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More or better: Do the number and specificity of implementation intentions matter in increasing physical activity?

Emely de Vet [a,b,*], Anke Oenema [b], Johannes Brug [c]

[a] Clinical and Health Psychology, Utrecht University, P.O. Box 80140, 3508 TC, Utrecht, The Netherlands
[b] Department of Public Health, Erasmus MC University Medical Center, Rotterdam, The Netherlands
[c] Department of Epidemiology & Biostatistics and the EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, The Netherlands

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ABSTRACT

Objectives: To examine 1) the specificity and number of implementation intentions people form for increasing physical activity, 2) the relation between motivation and the number and specificity of implementation intentions, and 3) the relation between number and specificity of implementation intentions and physical activity change.
Design: Content analyses of implementation intentions and prospective design.
Methods: Secondary data analyses on the implementation intentions 342 adults made in a larger randomized controlled trial. Implementation intentions formed at baseline were rated on specificity. BMI, self-concordance and intentions to increase physical activity were assessed at baseline. Physical activity was assessed at baseline and again two weeks later.
Results: Respondents formed on average 2.18 (SD = .84) implementation intentions, but over 30% did not form at least one specific implementation intention. Individuals motivated to increase physical activity formed better, but not more implementation intentions. Regardless of their motivation, respondents who formed better implementation intentions were more physically active two weeks later. The number of implementation intentions people formed was not related to physical activity, except when additional implementation intentions were formed with maximal specificity.
Conclusions: Forming implementation intentions of maximal specificity is crucial for behaviour change. Implementation intention interventions might become more effective if individuals are trained to form specific implementation intentions, especially to specify 'when to act'.

Introduction

Prevention of weight gain has become a pressing public health priority (Hill & Wyatt, 2005; Prentice et al., 2004). It has been calculated that weight gain can be prevented with small behavioural changes affecting the energy balance with 100 kcal per day, which is comparable to increasing physical activity by two hours per week (Hill, Wyatt, Reed, & Peters, 2003). Interventions that produce small but sustainable changes in physical activity in large populations should be designed to prevent weight gain.

Forming implementation intentions has been proposed as a potentially effective and inexpensive intervention (Gollwitzer, 1993, 1999) that could produce small behavioural changes in large samples. Implementation intentions are if-then plans linking an anticipated situation to a goal-directed response. People specify when, where and how one will act in order to achieve a goal ("If I encounter situation X, then I will perform behaviour Y"; e.g., "If I arrive at work in the morning, then I will take the stairs instead of the elevator to my workplace"). Generally, in implementation intentions interventions individuals are asked to write down on a pre-structured form when, where and how one will act to achieve an intended goal. Meta-analyses suggest that implementation intentions interventions are successful in changing a range of health behaviours, such as cancer screening behaviours, healthy eating, smoking cessation, binge drinking (Gollwitzer & Sheeran, 2006; Koestner, Lekes, Powers, & Chicoine, 2002; Sheeran, 2002), as well as physical activity (Armitage & Sprigg, 2010; Kwak, Kremers, Van Baak, & Brug, 2007; Luszczynska & Haynes, 2009; Prestwich, Perugini, & Hurling, 2010; Roberts, Maddison, Magnusson, & Prapavessis, 2010; Scholz, Knoll, Sniehotta, & Schwarzer, 2006; Sniehotta, Scholz, & Schwarzer, 2006).

Implementation intentions facilitate behaviour change, because the anticipated situation ('when and where') is recognized faster as

* Corresponding author. Clinical and Health Psychology, Utrecht University, P.O. Box 80140, 3508 TC, Utrecht, The Netherlands. Tel.: +31 30 2539250; fax: +31 30 2534718.
E-mail address: e.devet@uu.nl (E. de Vet).

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a good opportunity to act (Parks-Stamm, Gollwitzer, & Oettingen, 2007; Webb & Sheeran, 2004; 2007; 2008). Moreover, the goal-directed response is elicited automatically when the specified situation is encountered (Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009; Cohen, Bayer, Jaudas, & Gollwitzer, 2008; Gawrilow & Gollwitzer, 2008). When furnished with implementation intentions, intentions will be enacted upon even in situations where attention, memory or self-control is low (Brandstaetter, Lengfelder, & Gollwitzer, 2001; Hagger, Wood, Stiff, & Chatzisarantis, 2010; Webb & Sheeran, 2003).

To date most studies evaluated the effects of forming implementation intentions on behaviour change in experimental designs comparing an intervention group that formed implementation intentions to a control group who did not form these plans. Few studies explored in more detail what implementation intentions people form. This is important because implementation intentions are considered inexpensive and easy to administer in large-scale population studies, but this is only useful if people form effective implementation intentions on their own. Indications that people may form ineffective implementation intentions comes from two studies that showed that self-generated implementation intentions are less effective than implementation intentions formed when guided by an experimenter (Armitage, 2009; Ziegelmann, Lippke, & Schwarzer, 2006). The present study continues from this point by exploring why self-generated implementation intentions limit effectiveness.

In the present study, it is evaluated what implementation intentions people make to increase physical activity aimed to prevent weight gain. The present study presents a formative evaluation of data obtained in a larger randomized controlled trial (De Vet, Oenema, Sheeran, & Brug, 2009). In that larger trial, participants were randomly assigned to form implementation intentions to increase their physical activity by two hours per week or to a control group that did not form implementation intentions, but were only encouraged to increase their physical activity by two hours. Physical activity increased during the intervention period, but the increase did not differ between those who had formed implementation intentions and those who had not, despite the use of a commonly applied implementation intention manipulation. Participants were instructed to write down when, where and what they would do to increase their physical activity with at least two hours per week so that weight gain could be prevented. Individuals wrote the plans on a form and sent it back by mail. The detailed information written on the forms provided the input for a content analysis of the present study. Individuals could specify up to three implementation intentions and each implementation intention consisted of five components (specifying what activity, the day of the week, the moment of the day, the place of the activity and the duration of the activity).

Such a content analysis allows studying two interesting dimensions of implementation intention formation, i.e., the specificity of implementation intentions (quality) and the number of implementation intentions formed (quantity). High quality implementation intentions can be considered implementation intentions in which all the components of the plan (the when-, where- and how-component) are formulated in specific and detailed terms (Gollwitzer, 1999). To illustrate, the implementation intention "On Tuesday after work, I will go running" can be considered more specific than the plan "On a weekday evening, I will do sports". Implementation intentions are assumed to be effective, because of heightened accuracy and speed of cue detection (Parks-Stamm et al., 2007; Webb & Sheeran, 2004, 2007, 2008). More specific implementation intentions will better facilitate cue accessibility than vague ones, because the cue is less ambiguous and will be recognized swiftly and precisely rather than missed (Gollwitzer, 1999). Hence, specific implementation intentions are more likely to lead to behaviour change, than vague or broad plans.

Doing more physical activity is a broad goal with multiple instrumental behaviours and multiple opportunities to perform each of these behaviours. Consequently, a multitude of if-then links between situations can be formed. Especially when the behavioural goal is complex to achieve, reflects repetitive behaviours or consists of multiple sub-behaviours, multiple implementation intentions need to be formed connecting various actions with various situations. Forming multiple plans might enhance effectiveness because more opportunities for physical activity might be recognized and acted upon (Gollwitzer, 2006). Hence, a higher number of implementation intentions should increase the behaviour change.

The present study

In the present study we aim to provide an in-depth analysis of the quality and quantity of implementation intentions people form. This analysis is important because revealing complications in effective implementation intention formation may help to subsequently improve implementation intention interventions. It can also help to identify target groups who might benefit most from implementation intention interventions. The aims of the present study are three-fold. First, we aim to get insight into the quality and quantity of implementation intentions. It is evaluated if particular components of the implementation intentions (when, where or how) are not specified precisely. Additionally, we explore what activities people chose to form implementation intentions for. Second, we aim to gain insight into who forms more and better implementation intentions. According to implementation intention theory, forming implementation intentions is particularly suited for individuals motivated to change health behaviour such as increasing physical activity. Past studies have indeed indicated that forming implementation intentions was more effective for those with positive intentions to change the behaviour (Sheeran, Webb, & Gollwitzer, 2005).

Whereas intentions reflect what goals people have, self-concordance reflects why people hold their goals (Sheldon, Ryan, Deci, & Kasser, 2004). Self-concordant motivations (i.e., the extent to which a goal reflects personal interest and intrinsic motivations versus something one feels compelled to do) are associated with stronger intentions (Chatzisarantis, Hagger, Smith, & Sage, 2006). Several studies found that people do better when self-concordant motivations are furnished with implementation intentions (Chatzisarantis, Hagger, & Wang, 2010; Koestner et al., 2002, 2006; Koestner, Otis, Powers, Pelletier, & Gagnon, 2008). To a lesser extent also individuals with self-disconcordant motivations may benefit from implementation intentions (Chatzisarantis, Hagger, & Thøgersen-Ntoumani, 2008; Chatzisarantis et al., 2010).

Individuals motivated to change are assumed to benefit from implementation intentions, because it helps them to elaborate in sufficient detail the particular actions and contextual opportunities necessary for intention realization (Sheeran, Milne, Webb, & Gollwitzer, 2005). It is hypothesized that self-concordance and intentions to increase physical activity are positively related to the quality and quantity of implementation intentions. We further hypothesize that those who are already physically activity at baseline form more and better implementation intentions, because active individuals are more familiar with the critical cues for physical activity and therefore specify better and more implementation intentions.

Third, we aim to get insight into the relation between quality and quantity of implementation intentions with physical activity. We hypothesize that both quality and quantity of implementation intentions are independently related to physical activity. As outlined before, individuals who specified implementation intention