149; SD = 3.75)	42.87***
6.	Taking the stairs reduces *bodyweight*	3.74 (n = 296; SD = 3.70)	2.95 (n = 147; SD = 3.61)	4.52 (n = 149; SD = 3.59)	9.03**
7.	Taking the stairs reduces my *ecological footprint*	2.59 (n = 296; SD = 3.25)	2.03 (n = 147; SD = 2.98)	3.13 (n = 149; SD = 3.42)	2.94
8.	My *colleagues* take the stairs	1.61 (n = 296; SD = 2.72)	1.20 (n = 147; SD = 2.36)	2.02 (n = 149; SD = 2.99)	3.50
9.	The elevator *scares* me (f.e. claustrophobia, fear for technical defects,…)	0.78 (n = 296; SD = 2.21)	0.84 (n = 147; SD = 2.44)	0.72 (n = 149; SD = 1.97)	0.26

0 = completely disagree; 10 = completely agree; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.0001$ (significant effect between lower and higher floors)

In Table 9 the employees of the lower floors were compared with the employees of the higher floors for the statements concerning the barriers to take the stairs. None of the statements received a high score and were considered as good reasons to avoid the stairs. The highest score was found for the statement (M= 3.60) "*Taking the elevator is less tiring*". The lowest score (M= 0.30) was found for the statement "*The time recorder is closer to the elevators*". Given that the time recorder was placed opposite to the elevator, we expected that the employees would be more likely to take the elevator. Therefore, this result was very surprising and not in line with our expectations. We should also mention that the employees of the lower floors scored higher on almost every statement. We can conclude that the employees of the higher floors are less likely to avoid the stairs, because they are more aware of the benefits as seen in the motives.

Table 9: Barriers to take the stairs *(If I do not take the stairs, I do it because…)*

		Total	**Lower floors**	**Higher floors**	
		M	M	M	*F-values*
1.	Taking the elevator is less *tiring*	3.60 (n = 296; SD = 3.75)	4.38 (n = 147; SD = 3.78)	2.84 (n = 149; SD = 3.57)	8.77**
2.	Taking the elevator is easier to do or continue a *conversation*	2.77 (n = 296; SD = 3.42)	3.24 (n = 147; SD = 3.50)	2.30 (n = 149; SD = 3.29)	2.29
3.	Taking the elevator is a *habit* which I do not reflect about	2.67 (n = 296; SD = 3.47)	3.62 (n = 147; SD = 3.66)	1.72 (n = 149; SD = 2.99)	8.69**
4.	My *colleagues* take the elevator	2.45 (n = 296; SD = 3.41)	2.81 (n = 147; SD = 3.53)	2.09 (n = 149; SD = 3.26)	0.02
5.	I often have to *carry heavy loads*	1.85 (n = 296; SD = 3.15)	1.76 (n = 147; SD = 3.13)	1.95 (n = 149; SD = 3.19)	0.86
6.	I am already *sufficiently* physically *active*	1.82 (n = 296; SD = 2.91)	2.21 (n = 147; SD = 3.11)	1.43 (n = 149; SD = 2.66)	0.33
7.	I do not have enough *condition* to take the stairs	1.51 (n = 296; SD = 2.62)	1.80 (n = 147; SD = 2.81)	1.22 (n = 149; SD = 2.40)	1.36
8.	I have to *sweat* taking the stairs	1.33 (n = 296; SD = 2.65)	1.84 (n = 147; SD = 3.06)	0.83 (n = 149; SD = 2.06)	12.53***
9.	I have a *medical disease* that hinders me taking the stairs	1.11 (n = 296; SD = 2.64)	1.34 (n = 147; SD = 2.86)	0.89 (n = 149; SD = 2.38)	3.94*
10.	The *weather* influences me taking the elevator (f.e. too wet, too cold, too hot)	0.84 (n = 296; SD = 2.01)	1.09 (n = 147; SD = 2.38)	0.59 (n = 149; SD = 1.53)	10.76**
11.	Find taking the stairs *dangerous* (f.e. to fall)	0.53 (n = 296; SD = 1.67)	0.59 (n = 147; SD = 1.79)	0.48 (n = 149; SD = 1.53)	0.32
12.	The *time recorder* is closer to the elevators	0.30 (n = 296; SD = 1.33)	0.34 (n = 147; SD = 1.47)	0.26 (n = 149; SD = 1.18)	0.31

0 = completely disagree; 10 = completely agree; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.0001$ (significant effect between lower and higher floors)

DISCUSSION

The aim of this study was twofold: (1) to test the effects of visibility and accessibility of the stairs on the stair use of employees, and (2) to test the (additional) influence of a health promotion video. The visibility and accessibility of the stairs were improved by placing pictograms that indicated where the stairs were situated and by opening the obstructing door to the stairwell. The message of the health promotion video focused on the health benefits that come with regularly taking the stairs and on stimulating employees to take the stairs. This video was sent by email and displayed on a TV screen at the point-of-choice between the stairwell and the elevator.

In line with Hypothesis 1, the improvement of the visibility and accessibility of the stairwell resulted in an increased number of stair users. This finding confirms earlier research by Nicoll (Nicoll, 2007), who provided evidence that spatial deficiencies play an important role in the promotion of stair use in buildings. Based on their implications for further research, we remediated the spatial deficiencies in Building A and observed an average effect size of +6.5% in overall stair use. Other studies (Bungum *et al.*, 2007; Ruff *et al.,* 2014) also obtained positive associations between visibility improvement and stair use, but none of these studies examined actual effect sizes. For example, Bungum *et al.* (Bungum *et al.*, 2007) investigated mainly the effects of a motivational health sign and described various physical characteristics of buildings (visibility, number of floors, …). These characteristics were analysed to assess which building variables predict stair usage and therefore the study did not examine effect sizes. Furthermore, Ruff *et al.* (Ruff *et al.,* 2014) used a cross-sectional study design and were unable to deduce causality, they only comment on possible associations.

Hypothesis 2A, which predicted a further increase in stair use after sending an email with the health promotion video, was not confirmed by our results. This non-finding contrasts earlier research by Vanden Auweele *et al.* (Vanden Auweele *et al.,* 2005). After one week of traditional stair use promotion by placing a health sign at the point-of-choice (+8%), these authors observed an additional increase because of an email intervention (+8%). Their intervention involved sending a short email to all employees about the health benefits of taking the stairs. We will now elaborate on a number of characteristics of our email intervention in comparison with the email intervention of Vanden Auweele *et al.* to explore this discrepancy in results.

First, the purpose and content of both email interventions was very similar and implied a motivational message with health benefits related to stair use. Vanden Auweele *et al.* featured a picture of a staircase, at the top of which were the words “fit and healthy” and below the staircase “I

take the stairs". The health promotion video in our study included more specific stair-use encouraging messages such as: "An easy way to move", "x Kcal" each time the actor goes up a step and "Reduce the risk at heart and vascular diseases". Second, in comparison with Vanden Auweele *et al.*, we found a similar increase in stair use in the first intervention (+8% vs. +6.5%), previous to the email intervention. Consequently, it is unlikely that the effect size of the previous intervention affected the effect of the email intervention. Third, previous to the email intervention, both studies focused on another topic in the first intervention. Vanden Auweele *et al.* focused on a motivational health sign and therefore the health message of the email intervention was a repetition of the health sign. In contrast, our previous intervention focused on the spatial qualities of the building. Consequently, the health promotion video (via email) was the first persuasive stimulus to take the stairs. Fourth, another difference between the two email interventions was the format of the email: email-wording vs. health promotion video. The health promotion video was sent by email, but was not identical to the email-wording. Moreover, in the email with the health promotion video, employees had to click the file to see the video and were not directly confronted with the message. Furthermore, the health promotion video was made specific for the different buildings. It is possible that employees felt more pushed into taking the stairs and therefore refused to act in accordance with the message. The abovementioned differences could explain why we did not find an additional positive effect of the email on stair use, while Vanden Auweele *et al.* did. Nevertheless, we still observed a significant difference between the email intervention with the health promotion video (30%) and baseline (25%). Therefore we might conclude that the effect of the visibility and accessibility intervention remained over time after the email intervention.

Even though the email intervention showed no further increase in stair use, the following TV intervention did, which was in line with Hypotheses 3A. The repeated exposure to the health promotion video resulted in an additional increase in climbing stair use. This result can be linked with earlier research of Boen *et al.* (Boen *et al.*, 2010), in which a repeated exposure to a health sign increased the number of stair users in the train station of Harelbeke. Boen *et al.* found an increase of 6.4% in comparison to the first intervention including a health sign, and a similar increase in stair use was found after the second intervention, which involved the same health sign (+8%).

In line with Hypothesis 3B, we observed a positive effect of the TV intervention in Building B. In this building, the TV intervention was the employees' first exposure to the health promotion video and no earlier interventions had taken place. The health promotion video resulted in an increase for both climbing and descending stair use (+12% vs. +3%). The climbing stair use results were in line with earlier research in which similar effect sizes were found after a health sign intervention: +8%

(Vanden Auweele, 2005), +10% (shopping mall Hasselt), +8.6% (station Harelbeke) (Boen *et al.*, 2010), +8.2% (Van Nieuw-Amerongen *et al.,* 2011). These comparisons suggest that our health promotion video might have had a slightly higher effect size than a health sign, but further research is needed to confirm this result.

Contrary to Hypothesis 2B, the email intervention did not have an increased effect on the number of stair users. In comparison with the previous TV intervention, a decrease in stair use was found for both climbing (-6%) and descending stair use (-4%). Earlier we mentioned that the email intervention did not have the same positive effects as found in the study of Vanden Auweele *et al*. In our study, even negative effects were found and the results did not differ from the baseline measurement. Consequently, it seems that the email intervention neutralized the previous positive effects caused in the TV intervention or that these effects disappeared over time.

To summarize, out of the five hypotheses that we formulated, three were confirmed. More specifically, we can conclude that improving the visibility/accessibility of the stairs, and sending a health promotion video by TV had positive effects on the stair use of employees. We found that the first intervention that was implemented in a particular building, increased both climbing and descending stair use. Furthermore, the TV intervention had a strong impact on both buildings, mainly for climbing stair use. It seems that the TV intervention had the highest impact on stair use because the employees were confronted at the point-of-choice. Therefore, this could have an immediate influence on their actual behaviour on the spot, whereas in the email intervention the video had to be watched behind the employees' desks, and the possible influence was delayed. The largest influences on stair use were found on climbing stair use. It could be argued that employees only copied the climbing stair use because the health promotion video represented a climbing model, but not a descending model. Therefore employees could have paid more attention to the climbing form of stair use, while the descending form was neglected. This possible explanation is not problematic because climbing stair use is more relevant in the contribution to health enhancement.

During the post-intervention week almost every positive stair use effect disappeared and only one difference in climbing stair use was found in comparison with the baseline measurements. Therefore, we need to search for other methods that have a more lasting influence on stair use over time. A possible explanation for the fact that we only found one significant lasting effect in the current study is that the interventions did not affect the behaviour and thinking of the employees in terms of stair use as a health behaviour. This interpretation is based on a number of reactions that we received on the interventions. These reactions suggest that the employees thought that the interventions were

caused by the economic crisis to decrease in the costs of elevator use. Consequently, many employees might have believed that the stair use message was designed by the company itself, rather than by the university. Therefore, some employees might have resisted our interventions because they wanted to react against these savings. Although we tried to frame the interventions very carefully, the management had warned us for some negative feedback from the employees due to previous problems and firm strikes.

In addition to our general behavioural research, we also conducted a survey to compare our results to the self-reported opinions of the employees. However, we found no remarkable results on the self-reported influences of the interventions. These opinion results were very neutral on a scale of -5 to +5 (close to zero), and the employees did not indicate stronger or weaker influences of specific interventions. A second notable finding in the survey where the low scores of the employees on the perceived different barriers to stair use. These low scores suggest that employees did not have specific reasons to avoid the stairs. However, at the end of the study the number of climbing stair users was much lower than the number of elevator users (29% vs. 71%). This contradiction can be linked to the fact that employees did not have specific reasons to avoid the stairs but that their intentions might be different from their actual behaviour (referring to The Theory of Planned Behaviour) (Ajzen, 1991). Moreover, there can be a difference in what the employees reported in the survey and stair use behaviour. Third, we found that employees of the higher floors were more aware about the health benefits linked with stair use. They seem to realize that taking the stairs to the higher floors is associated with taking more stairs and consequently with more physical activity and more health benefits.

This study has a number of particular strengths. First, we point out that this study is one of the first to differentiate between climbing and descending stair use. Consequently, the results give a more overall picture of stair use compared with previous studies that focused on the climbing form only. We found only a few studies that made a distinction between both stair use forms (Bungum *et al.*, 2007; Lee *et al.*, 2012). Bungum et al. (Bungum *et al.*, 2007) found no difference in the proportions of people going up or down across the data collections but the proportion of people who took the stairs differed significantly between the interventions and baseline. Results of Lee *et al.* (Lee *et al*., 2012) suggest that prompts are associated with increases in both activities; stair climbing (11.3%) and stair descent (+3.5%). In our study, overall the findings revealed a large difference between climbing and descending stair use. More specifically, during the baseline week, the descending stair use was much higher than climbing stair use (25.1% vs. 33.9%). At the end of a working day, employees might not have wanted to wait for the elevator and so they preferred a faster way to get down. Second, we

conducted a relative long observation over 4 consecutive months (17 November 2014 – 23 March 2015). We measured stair use over five successive weeks including a baseline measurement, different interventions and one post-intervention week. Three months after this post week, a survey was sent to the employees. Third, we performed an additional survey to question the employees' opinion about stair use. More specifically, we analysed their motives and barriers with respect to stair use, and also the influence of the different interventions. Fourth, we used infrared systems to collect the stair use movements. In contrast to manual counting by observers in previous studies (Vanden Auweele *et al.,* 2005; Boen *et al.,* 2010; Duchi and Nevejan, 2013), this is a more accurate and objective way to measure stair use movements. Moreover, this measurement system allowed us to continue during the day/week and in contrast to manual observers our study was not limited to specific observing hours and therefore all stair use passages were taken into account. Finally, we examined an innovative motivational health sign format. We tried to go beyond the standard motivational health sign and used a more dynamical form of health promotion with moving images.

It should be noted that our research also had several limitations. First, the buildings were selected on ground of specific architectural and obstruction characteristics that could have led to a more positive result. It is possible that more neutral buildings, where the stairs are more visible and within reach, would a show smaller increase in stair use.

Second, we used infrared systems to count the number of employees that passed by the stairs or elevator. These systems are very accurate but sensitive for technical problems. As a result, we had to eliminate two interventions days (11, 12 December 2014) in one of our settings.

Third, the IR-systems were placed at the ground level only and no data between floors was taken into account. Due to the high cost price of the IR-systems, it was not possible to implement this system at all floors. If data had been gathered on each floor we would have been able to see how the specific height of the floor influenced the employees' stair use. Moreover, on some floors employees could switch between buildings and this could have an effect on the stair passages at ground level.

Fourth, because the IR-systems only counted passages, it was not possible to make an objective distinction between age and gender. Previous research found that these background characteristics had an influence on stair use (Demeulenaere and Voeten, 2015; Duchi and Nevejan, 2013). Nevertheless, in our study we used the survey to differentiate between gender and age. In contrast to previous findings, gender and age differences were not found in the self-reported stair use of the employees. Fifth, the health promotion video was made for the two buildings separately but showed the same male person as the role model. This choice was made because most of the employees were male, but could have led to a difference in attraction of the health promotion video to male or female employees (Duchi and Nevejan, 2013).

To conclude, this study tested the impact of visibility and accessibility on stair use. As reported by Nicoll *et al.* (Nicoll, 2007), it is important to send a clarifying message to companies and firms about these interventions and their positive effects on stair use. Organisations should analyse and integrate similar stimulations so they can contribute to an improvement of their employees' health and physical fitness. Furthermore, the health promotion video had a similar effect size in comparison with other more inexpensive health signs. Nevertheless, it was the first time a health promotion video was used, so further research should be performed to further test the long-term impact of this innovative intervention form. In the future, researchers should focus on long-term effects and specific interventions. The employees' cognitions about stair use could be manipulated through more founded interventions were benefits and advantages (that come with stair use) are highlighted more. This could be realized through education or informative sessions about health, physical fitness and the effect of stair use on our daily accumulation of physical activity. In our study, such information sessions could have taken away some misconceptions (economic crisis, decrease in the costs of elevator use) about the interventions and might have led to more understanding and willingness of the employees to participate in stair use.

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Appendix 1: Instructions to authors: Health Promotion International

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• Authors should check all references carefully, and in particular ensure that all references in the Reference section are cited in the text.
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Chapter in a book: Zerjal, T., Singh, L. and Thangaraj, Jr K. (1999) The use of Y-chromosomal DNA variation. In Papiha, B. N. and Chakraborty, E. (eds), Genomic Diversity, 2nd edition, Chapter 4. Kluwer Academic, New York, NY, pp. 91–101.

Book (Editor as author): Shaw, S. and Anderson, D. L. (eds) (1978) Classification of osteogenesis imperfect. New England Journal of Medicine, 21, 1003–1007.

Number of authors: *Single author: Shaw, S.*
Two authors: Kennedy, T. and Jones, R.
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More than six authors: If more than 6, retain first six authors and put et al.

Electronic source: Barry, P. (2002) One Tel's cash SOS, then it all fell apart. Sydney Morning Herald, 1 August. Http://www.smh.com.au (last accessed 16 September 2002).

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COMMUNICATIONS

Editorial Office contact information:
Ms Robyn Perlstein BSc (hons); Grad Dip Diet; APD
Health Promotion International Journal Administrator
VicHealth
Ground Floor
15–31 Pelham St
Carlton, VICTORIA 3053
Australia
http://heapro.oxfordjournals.org/
Email: HPI@vichealth.vic.gov.au

Appendix 2: Populaire samenvatting

In de huidige samenleving lijkt fysieke activiteit steeds meer weg te sijpelen uit het dagelijkse leven. Allerhande hulpmiddelen en innovaties zorgen ervoor dat we niet meer fysiek actief moeten zijn, denk maar aan auto's, elektrische fietsen en internetshopping. Door gebruik te maken van deze middelen is onze dagdagelijkse activiteit drastisch gedaald. Wetenschappers zijn dan ook op zoek naar manieren om dit tekort aan fysieke activiteit te verhelpen en mensen, al dan niet bewust, warm te maken voor dagdagelijkse beweging.

Een mogelijke manier om aan de slag te gaan, is inspelen op de manier van verplaatsen. Niet alleen het gebruik van de fiets in plaats van de auto kan een bijdrage leveren, ook het gebruik van de trappen draagt bij tot een stijging van onze dagdagelijkse bewegingsmeter. Dit onderzoek richt zich op het trappengebruik in een werkomgeving, aangezien een bureau job meestal niet bevorderlijk is voor de graad van activiteit.

Om de mensen van een trappenstimulans te voorzien, werd er gekozen om de trap toegankelijk en meer zichtbaar te maken. Deze toegankelijkheid werd verbeterd door het openen van een belemmerende deur en tegelijk werd ook de zichtbaarheid versterkt door het ophangen van pictogrammen. Er werd vastgesteld dat het verbeteren van de toegankelijkheid en zichtbaarheid, een positieve invloed had op het stijgend trappengebruik ten opzichte van de beginsituatie (+6%).

Verder werd er ook gebruik gemaakt van een gezondheidspromotie video die op twee manieren werd aangeboden. Een eerste methode was het gebruik van een TV-scherm in de hal, op het keuze punt tussen de trap en de lift. Voor deze interventie werd er een stijging in trappengebruik gevonden, deze stijging was zelfs groter dan de toegankelijkheid en zichtbaarheid interventie. Het stijgende trapgebruik, verhoogde maar liefst met (gemiddeld) 12% ten opzichte van de beginsituatie. Dit is nog eens 6% meer dan de interventie in verband met toegankelijkheid en zichtbaarheid. Wanneer de video werd getoond via email, werd er geen stijging in trapgebruik gevonden. Deze positieve effecten verdwenen bij het wegnemen van de trappenstimulans. De positieve invloed was dus aanwezig tijdens de meeste interventies (uitgezonderd email) maar bij het wegnemen van de interventies waren deze bijna helemaal terug afgevlakt naar de beginwaarden.

De positieve resultaten tijdens de studie tonen aan dat er dus wel degelijk kan ingewerkt worden op trapgebruik door de trappen meer toegankelijk en zichtbaar te maken, en door ter plekke een gezondheidspromotievideo te tonen. Nu moet er gezocht worden naar blijvende stimulans.

Appendix 3: Setting pictures

Building A

Building B

Appendix 4: pictograms Building A


AGFA
ER IS EEN TRAP
NAAST DE GOEDERENLIFT


ER IS OOK EEN TRAP
NAAST DE GOEDERENLIFT

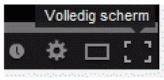

DEZE DEUR MAG OPEN BLIJVEN
DAN IS DE TRAP BETER BEREIKBAAR

Appendix 5: email with health promotion video

Email Building A, the same email was used in Building B.

Beste collega van gebouw 550,

Laat je inspireren door de volgende beelden ...
klik op deze link : https://www.youtube.com/watch?v=87qygvtRZYs

voor een maximaal effect - zet het geluid op en stel in op volledig scherm 

indien je geen internetverbinding hebt, klik dan op de volgende link => Koppelen
en open het filmpje door erop te dubbelklikken

Met vriendelijke groeten,

Gemeenschappelijke Dienst Preventie en Bescherming
in samenwerking met de KU Leuven
M/O/VGM/DPB/Preventiedienst
T +32 3444 5492

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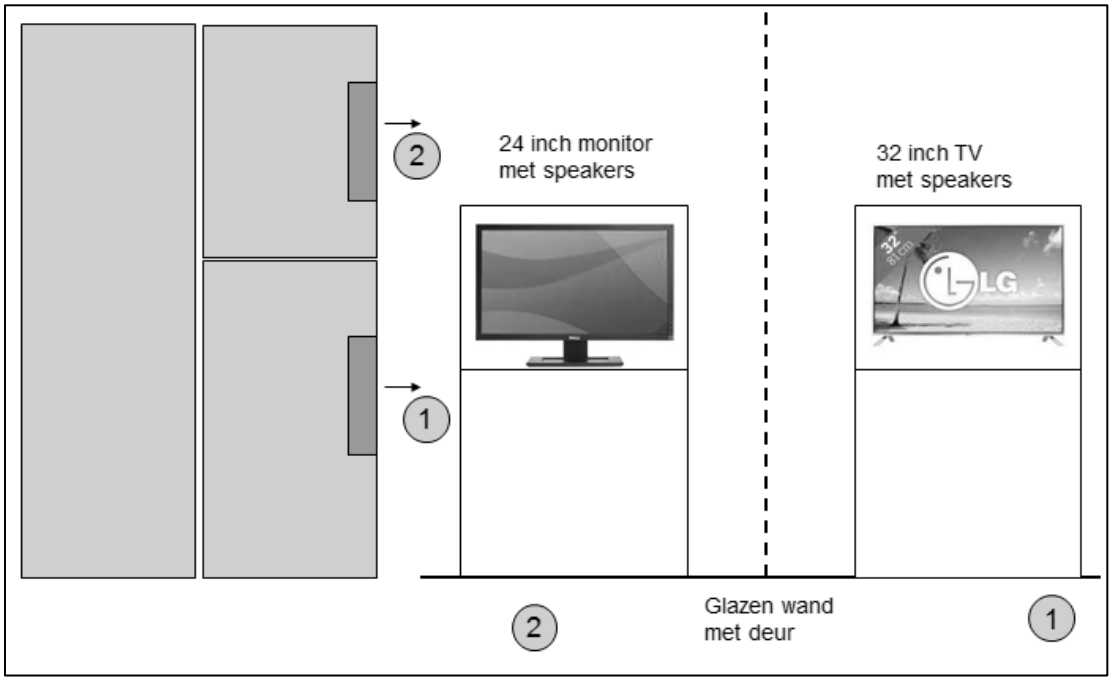
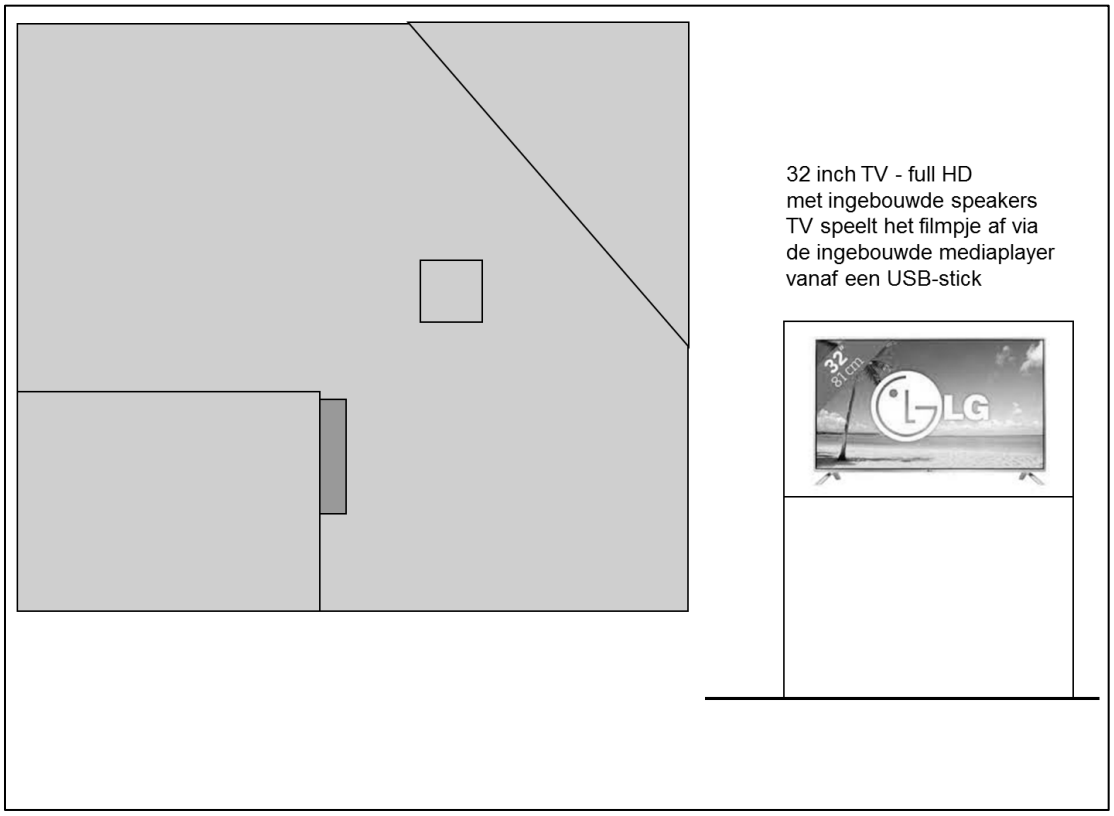
Appendix 6: placing of the TV-screen

Building A



Building B


32 inch TV - full HD
met ingebouwde speakers
TV speelt het filmpje af via
de ingebouwde mediaplayer
vanaf een USB-stick
32
81cm
LG

Appendix 7: Infrared System Spottic SP

WV Technics
Fatimastraat 62
4835 BD Breda
Telefoon 076-560 27 87
E-mail info@wvtechnics.nl
Website www.wvtechnics.nl

Picture: example placing IR-system at Building A

Appendix 8: Introduction Survey

Geachte werknemers van gebouw 076 en 550,

Als studenten Lichamelijke opvoeding en Bewegingswetenschappen, voeren wij in samenwerking met Agfa-Gevaert ons masterproefonderzoek uit. In deze vernieuwende studie hebben we getracht om in uw werksetting, het gebruik van de trap te stimuleren via verschillende interventies.

Om ons onderzoek te kunnen voltooien willen we u echter nog om een gunst vragen. In bijlage vindt u een enquête die onze resultaten zou moeten vervolledigen. Mogen wij u vriendelijk vragen deze zo correct mogelijk in te vullen en een bijdrage te leveren aan ons wetenschappelijk onderzoek. Deze vragenlijst neemt slechts een tiental minuten van uw tijd en verloopt volledig anoniem. Na verdediging van onze masterproef, zal u geïnformeerd worden over de resultaten van ons masterproefonderzoek.

Wij willen u alvast bedanken voor de talrijke reacties.

Met vriendelijke groeten,

Lisa Van Calster & Arnaud Octaef

2de Master Studenten Lichamelijke opvoeding & Bewegingswetenschappen (KU Leuven)

Geachte werknemers van gebouw 065,

Als studenten Lichamelijke opvoeding en Bewegingswetenschappen, voeren wij in samenwerking met Agfa-Gevaert ons masterproefonderzoek uit. In deze vernieuwende studie hebben we getracht om in uw werksetting, het gebruik van de trap te stimuleren via verschillende interventies en dit voor gebouw 076 en 550.

Om ons onderzoek te kunnen voltooien willen we u echter nog om een gunst vragen. In bijlage vindt u een enquête die onze resultaten zou moeten vervolledigen. Mogen wij u vriendelijk vragen deze zo correct mogelijk in te vullen en een bijdrage te leveren aan ons wetenschappelijk onderzoek. Deze vragenlijst neemt slechts een tiental minuten van uw tijd en verloopt volledig anoniem. Na verdediging van onze masterproef, zal u geïnformeerd worden over de resultaten van ons masterproefonderzoek.

Wij willen u alvast bedanken voor de talrijke reacties.

Met vriendelijke groeten,

Lisa Van Calster & Arnaud Octaef

2de Master Studenten Lichamelijke opvoeding & Bewegingswetenschappen (KU Leuven)

Appendix 9: Online Survey

Section A: Enquête Agfa-Gevaert

A1. 1. Wat is uw geslacht?

- ☐ Vrouwelijk
- ☐ Mannelijk

A2. 2. Wat is uw leeftijd?

- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65+

A3. 3. Hoeveel dagen per week werkt u meestal op Agfa – Gevaert?

- ☐ Nooit
- ☐ 1 dag
- ☐ 2 dagen
- ☐ 3 dagen
- ☐ 4 dagen
- ☐ 5 dagen

A4. 4. In welke gebouw werkt u?

- ☐ Gebouw 065
- ☐ Gebouw 076
- ☐ Gebouw 550

A5. 5. Op welk verdiep werkt u?

- Gelijksvloers ☐
- 1e verdieping ☐
- 2e verdieping ☐
- 3e verdieping ☐
- 4e verdieping ☐
- 5e verdieping ☐
- 6e verdieping ☐
- 7e verdieping ☐
- 8e verdieping ☐

A6. 6. Welke personeelsstatus heeft u?

- Arbeider ☐
- Bediende ☐
- Contractor ☐
- Kader ☐
- Stagiair ☐
- Student ☐
- Ander statuut ☐

A7. 7. Hoe vaak neemt u de trap naar boven?

	Nooit (0%)	10%	20%	30%	40%	50%	60%	70%	80%	90%	Altijd (100 %)
's morgens	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
's middags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
's avonds	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

A8. 8. Hoe vaak neemt u de trap naar beneden?

	Nooit (0%)	10%	20%	30%	40%	50%	60%	70%	80%	90%	Altijd (100 %)
's morgens	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
's middags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
's avonds	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

A9. **9. Tot welke verdieping zou u bereid zijn de trap te nemen?**

1e verdieping ☐
2e verdieping ☐
3e verdieping ☐
4e verdieping ☐
5e verdieping ☐
6e verdieping ☐
7e verdieping ☐
8e verdieping ☐

A10. **10. Is uw trapgebruik de laatste maanden gewijzigd?**

Helemaal niet van toepassing (0)	1	2	3	4	5	6	7	8	9	Helemaal van toepassing (10)
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

A11. **11. Als ik de trap neem in Agfa - Gevaert, dan doe ik dat omdat … :**

	Helemaal niet van toepassing (0)	1	2	3	4	5	6	7	8	9	Helemaal van toepassing (10)
De trap nemen sneller is	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De trap nemen mijn ecologische voetafdruk verkleint	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De trap nemen mijn gezondheid bevordert	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De trap nemen voor gewichtsverlies zorgt	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De trap nemen een gratis mogelijkheid is om te bewegen/sporten	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De trap nemen een gewoonte is waar ik niet bij stil sta	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De trap nemen mijn conditie verbetert	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Mijn collega's de trap nemen	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De lift mij angst bezorgt (bv. claustrofobie, angst voor technische defecten, …)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

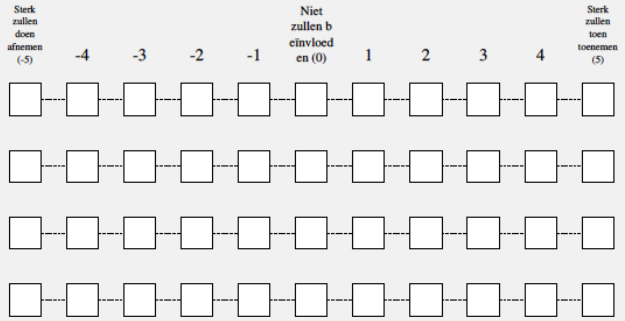
A12. 12. Als ik de trap niet neem in Agfa - Gevaert, dan doe ik dat omdat … :

	Helemaal niet van toepassing (0)	1	2	3	4	5	6	7	8	9	Helemaal van toepassing (10)
Ik erg moet zweten bij het nemen van de trap	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ik onvoldoende conditie heb om de trap te nemen	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ik een medische aandoening heb die mij verhindert de trap te nemen	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ik al voldoende fysiek actief ben	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ik de trap nemen gevaarlijk vind (bv. om te vallen)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De lift nemen een gewoonte is waar ik niet bij stil sta	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De lift nemen minder vermoeiend is	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De lift nemen gemakkelijker is om een gesprek te voeren of voort te zetten	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ik vaak zware lasten moet dragen	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Het weer mij beïnvloedt om de lift te nemen. (bv. te nat, te koud, te warm)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Mijn collega's de lift nemen	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
De tikklok dichter bij de lift staat	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

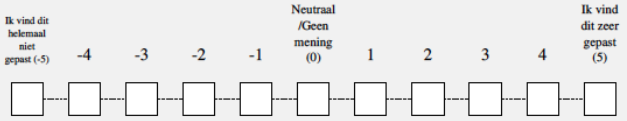
A13. 13A1. Hoe sterk is uw trapgebruik gewijzigd door de verschillende interventies?

	Heel sterk verminderd (-5)	-4	-3	-2	-1	Heeft me niet beïnvloed (0)	1	2	3	4	Heel sterk doen toenemen (5)
a. De pictogrammen die de trap aangeven, hebben mijn trapgebruik	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b. De gezondheidspromotie video via e-mail heeft mijn trapgebruik:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c. De TV, in de inkomhal, met de gezondheidspromotie video, heeft mijn trapgebruik:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

A14. 13A2. Welke van onderstaande interventies zouden uw trapgebruik in de toekomst kunnen beïnvloeden?

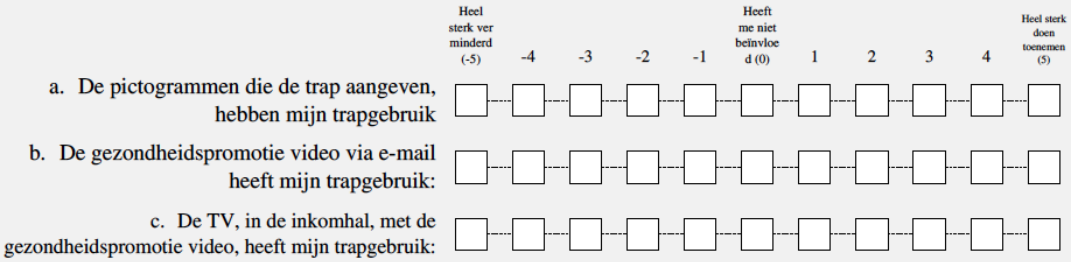


A15. 13A3. Vindt u het gepast dat een bedrijf interventies organiseert met als doel het trapgebruik van de werknemers te verhogen?



A16. 13A4. Heeft u suggesties om het trapgebruik te promoten op uw werkplek?

A17. 13B1. Hoe sterk is uw trapgebruik gewijzigd door de verschillende interventies?



A18. 13B2. Welke van onderstaande interventies zouden uw trapgebruik in de toekomst kunnen beïnvloeden?

	Sterk zullen doen afnemen (-5)	-4	-3	-2	-1	Niet zullen beïnvloeden (0)	1	2	3	4	Sterk zullen toenemen (5)
a. Pictogrammen	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b. Gezondheidspromotiefilmpje via e-mail	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c. Gezondheidspromotiefilmpje via TV in de hal	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
d. Enquête	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

A19. 13B3. Vindt u het gepast dat een bedrijf interventies organiseert met als doel het trapgebruik van de werknemers te verhogen?

Ik vind dit helemaal niet gepast (-5)	-4	-3	-2	-1	Neutraal /Geen mening (0)	1	2	3	4	Ik vind dit zeer gepast (5)
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

A20. 13B4. Heeft u suggesties om het trapgebruik te promoten op uw werkplek?

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A21. 14. Hoe vaak heeft u in een typische week tijdens de afgelopen maand onderstaande intensiteiten van fysieke activiteit uitgevoerd gedurende minstens 20 minuten aan één stuk? Uw antwoord is in aantal keren / week

1. Intense fysieke activiteit (= zwaar versnelde hartslag, veel zweten, uitputtend) vb. joggen, snel zwemmen, snel fietsen, fitnessen, ... ☐
2. Matige fysieke activiteit (= hartslag iets omhoog, licht zweten, niet uitputtend) vb. snel wandelen, rustig fietsen, rustig zwemmen, dansen, tuinieren, … ☐
3. Lichte fysieke activiteit (= minimale inspanning) vb. rustig wandelen, golf, bowlen, yoga / tai-chi, ... ☐