

Promoting stair climbing: effects of message specificity and validation

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Abstract

Current exercise guidelines encourage the daily accumulation of lifestyle activities, such as stair climbing. Although several studies show that visual prompts can increase stair usage, there has been little systematic assessment of the messages employed. Some of the messages used in previous interventions represent general descriptions of stair climbing (e.g. ‘free exercise’), while others emphasize specific consequences of stair use (e.g. ‘keeps you fit’). Twelve hundred structured interviews were conducted in order to establish which type of message is more persuasive. In addition, half of the interviewees were told that the messages were true, in order to assess how validating messages may influence their persuasive appeal. Results suggest that messages focussing on specific consequences are more persuasive than those providing general descriptions and that validating the information presented in stair-climbing interventions may increase their efficacy. Previous messages may not, therefore, have demonstrated the full potential of stair climbing as a model for increasing population activity levels.

Introduction

Physical activity reduces the risk of morbidity and mortality [1, 2]. In industrialized nations, however, up to three-quarters of the population do not achieve recommended activity levels [3, 4]. Overambitious exercise guidelines from the early 1990s failed to engage the general population [5]. Consequently, recommendations have been broadened to endorse 30 min of moderate intensity activity per day, which may be accumulated in several bouts [2].

The change in exercise guidelines coincides with the emergence of a socio-ecological model in physical activity promotion [6–10]. This approach recognizes that the environment and policy decisions can have a major impact on physical activity, in addition to intrapersonal factors (e.g. psychological and biological variables) and interpersonal processes (e.g. social support). Hence, there is a shift in emphasis, from determinants of individual exercise participation to how the built environment may influence physical activity at a ‘population’ level.

Within this framework, interventions to promote stair climbing exemplify how the modification of the environment can increase population activity levels [10]. Posters installed at the ‘point-of-choice’ between stairs and escalators increased stair climbing by 50–129% in shopping and commuter venues [11–15]. Message banners attached to the stair risers themselves produced even greater effects, increasing stair climbing by 127–179% [16–19]. Opportunities for stair use are abundant and accessible for most population groups. Hence, stair climbing is acknowledged as a good means of accumulating

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physical activity [3, 20]. In addition, stair climbing is a physiologically vigorous activity [21] and thus associated with several health benefits [22, 23].

Point-of-choice prompts can be considered a method of mass health communication. Regrettably, previous mass-media campaigns promoting physical activity have often been ineffective [24]. One possible explanation is that they are based on an overly simplistic approach to health communication, which assumes that messages have direct and homogenous effects on audience behaviour [25]. As Finlay and Faulkner [26] point out, while detailed consideration is given to the 'type' of media employed, the actual 'content' of campaigns is often inadequately explored. Indeed, previous stair-climbing interventions demonstrate little scrutiny of the messages used. Only one intervention pre-tested materials in the field [16]. Two convenience samples ($n = 161$ and $n = 156$) were asked to select messages according to their accuracy and ability to encourage stair use. An initial schedule of 49 messages was reduced to 16 for the second sample, from which the eight top selections were used. Elsewhere [11–15, 17–19], messages appear to have been spontaneously composed by the investigators, with minimal input from the target audience.

The emerging wisdom in health communication is that the public are active 'consumers' of information [25]. Therefore, while point-of-choice prompts target physical activity at a population level, it is important not to neglect intrapersonal effects which may influence the public's response to the intervention. Specifically, the content of the messages themselves may influence individuals' motivation to engage in stair use. There has been extensive research into message features which can influence persuasiveness. These include message length [27], the number and order of arguments presented [28, 29], tailoring [30, 31] and message framing [31–33]. By contrast, there has been less scrutiny of how the particular type of information contained in a message influences its persuasiveness. One variable which has thus far been neglected is the 'specificity' of the message content.

Messages used in earlier stair-climbing interventions [11–19] typically fall into two categories. Some represent general descriptions of stair climbing (e.g. 'free exercise', 'easy exercise'), whereas others emphasize specific consequences (e.g. 'keeps you fit', 'exercises your heart'). Recent research suggests that the most feasible campaign format may only involve a single message [19]. It is, therefore, important to determine the most effective message type so that single theme campaigns can be prepared. While few studies have formally addressed the issue of specificity, Roberson *et al.* [34] found evidence that specific messages have greater motivational properties. Participants read one of two messages advertising a hypothetical job vacancy. A message detailing the specific rewards of the post was associated with greater intention to apply than a message describing the position in more general terms.

There are theoretical reasons for believing that messages focussing on specific consequences may be more influential than those offering a general description of physical activity. The theory of planned behaviour (TPB) [35] posits that the primary antecedent of future behaviour is intention. In the physical activity domain, the major determinants of intention are attitudes and perceived behavioural control, with a smaller contribution from social pressure [36, 37]. Physical activity campaigns have sought to change behaviour by targeting the belief component of attitude. In the TPB, attitudinal beliefs are operationalized as the expected 'outcome' of a behaviour (e.g. If I exercise this month it will keep me fit) multiplied by the value ascribed to that outcome. Hence, messages which focus on specific consequences should resonate more strongly with individuals' attitudinal beliefs, which in turn determine intention to engage in physical activity. Importantly, messages which emphasize positive consequences are also 'gain-framed' and so should help facilitate preventive behaviours such as physical activity [31–33, 38]. The first aim of this study was to formally compare the general description messages and specific consequence messages used in four

earlier interventions [16–19] to establish which types are more likely to encourage stair use.

Persuasion literature shows that the perceived credibility of a message influences its effectiveness. Perhaps unsurprisingly, the quality of the arguments contained in a message has been found to influence the favourability of resulting attitudes [28, 29, 39]. In addition, many studies have looked beyond the message itself; revealing that greater credibility of the message ‘source’ is associated with higher motivation [29, 32, 40]. Hence, the persuasiveness of a message is influenced by the audience’s confidence in both the content of the message and the party delivering the message. In previous stair-climbing interventions, however, it is not possible to deduce the ‘extent’ to which people agreed with the information presented. Thus, while interventions provide strong evidence that point-of-choice prompts work in general, it is possible that they had suboptimal effects because some people lacked belief in the messages used. Therefore, the second aim of this study was to examine if validating messages, by telling participants that they were true, increased their motivational potential.

In summary, this study formally assessed the motivational properties of eight messages previously used in successful stair-climbing interventions [16–19]. We hypothesized that general descriptions of stair climbing would be rated less motivating than specific consequences. Second, we predicted that telling participants the messages were true would enhance their motivational potential.

Methods

Design

A replicated design was used in order to control for random sampling effects. The study was thus repeated with two separate samples of 600 participants. Given that the same personnel and standardized interview schedules were employed, any difference in results between samples could be attributed to sampling error. Therefore, only effects which were present in ‘both’ samples were considered robust and included in discussion.

Procedure

Ethical approval for the study was granted by the University of Birmingham Ethics Subcommittee. Two interview schedules (A and B) were composed based on stair-climbing messages used in previous interventions [16–19]. In both schedules, respondents were read two general description messages and two specific consequence messages, all beginning with the stem ‘regular stair climbing’. Schedule A included the descriptions ‘provides daily exercise’ and ‘helps to keep you active’ and the consequences ‘keeps you fit’ and ‘helps to keep you healthy’. Schedule B included the descriptions ‘is free exercise’ and ‘is the easy way to exercise’ and the consequences ‘works your legs’ and ‘exercises your heart’. Respondents were asked to rate how much they agreed with each message (agreement rating). Ratings were made on a five-point scale with the verbal labels ‘1 = not at all’, ‘2 = a little’, ‘3 = moderately’, ‘4 = a lot’ and ‘5 = very much’. Using the same scale, respondents were then asked to rate how much each message would encourage them to use the stairs (motivation rating).

Data were collected over 3 weeks in a UK town square. Investigators ($n = 4$), introducing themselves as from the sport and exercise science department of a local university, approached a convenience sample of people and asked them to complete a brief interview. Participation was entirely voluntary and anonymous. Interview schedules A and B were conducted with 300 people, respectively, making a total cohort of 600 (56% female; 8% >60 years old). In order to examine the effects of validating the messages, participants in each interview schedule were equally divided between a validation group (Told True) and a comparison group (Told Nothing). True randomization is difficult in field studies, thus allocation of participants between conditions was non-random in order to avoid possible errors in coding and assignment. After providing agreement ratings, respondents in the Told True group were informed that all the messages were true, prior to supplying motivation ratings. Investigators also coded participants’ age (grey hair and/or

appearance >60 years old) and gender (inter-observer reliability = 95%).

The study was then replicated in the same location with a further 600 interviewees (47% female; 13% >60 years old). Over 3 weeks, Schedules A and B were again administered to 300 participants, respectively. As before, half of the respondents in each interview schedule were told that the messages were true, prior to giving motivation ratings.

Analysis

In the first sample, 23 participants from Schedule A and 11 participants from Schedule B were excluded from analysis due to incomplete data. Similarly, in Sample 2, 12 participants were omitted from Schedule A.

The messages presented in interview schedule A were fully independent from those presented in interview schedule B. Hence, in each sample, Schedules A and B were analysed separately. Agreement and motivation ratings were entered as the dependent variable in a $2 \times 2 \times 2 \times 2$ mixed-model multivariate analysis of variance with the between-subjects factor of Group (Told Nothing versus Told True). The three within-subjects variables were Rating Type (agreement versus motivation), Message Type (general description versus specific consequence) and individual Message. Results for the respective interview schedules were then compared across samples. Using the replicated study design, significant effects were only reported if robust across samples. As no participants responded to both interview schedules, there can be no 'formal' comparison between schedules; suffice to say that any disparities must reflect the different items which they contain.

Results

Preliminary analyses including the between-subjects factors of gender and age revealed no robust interactions or main effects involving either factor. Hence, there was no evidence of differential responses resulting from the demographics of participants. Critically, there were also no robust

interactions involving the Message variable, meaning that it is not possible to discuss the effects of individual messages.

There was no main effect of Group in any of the analyses, confirming that respondents in the validation (Told True) and comparison (Told Nothing) conditions were homogenous cohorts. Figure 1 shows agreement and motivation ratings collapsed across samples and interview schedules. As can be seen, motivation ratings were generally lower than agreement ratings. Further inspection of the figure, however, suggests an interaction between Rating Type and Message Type. While agreement ratings were similar for general descriptions and specific consequences, respondents rated specific consequences as more likely to motivate them into using the stairs. This interaction was significant in both Schedule A [Sample 1: $F(1, 275) = 17.20, P < 0.001$; Sample 2: $F(1, 286) = 7.11, P < 0.01$] and Schedule B [Sample 1: $F(1, 287) = 29.49, P < 0.001$; Sample 2: $F(1, 298) = 39.40, P < 0.001$].

Analyses also revealed a significant interaction between Rating Type and Group, both in Schedule A [Sample 1: $F(1, 275) = 18.38, P < 0.001$; Sample 2: $F(1, 286) = 11.25, P < 0.01$] and Schedule B [Sample 1: $F(1, 287) = 9.70, P < 0.01$; Sample 2: $F(1, 298) = 14.28, P < 0.001$]. Figure 2 summarizes the interaction across all respondents. As can be seen, there was an apparent elevation of motivation in the group that were told the statements were true relative to the comparison group. Although the figure also suggests a disparity in agreement ratings between the groups, it should be noted that this 'must' reflect sampling variability; the difference between what the groups were told only occurred 'after' the agreement ratings were taken.

Finally, in Schedule B, a significant three-way interaction between Rating Type, Message Type and Group was detected [Sample 1: $F(1, 287) = 4.38, P < 0.05$; Sample 2: $F(1, 298) = 8.38, P < 0.01$]. Figure 3 illustrates the interaction. Consistent with the earlier findings, participants in both the validation and comparison conditions provided higher motivation ratings for specific consequences than general description messages. As is evident

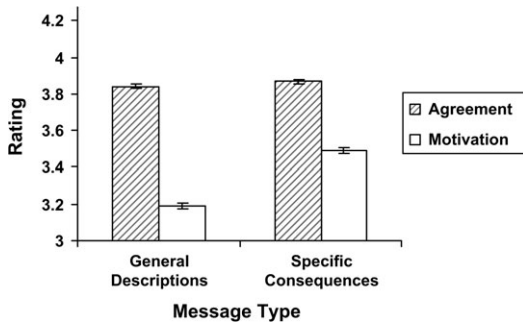


Fig. 1. Agreement and motivation ratings for general description messages versus specific consequence messages (collapsed across all respondents).

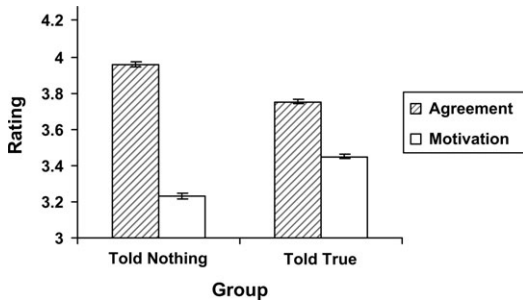


Fig. 2. Agreement and motivation ratings for the validation versus comparison groups (collapsed across all respondents).

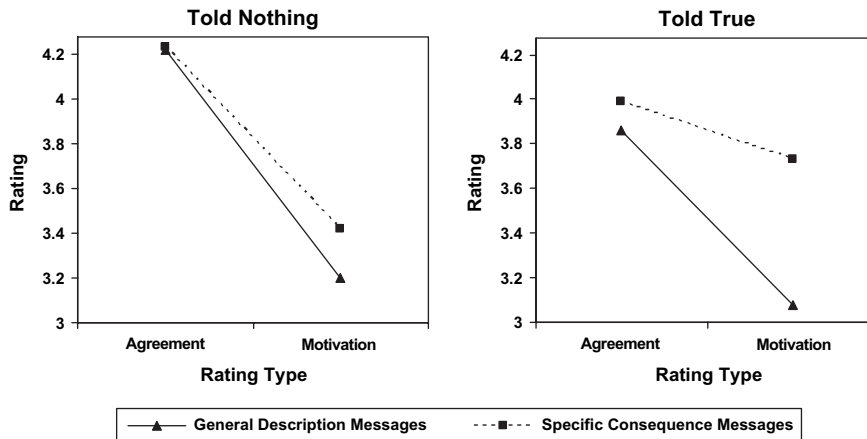


Fig. 3. Agreement and motivation ratings for interview schedule B, stratified by Group.

from the figure, however, the difference in motivation ratings between specific consequences and general descriptions was greater in the validation group than in the comparison group.

Discussion

To date, there have been few attempts to investigate how the specificity of the information contained in a message influences its persuasiveness. The existing research in this area is routed in the world of business rather than health promotion [34]. Using the most extensively researched model for the prediction of health behaviours, the TPB [35], we hypothesized that messages which focus on specific consequences would be perceived as more persuasive than those offering more general descriptions. The current results support our hypothesis; participants in both interview schedules rated specific consequence messages as more likely to encourage stair use than general description messages. These findings happily concur with the recommendation of Aarts *et al.* [41] that intervention programmes should explicitly state the health outcomes of exercise behaviours. It would appear, therefore, that specific consequence messages should be utilized in prospective campaigns. Regular stair climbing has been associated with several key health benefits,

including improved lipoprotein profiles, enhanced cardiorespiratory fitness and reduced risk of osteoporosis [22, 23]. These dividends could be used to form an array of potential messages for future use.

Meanwhile, participants who were told that the messages were true felt more encouraged to climb stairs than the comparison group. While it may appear elementary that validating a message will enhance its persuasiveness, this finding has important implications. On initial exposure, it seems that respondents were not fully motivated by the stair-climbing messages. After receiving validation of the messages, however, individuals' motivation increased. This suggests that the previous interventions which featured these messages may have had sub-optimal effects because people lacked faith in the information presented. Hence, by finding ways to affirm the validity of messages, it may be possible to heighten the impact of stair-climbing interventions.

Given the extensive research documenting a relationship between source credibility and persuasiveness [29, 32, 40], one obvious means of validating messages would be to provide a credible source for the information presented. The current study did not formally test or manipulate source credibility. However, a previous intervention to promote stair climbing in the workplace found that an initial surge in stair use following installation of poster prompts was further amplified when an e-mail was circulated from the company doctor affirming the information in the posters [42]. In public access settings, it would be easy to convey the source of a stair-climbing campaign. Printed materials could incorporate the insignia of a recognized health or research body as is *de rigueur* in existing mass-media campaigns for smoking cessation, healthy eating, etc. Importantly, the elaboration likelihood model [29, 39] posits that the effects of source credibility are variable under different circumstances. Source credentials have most influence in situations where the audience is unwilling or unable to think about the issue in depth [29, 32, 39]. Conveying the message source may, therefore, be particularly advantageous in

public access stair-climbing interventions, given that they must compete with advertising, signage and announcements for individuals' attention.

It is evident that there are separate effects of message specificity and validating messages. The three-way interaction in Schedule B suggests that these factors can also have a 'composite' effect on motivation. Among people who were told that the messages were true, the disparity in motivation ratings between specific consequences and general descriptions was wider than in the comparison group. In effect, validating the messages further accentuated the superior ability of specific consequences to motivate stair choice. There is a logical rationale for this effect. Whereas the general descriptions are more obvious and, to an extent, incontrovertibly true, the specific consequences present bolder, more contentious scientific claims. Verification of the message content may, therefore, have had a more critical influence on motivation in the case of specific consequences. The three-way interaction supports the two main findings and confirms the substantive impact that message characteristics can exert.

Finally, participants' motivation ratings were, in general, lower than their agreement ratings. Thus, it appears that while some individuals may believe stair-climbing messages, they are less motivated by them into action. This finding is consistent with existing evidence from social cognition models such as the TPB, which shows that awareness about health behaviours is not automatically followed by action [43]. The current results should, therefore, counsel health promoters against the assumption that exposure to seemingly potent stair-climbing messages will necessarily yield an analogous increase in stair use. Further research into message characteristics is needed in order to narrow the discrepancy between their capacity to simply provide information and their success in effecting 'tangible' behavioural change.

It is important to acknowledge the limitations of the current study. Although the distinction between general descriptions and specific consequences was made *a priori*, one could argue that there was some overlap between categories. In particular,

'helps to keep you active' could be considered similar to a consequence. Despite this caveat, we feel that the specific messages detail consequences of 'exercise', whereas 'keeping active' can be more accurately described as a state of being. Additionally, as with all interview-based research, it is possible that responses were influenced by social desirability [43, 44]. Thus, respondents may have purposefully provided answers which they thought were congruent with the investigators research aims. This possible source of inaccuracy reflects the fact that this study was a pencil and paper exercise, unlike previous stair-climbing interventions which directly observed behaviour. Therefore, caution is appropriate. Observational studies are needed to confirm these effects of self-report, before they are advocated as prerequisites of intervention design. In addition, we would have liked to have found the optimal message. Unfortunately, there were no interactions specific to individual messages which were robust across samples. Thus, future research may wish to employ a different experimental design in order to identify the single message which best motivates stair climbing. Given existing knowledge of message tailoring and social marketing theory, however, it is important to acknowledge that this optimal message may differ depending on the context in which it is presented [30, 31, 45]. For example, in a school setting, 'exercises your heart' may not be effective because young people are less concerned about heart health, whereas the same message may resonate strongly with people at say a senior citizens centre.

There are, however, strengths to the experimental design. The sample size was large and the replication element increases the reliability of the findings. As Winer [46] pointed out, the evidence provided by a single test is 'seldom complete enough to arrive at a decision which is free of all error' (p. 13). An approach based on replication is less influenced by the vagaries of sampling error and is, therefore, less likely to misconstrue random artefacts as genuine effects. In addition, whereas the previous study addressing message specificity [34] recruited university undergraduates as participants, this was a field exercise. While field research is more difficult

to perform and makes it harder to demonstrate causal relationships, the ecological validity of the data is usually strong. Thus, there have recently been calls for more field research in social psychology and health-related fields in particular [33].

Previous interventions to promote stair climbing have rarely analysed the content of the messages used. This is indicative of a wider problem in mass-media health communication where insufficient consideration may be given to the content of campaigns [26]. This paper, therefore, makes a new contribution to the knowledge base of how to promote lifestyle physical activity. Our findings suggest that by prioritizing specific consequence messages and finding ways to affirm the information presented, it may be possible to enhance the efficacy of stair-climbing interventions. This study begins to refine our understanding of message dynamics and suggests that previous messages may not have unlocked the full potential of stair climbing as a model for increasing population activity levels.

Conflict of interest statement

None declared.

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