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Forming Implementation Intentions in an Uncontrolled Environment:
Not as Simple as it Seems

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Forming Implementation Intentions in an Uncontrolled Environment:

Not as Simple as It Seems

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Abstract

Previous research showed the effectiveness of implementation intentions on goal attainment using controlled settings. The aim of this study was to evaluate to what extent people are able to form implementation intentions which benefit goal attainment in an uncontrolled environment. For this purpose, a questionnaire was placed on a website which informed men who have sex with men (MSM) about the possibility of a free hepatitis B virus (HBV) vaccination. Participants of the questionnaire who wanted to make an appointment for a HBV vaccination at a later time or were contemplating making an appointment, were either asked to form implementation intentions or were routed to the control condition. Results show that individuals who formed implementation intentions were more successful in obtaining their goal of making an appointment. Intentions were also a significant predictor of behavioural enactment. The combined effect of strong goal intentions and implementation intentions provided the highest likelihood of goal attainment. Only 33% of the participants were able to form implementation intentions which could be identified as being good. These individuals were more successful in attaining their goals than people who formed poor implementation intentions and participants in the control condition. Forming poor implementation intentions and the control condition did not differ significantly in the probability of successful goal striving. Hence, forming good implementation intentions is important to increase the likelihood of goal attainment. The strength of the goal intentions proved to be a predictor of the quality of the formed implementation intentions.

Introduction

Quit smoking, save money, lose weight, eat healthier, be on time; these are some examples of New Year's resolutions people make every year. However, just a proportion of the individuals who form these goals actually seem to be able to accomplish them. What is the cause of this phenomenon; not being able to act on ones intentions? And what can there be done to prevent this?

In 1999 Gollwitzer wrote the article *Implementation Intentions – Strong Effects of Simple Plans*. With the concept *implementation intentions* he referred to the method of making strategic if-then plans to achieve a certain goal (Gollwitzer, 1993, 1996, 1999). Numerous studies show the effectiveness of forming implementation intentions in order to decrease the discrepancy which exists between ones goal intention and the actual behaviour accordingly (Gollwitzer & Sheeran, 2006). But is it really that simple to let people form implementation intentions?

Intentions predict behaviour

The theory about implementation intentions was proposed by Gollwitzer (1993) to provide a method to deal with the issue of the intention-behaviour discrepancy; the gap which exists between ones intentions and his/her actual behaviour. Multiple psychological models propose intentions as one of the most immediate predictors of behaviour. The most notable of these are the theory of reasoned action (Fishbein & Ajzen, 1975), the protection motivation theory (Rogers, 1983), the prototype/willingness model (Gibbons, Gerrard, Blanton, & Russell, 1998) and the extension of the theory of reasoned action (TRA), the theory of planned behaviour (Ajzen, 1985). These models suggest that multiple factors, like attitudes, self-efficacy, risk perception and perceived behavioural control, lead to motivate one to achieve a desired outcome. These variable are the prerequisites of the intention one has to achieve a certain goal, e.g, stop smoking.

To illustrate the role of the variable intention in one of these models, let's consider one of the most used conceptual frameworks concerning the determinants of particular behaviours, Ajzen's (1985) theory of planned behaviour (TPB). Being an extension of the TRA, the TPB also includes the determinants attitudes and subjective norm as predecessors of intention (for an overview, see; Conner & Sparks, 2005). Furthermore, Ajzen added the component of perceived behavioural control (PBC) to broaden the applicability of the TRA beyond purely volitional behaviours (Ajzen, 1991).

In the model, behavioural intention is conceptualized as the most immediate determinant of behavioural enactment, and mediates the effects of attitude, subjective norm, and, to a lesser extent, perceived behavioural control, on behaviour (Orbell & Sheeran, 2000). However, due to the difficulties of execution that may limit volitional control, Ajzen (1991) suggested it is useful to consider the effect of PBC on behaviour, in addition to intention.

The PBC refers to people's appraisals of their ability to perform the behaviour (e.g., "I really think I can stop smoking"). It can be seen as a proxy for actual behavioural control. PBC is influenced by beliefs concerning whether one had access to the necessary resources and opportunities to perform the behaviour successfully. The addition of PBC can also add to the predictability of behaviour (Armitage & Conner, 2001; Ajzen & Manstead, 2007). For instance, Godin, Valois, Lepage, and Deshamais (1992) found PBC accounted for an additional 12% of the variance in smoking behaviour over and above intentions. Attitude refers to a person's positive or negative evaluation of their performing the behaviour (e.g., "it is important to quit smoking") and is preceded by one's behavioural beliefs, which represent perceived consequences or other attributes of the behaviour. Subjective norms refer to one's perceptions of social pressure to perform the behaviour (e.g., "most of my friends think I should stop smoking"). It is a function of normative beliefs, which represent perceptions of specific significant others' preferences about whether one should or should not engage in a behaviour, together with the person's motivation to comply with the referent's expectation.

Finally, the model included demographic, environmental and personal characteristics. These factors are considered background variables that through its effect on behavioural, normative and control beliefs can influence behaviour indirectly. The causal model the TPB represents is illustrated in Figure 1.

In their review about changing health-related behaviour using the TPB, Ajzen and Manstead (2007) illustrate a great number of studies that show its utility in the health domain (e.g. Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997; Sheeran & Orbell, 1998). The three predecessors of intention have been identified as strong predictors of intentions, while PBC and intentions usually provide the best indication of the actual execution of behaviour. Armitage and Conner (2001) performed a meta-analysis to integrate and review the efficacy of the TPB found in research. The TPB variables accounted for 39% of the variance in intention. The subjective norm seems to be the weakest predictor. But how well do intentions predict behaviour?

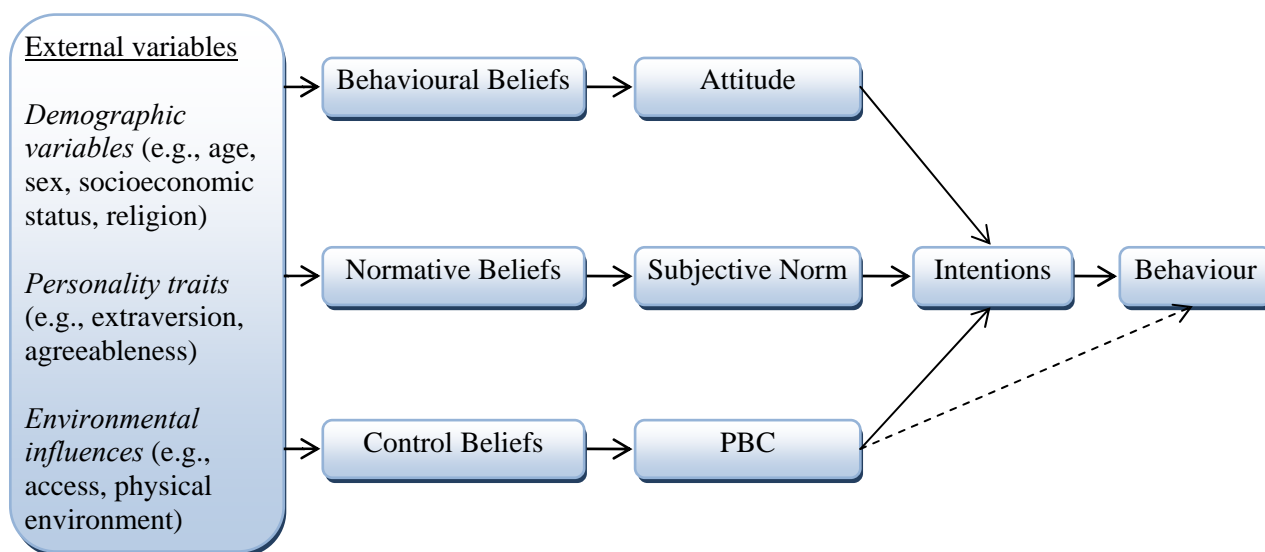


Figure 1 The theory of planned behaviour (Ajzen, 1985).

Sheeran (2002) has found an average correlation of 0.53 between the intention to achieve a certain goal (goal intention) and the actual behaviour accordingly. He states that, based on Cohen's (1992) power primer, this is a large correlation. But explaining 28% of the variance, still leaves 72% unexplained. Moreover, taking in account past behaviour will further decrease the effect size for goal intentions (Sutton and Sheeran, 2003). Sheeran notes that, with some methodological improvements, the correlation would be increased dramatically. Nevertheless, he agrees that the intentions-behaviour consistency is far from perfect. Though being the prerequisite, motivation to change is far from sufficient to behaviour change (Maio et al, 2007), as previously acknowledged by the Model of Action Phases (Gollwitzer, 1990).

The intention behaviour gap elaborated

So why do people fail to act on their intentions? The main source of the discrepancy between intention and action is to be found in inclined abstainers; participants who intend to act but do not act (McBroom & Reid, 1992; Orbell & Sheeran, 1998; Sheeran, 2002). People fail to act out intentions like work-out more often (e.g., Sheeran & Orbell, 2000), diet (e.g., Conner & Sparks, 2005) or use condoms (e.g., Sheeran & Orbell, 1998). Sheeran (2002) indicated in his review that people were successful in enacting their intentions in only 53% of the cases. So, the biggest problem lies not in the things we don't want to do, but mainly in the things we actually want start doing.

There are a number of explanations mentioned by Sheeran, Milne, Webb, and Gollwitzer (2005) for the existence of the intention-behaviour gap. The first reason concerns the actual control one has over executing the desired behaviour. A person should be able to perform a behaviour. Often, one goal conflicts with another, the goal is too ambitious, or simply too difficult to attain. A lot of goal intentions cannot be executed in the absence of particular abilities, resources or opportunities.

The second explanation given by Sheeran et al (2005) concerns the idea that goal intention may be reduced by the environment, which may trigger activation of alternative goal representations. People can consequently forget to perform the behaviour or the goal intention becomes reprioritized. For instance, Abraham et al (1999) found that the goal of using a condom became less important than the goal of having sex when the opportune situation occurred. This is partly due to the fact that the goal is adopted for external reasons (e.g. social pressure), making them likely to generate intrapersonal conflict (Ryan, Sheldon, Kasser, & Deci, 1996).

A further reason for ineffective goal pursuit is the idea that people often fall short in analyzing the particular actions and contextual opportunities. They fail to develop specific action plans for how they will attain their goals. Thus, they fail to specify when they will initiate their goal pursuit and how they will ensure their persistence in the face of distractions and obstacles (Gollwitzer, 1999). For instance, to realise the goal intention of using a condom, one must have condoms present at the appropriate moment, talk about using one to the sexual partner and have the skills to use a condom (Bryan, Fisher, & Fisher, 2002).

Moreover, Ajzen and Manstead (2007) also call the issues of habit and addiction to attention. They postulate that people who engage in a behaviour may be motivated to change it for something healthier, but precisely because of the habitual or addictive nature of the behaviour in question they may find it difficult to act on their good intentions.

According to Gollwitzer (1993) forming goal intentions are only the starting point to the route to goal completion. Next, the person must deal with a series of self-regulatory problems in order to attain the desired outcomes (Maio et al., 2007). Gollwitzer and Sheeran (2006) suggest a number of self-regulatory problems that undermine goal striving.

The first of the self-regulatory tasks people must overcome mentioned by Gollwitzer and Sheeran (2006) is initiating goal striving. People often fail to get started because they forget to act. For example, 70% of the participants who failed to perform a breast self-examination, stated they forgot to do so (Milne, Orbell, & Sheeran, 2002). Another issue why people may fail to start goal striving concerns failing to seize the right opportunity to act. People can miss

out on opportune moments to move toward their goal because they are unsure how to act when the moment presents itself (e.g., which options on the menu are low fat). The third possible factor which militates against getting started with goal striving has to do with overcoming initial reluctance. Often the long term positive outcome of the goal intention (e.g., losing weight) is accompanied by the short term less-attractive consequences (e.g., eating food which is perceived as unsatisfying). This last reason may for instance explain the problems individual have overcoming reluctance to practice safer sex (e.g., Abraham et al., 1999) in “the heat of the moment”.

The next problem that can undermine goal attainment according to Gollwitzer and Sheeran (2006) is controlling unwanted influences which can get goal striving derailed. These influences can originate in the environment, like conflicting attention responses (i.e., distracting stimuli can provoke spontaneous attention) and unwanted behaviour responses (e.g., next to ordering a healthy meal, when a person’s goal is to lose weight, he/she may also has to forego the chocolate dessert). But one can also get derailed by influences which originate within the person (Gollwitzer, Bayer, & McCulloch, 2005), like detrimental self-states. For example, people who are in a good mood are more liable to stereotyping (Schwarz, 1990), which makes it hard to form non-stereotypical impressions when this is the goal intention. Further, ego-depletion can reduce the intensity of goal striving, for instance in puzzle task performance (Webb & Sheeran, 2003).

The third self-regulatory problem proposed by Gollwitzer and Sheeran (2006) regards disengaging from goal striving that has come unproductive (Wrosch, Scheier, Carver & Schulz, 2003). It has been proven very difficult to disengage from an ongoing goal pursuit when it has become a failing course of action (Bragger, Hantula, Bragger, Kirnan, & Kutcer, 2003).

The last problem describes by Gollwitzer and Sheeran (2006) concerns the fact that people pursue multiple goals and in so doing overextend themselves, which is likely to jeopardize the achievement of subsequent important goals. It is proposed that together, these self-regulatory problems can prevent people from attaining their goal, no matter how strong the goal intention is (Schweiger Gallo & Gollwitzer, 2007).

The concept of implementation intentions

So, people often fail to do the things that they say they want to do or fail to avoid doing things that they do not want to do (Orbell & Sheeran, 1998). And according to Sheeran and Gollwitzer (2006) this is due to self-regulatory problems in goal striving. To deal with these

problems that prevent people from goal attainment, Gollwitzer (1993, 1996, 1999) proposed that forming implementation intentions offers a simple and effective strategy.

According to Gollwitzer performing a behaviour has two phases: a motivational phase and a volitional phase. During the motivational phase a person decides to act (one forms the goal intention). During the volitional phase this person plans how he/she is going to make the decision become a reality. It is during this volitional phase forming implementation intentions come into play. The model of action phases (Gollwitzer, 1990) views goal setting merely as the first of a number of consecutive tasks. Making a plan how to achieve the goal, to get started and to successfully complete goal striving are considered equally important subsequent tasks.

The purpose of an implementation intention is to lay down a specific plan, that helps to promote the initiation and efficient execution of goal-directed activity (Gollwitzer, 1993). In order to be effective, a person must have the intention to perform the behaviour, otherwise planning makes no sense according to Ajzen and Manstead (2007). Sheeran, Webb, and Gollwitzer (2005) state that strong goal intentions combined with forming an implementation intention will be most effective in bringing about behavioural initiation.

Gollwitzer (1993) postulates goal intentions have the format of “*I intend to reach goal Z*”. For instance, one can have the goal intention to lose weight (i.e., “I intend to lose weight”). However, implementation intentions are plans that have to be constructed according a specific if-then construction, specifying when, where and how one is going to perform the goal-directed behaviour. Implementation intentions differ from goal intentions, having the format; “*I intend to initiate behaviour x, whenever the situational conditions y are met*”. For example, to achieve the goal intention of losing weight, one can form the if-then plan “I intend to say no to chocolate bars, whenever my stepmother offers me some”. Hence, an association between a specific situation and a behavioural approach toward goal attainment is created. The situation specified in the if-component is meant to increase the likelihood that one identifies good opportunities, while the goal-directed behaviour is thought to be elicited automatically, relieving the individual of the tasks of deciding which behaviour in situ is will lead to goal-attainment (Gollwitzer, 1999).

Research on Implementation Intentions

Accumulated evidence indicates that forming implementation intentions increases the likelihood of goal attainment in a variety of domains. Research in the area of health promotion, (e.g., attending workplace health and safety training courses, Sheeran &

Silverman, 2003; vitamin C pills intake, Sheeran & Orbell, 1999; breast examination, Orbell, Hodgkins & Sheeran, 1999), academic issues (e.g., writing a curriculum vitae, Oettingen, Hönig, & Gollwitzer, 2000; writing a report, Kool & Van 't Spijker, 2000; overcoming procrastination, Owens, Bowman, & Dill, 2008), environmental issues, (e.g., recycling behaviours, Holland, Aarts & Langendam, 2006) and personal goals (e.g., setting ten personal goals, Dewitte, Verguts & Lens, 2003) has provided very promising results. In all these domains significant differences in behaviour have been found between the individuals who had formed implementation intentions and those who had not.

In their meta-analysis of 94 studies, Gollitzer and Sheeran (2006) found an average effect size of 0.65 of implementation intention formation on goal attainment, which according to Cohen's (1992) power primer is a medium-to-large sized effect. So, forming an if-then plan can effectively help people to overcome problems which prevent them from successfully obtaining their goals.

One of the most recent developments surrounding research of implementation intentions concerns the finding that they might be able to replace (antithetical) habits (Holland, Aarts, & Langendam, 2006). Implementation intentions mimic automatic processes, showing the three features of immediacy (Webb & Sheeran, 2004; Gollwitzer & Brandstätter, 1997), efficiency (Brandstaetter, Lengfelder, & Gollwitzer, 2001) and lack of conscious intent (Sheeran, Webb, & Gollwitzer, 2005). In the experiment of Holland, Aarts, and Langendam (2006) participants' habit of disposing paper and plastic cups in the wastebaskets, was replaced by forming strategic implementation intentions, to recycling behaviour. In the instruction Participants were asked to plan when, where and how to recycle their old paper and used plastic cups. Participants were asked to visualize and write down their implementation plans. The new behaviour sustained, showing the characteristics of a new habit. Hence, this research indicates forming if-then plans may be able to help people overcome persistent contra-intentional behaviour and replace them by the desired behaviour, which is one of the biggest obstacles in changing behaviour. Although some consideration is required. Adriaanse, De Ridder and De Wit (2009) found in their study about changing unhealthy eating behaviour that this ability is only due to motivational cues and not to situational cues. So, although positive effect of forming if-then plans to replace habits have been found, more research investigating the efficacy of implementation intentions to replace habits is required to fully understand the mechanism through which this can be achieved.

Explaining the efficacy of Implementation Intentions

The efficacy of the implementation intentions in decreasing the intention-behaviour discrepancy is thought to be explained by two processes induced by the *if* component and the *then* component (Gollwitzer, 1999; Webb & Sheeran, 2004).

First, implementation intentions promote identification of good opportunities to act through the *if*-component. It increases the accessibility of situational cues, as a result both the detection of, and the attention to, the critical situation is facilitated (Aarts, Dijksterhuis, & Midden, 1999; Webb and Sheeran, 2004). For instance, Aarts et al. (1999) found that a heightened mental accessibility of environmental cues related to the goal task mediated the effect of planning on the goal completion. According to Aarts et al., this may be explained by the fact that people who form implementation intentions probably form mental representations of situational features related to the goal-directed behaviour.

Second, implementation intentions automate the execution of the goal-directed response (*then*-component). Initiation of behaviour in the presence of the critical situation is immediate, efficient, and does not require conscious awareness (Webb & Sheeran, 2007). For example, Webb and Sheeran (2007) found that the accessibility of the specified cue and the strength of cue-response links mediated the implementation intentions effects on goal attainment on a verbal task.

Gollwitzer and Sheeran (2006) found in their meta-analysis large effect sizes for both processes related to the *if* component, which among others consists of cue detection and cue accessibility, as well as processes related to the *then* component of implementation intentions, which among others consists of immediacy and efficiency. Suggesting that it is important that both these components are carefully defined to result in effective goal striving.

Forming implementation intentions also has an effect on all four of the self-regulatory problems mentioned earlier. The effect sizes on ‘failed to get started’, ‘getting derailed’, ‘not calling a halt’ and ‘overextending oneself’ were .61, .77, .47 and 1.28 respectively (Gollwitzer and Sheeran, 2006). Implementation intentions ensured that people did not forget to execute the intended actions, did not miss good opportunities and overcame initial reluctance. Moreover, implementation intentions facilitated the control of unwanted influences on an ongoing goal pursuit (Gollwitzer, Bayer & Culloch, 2005). It can control unwanted behaviour by shielding ongoing goal striving from unwanted influences (Achtziger, Gollwitzer & Sheeran, 2008; Schweiger Gallo et al, 2006). This way it can promote goal attainment by preventing goal striving from straying off-course. Implementation intentions helped people to disengage from failing goals. Furthermore, consistent with the idea that forming *if-then* plans

to overcome overextending oneself, it was found that participant who formed implementation intentions to control initial performance did not exhibit ego-depletion or stereotype rebound (Gollwitzer & Sheeran, 2006).

The Present Study

Aims of the study

Research on implementation intentions and its efficacy on goal attainment so far has mainly been including controlled laboratorial designs to ensure an optimal formation of the plan and to minimize the influence of factors out of the control of the experiment, i.e., the implementation intentions are experimentally induced (Brickell, Chatzisarantis, & Pretty, 2006). Participants had limited freedom in deciding when, where and how to perform their plans, instead of being able to form implementation intentions out of their own volition (e.g., Sheeran, Webb & Gollwitzer, 2005, Sheeran & Orbell, 2000, Verplanken & Faes, 1999). According to Brickell and Chatzisarantis (2007) such form of manipulation leaves little room for choice over the regulation of implementation intentions. The instruction to form them is not communicated in the context of choice. Therefore, the question rises whether the effect of implementation intentions on goal attainment can be found in those experiment where the formation of plans is not controlled by a skilled experimenter (Brickell et al, 2006).

For instance, consider the study of Sheeran et al. (2005) regarding the interplay between goal intentions and implementation intentions. In their experiment, they had participants, who were undergraduates at a United Kingdom university, form implementation intention by means of the following instruction: “*Decide now where (e.g., library) and at what times (e.g., 2-3 p.m. and 4-5 p.m.) you will do your independent study in the next week.*” The goal intention (to do the independent study) was set by the researchers and the instruction specifying which necessary if-then plan had to be formed is hard to be misinterpreted. Although more open implementations intention formation instructions have been applied, such as the one used by Luszczynska, Scholz, and Sutton (2007), the situation in which this usually occurs is similar. In the Luszczynska et al. study, which aimed to test the effect of forming implementation intentions on reducing saturated fat intake, a long form was presented in which the participants had to fill in what they were going to do, and when and where they were going to do this, in order to accomplish their goal. As in the experiment of Sheeran et al. (2005), the participants, which were also students, agreed to participate in an

experiment and therefore filled out the required fields, simply following the carefully worded instructions.

The samples of the studies that Gollwitzer and Sheeran (2006) used in their large meta-analysis (N=8461) concerning the effects and processes of implementation intentions and goal achievement, consist mainly of university students (N=6855). Only 8 studies were conducted using a sample from the general public, which may suggest that the overall findings of the meta-analysis do not provide a proper reflection of the applicability and efficacy of the method in the general public. The 8 experiments that included a sample of the general public proved to produce similar effect sizes as the student-based sample. But, these studies also integrated well controlled experiments, to minimize any influence from the environment. See for instance the experiment by Armitage (2004) using a sample consisting of the general public to research the capacity of implementation intentions to reduce dietary fat intake, where the author states that 'this study provides a well controlled-test'. This still leaves little room for the formation of plans out of their own initiative. So, even though the sample is more generalizable to the general population, the condition at which the experiment was executed was not.

The main issue with the generalization of the results from this meta-analysis is related to the motivation of individuals to form the implementation intentions. It can be postulated that the main reason that student participants make an if-then plan is the fact that they are participating in an experiment which requires them to do so. They may not do this out of their own initiative or because they have the strong desire to accomplish their goal, i.e., out of their own volition. The participants have the intention to achieve a certain goal, but do they also have the intention to make an if-then plan to attain their goal? In a less controlled situation, including a non-student based sample, how well will people be able to do form implementation intentions when this is asked or suggested?

The aim of the present study is to analyse to what extent people are able to form adequate implementation intentions in a context that is not as controlled as it is in most previous studies involving the formation of if-then plans. What effect will this have on the likelihood of goal attainment? Moreover, the study sample will be recruited from the community. This will improve possible generalisation of the model to the general public.

Hypothesis

Based on previous findings in the field of intentions and implementation intentions, it is hypothesized that participants who form implementation intentions will have a significantly

higher chance of attaining their goal of making an appointment for a HBV vaccination than participant who do not make an if-then plan. Further, it is expected that participants who have a higher goal intention will also be better in effective goal striving. The idea that the participants who have strong intentions and have formed implementation intentions will have the highest rate of behavioural enactment, is the third hypothesis.

Next, it is hypothesized that the quality of the formed implementation intentions will have its effect on goal attainment; good plans will provide a significantly higher likelihood of goal attainment than poor plans, while poor plans will have no effect in decreasing the intention-behaviour discrepancy (i.e., poorly formed plans will not differ significantly in obtaining the goal intentions from the control group). Finally, it is expected that the quality of the formed implementation intentions is influenced by the strength of the goal intention, since a strong motivation to accomplish a certain goal will probably motivate a person more to form good plans to accomplish this, than a weak goal intention does.

Method

Design and participants

To promote vaccination against the hepatitis B virus (HBV) among men who have sex with men (MSM) a range of promotional activities are carried out by health services and the national gay and lesbian community health organisation in the Netherlands, including the development of a website. The main purpose of this website is to provide MSM with information about the HBV, the possibility of a free HBV vaccination, and health services where free vaccination can be obtained. In addition, the website offered the possibility to make an appointment online with a selection of health services supporting this tool. This website was used to conduct the present study and during the study period it was made clear that the website was being used to conduct research and the nature of the research was explained. All participants provided consent by clicking on a button to obtain access to the study materials. Under prevailing law in the Netherlands this study is exempt from approval by a accredited ethics committee.

The majority of the participants were recruited through electronic links on other websites that attract MSM for chatting and dating websites (e.g., gaysite.nl, gay.nl, homoseks.nl) or news and entertainment (e.g., gaykrant.nl). Respondents were first asked whether they wanted to make an appointment in order to get vaccinated against the HBV. Men who indicated that they wanted to make an appointment online and wanted to do so directly were routed to the

relevant page and excluded from the study. Men who indicated that they did not want to make an appointment were equally excluded. For the present study only those men were eligible who responded that they wanted to make an appointment at a later time or were contemplating making an appointment. Only men who provided consent to anonymously link their data to their records in the HBV vaccination register holding, the information whether they had made an appointment were retained (N=300). Data linkage was based on a code consisting of the first two letters of participants surname, their date of birth and the 4 numbers of the postcode of their residence (Note: postcodes in the Netherlands consist of 4 numbers and 2 letters; the obtained information specifies a street). All participants were MSM and mostly of Dutch origin (95%). Participants mean age was 33 years (range 13-88).

Participants were randomly assigned to either the experimental or control conditions in a between-participants design (forming implementation intentions: yes vs. no).

The quality of the formed implementation intentions

To analyse the effect of the quality of the formed implementation intentions, participants were divided into three different groups. This was based on the answers given on the three questions of the implementation intention condition, summarised by the city-, when- and where-questions. In order to be classified as being a good implementation intention, the answer for the city-question had to contain a city name, the answer to the when-question had to reflect a specific date or day (e.g., tomorrow, 4th of June), and the answer to the where-question had to be a specific location from which the participants could make the appointment (e.g., at home, at work).

The first group consists of participants who did form implementation intentions conform the instruction and answered all three questions correctly. Their plans were marked as **good** implementation intentions. Participants who filled out 2 of the question correctly were classified as having formed **mediocre** implementation intentions. If less than two of the questions is answer in the appropriate way, the implementation intentions were identified as being **poor**.

The intention-question

As mentioned earlier, prior to the implementation intention experiment, participants who completed the questionnaire were asked about whether or not they had the intention to make an appointment at the Municipal Health Services for a HBV vaccination. Individuals included in the implementation intentions experiment either gave the answer 'yes, later' or 'maybe

later'. The answer 'yes, later' indicates there is a clear goal intention to make an appointment, whereas 'maybe later' indicates this goal intention is not strongly present at the moment. Thus, individuals who answered 'yes' on the intention question will have a stronger goal intention than people who stated they will 'maybe' execute the behaviour on a later time.

Procedure and materials

Participants in the experimental condition (N=99) were routed to a page where they were asked to form implementation intentions before going to the contact information page, while participants in the control condition (N=201) were immediately directed to the contact information page, where they could find the information they needed to come in contact with the Municipal Health Services centre of their choice. Participants in the experimental condition were routed to this page after having formed implementation intentions.

The following instructions were given to participants in the implementation intention condition: "You are about to make an appointment for a vaccination against the HBV. A good intention! But often people do not act on their good intentions. It can help if you record your intention now by making an agreement with yourself. Now, think about when, where and how you will make an appointment for hepatitis B vaccination. It is possible to make an appointment by phone (at every local Health Service) or on-line (at health services in one of these cities [a list appeared by clicking on the hyperlink formed by the last two words]). Answer the next questions and print them, e-mail them to yourself (this mail will be sent immediately) or write them down in your diary. In which city would you like to be vaccinated? Choose your city [dropdown box with city names] or find the nearest Public Health Service by filling out your postal code. When do you want to make an appointment for the first vaccination? From which location do you want to make an appointment for the first vaccination?". The first question, where a city name is required, is labelled the 'city-question'. The second question is called the 'when-question', while the last question, asking about a location to make an appointment, is the 'where-question'.

The independent variable representing the behaviour, was determined by the fact whether or not someone made an appointment for a HBV vaccination at one of the Municipal Health Services. Because the sample of participants used in this study provided the required personal data, the behaviour of the participant was established using a register with all the participants who had made an appointment. The collection of this information continued until five months after the experiment had ended.

Statistical analysis

To test the first two and the last two hypothesis, χ^2 analysis were used. A logistical regression analysis was conducted to examine whether an interaction effect between ‘intention’ and ‘implementation intention’ on goal attainment was statistically significant (hypothesis three).

Results*The influence of goal intention en forming implementation intentions on goal attainment*

Participants in the implementation intention condition were more successful in attaining their goal of making an appointment at a Municipal Health Service for a HBV vaccination then those in the control condition, attaining their goal in 21,2% of the cases, versus 9% in the control condition. This difference can be seen in Figure 2. This effect was statistically significant ($\chi^2(1) = 8,811, p \leq .01$), supporting the first hypothesis; participants in the implementation intention condition were more successful in attaining the goal making an HBV appointment.

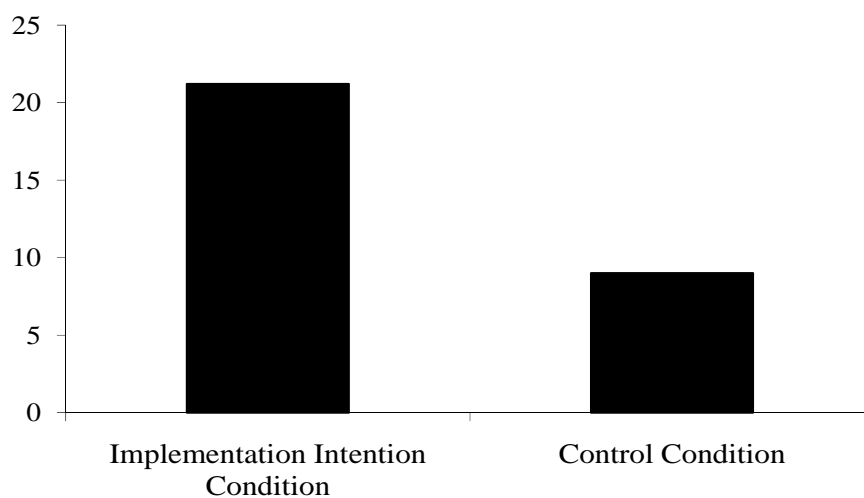


Figure 2 Percentage of participants who made an appointment in either the implementation intention condition or the control condition.

The influence of the intention question on goal attainment prior to the implementation intention experiment was also analyzed. The effect of the difference in amount of goal intention on goal attainment is statistically significant $\chi^2(1) = 15.797 p \leq .001$. Participants with the stronger goal intention had a higher change of attaining their goal of making an

appointment, with 23.4%, compared to 7.3% for those who had a weaker goal intention, see Figure 3.

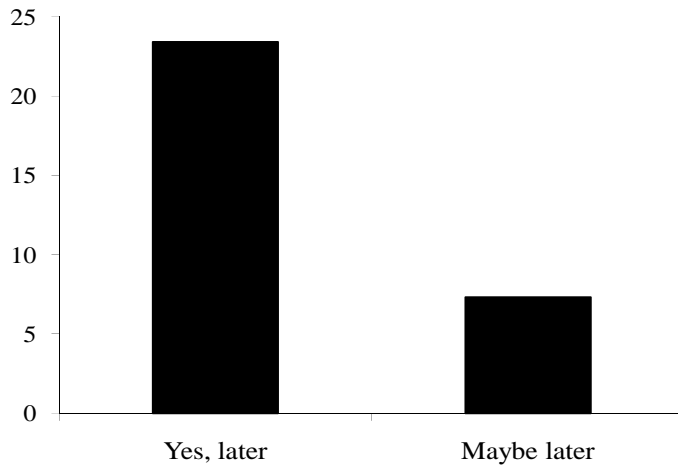


Figure 3 Percentage of participants who made an appointment for a HBV vaccination dependent of the answer given on the goal intention question.

To investigate whether intention and implementation intentions combined determined the behavioural enactment, a logistical regression was executed, see Table 1. The odds ratio (O.R.) of .22 should be interpreted as follow: the odd of behavioural enactment were about .22 times greater (so about 4 times smaller) for someone who had a weak goal intention and did not form an implementation intention compared to someone who had a strong goal intention and formed an implementation intention. The interaction of intention and implementation intentions has a statistically significant effect on goal attainment, $\chi^2(1) = 14,775, p \leq .001$, confirming the third hypothesis.

Table 1. *Logistic regression analysis of having made an appointment for HBV vaccination on intention to obtain vaccination and Implementation intention*

	B	S.E	Wald	O.R	Sign.
Intention	-1.30	.364	12.720	.273	.010
Implementation Intentions	-.92	.358	6.577	.399	.000
Intention x Implementation Intentions	-1.50	.44	11.83	.22	.001

Influence of the quality of implementation intentions

Of the participants in the implementation intention condition, 31.3% (N=31), 51.3% (N=51) and 17.3% (N=17) was able to form good, mediocre or poor implementation intentions respectively, under the criteria mentioned earlier. Figure 4 shows the percentages of participants who made an appointment for a HBV vaccination at a Municipal Health Service in the three groups based on the quality of the implementation intention and the control condition. Of the participants classified in the poor implementation intentions group, none of them were able to obtain their goal of making an appointment (note that this was a relatively small sample of 17 participants). In the mediocre implementation intentions group, 19.6% succeeded in acting on their intention. In the group of men who made good implementation intentions, 35.5% made an appointment. As expected both the formation of mediocre as well as good implementation intentions resulted in a statistically significant difference in goal attainment compared to the formation of a poor if-then plan ($\chi^2(1) = 3,908, p \leq .05$ and $\chi^2(1) = 7,826, p \leq .01$, respectively). The difference between good and mediocre formed plans was not statistically significant ($\chi^2(1) = 2,551, p \leq .11$). Compared to the control condition, good plans differ statistically significant ($\chi^2(1) = 17,282, p \leq .001$), as did mediocre implementation intentions ($\chi^2(1) = 4,674, p \leq .05$). No significant difference was found between poor-plans and the control condition.

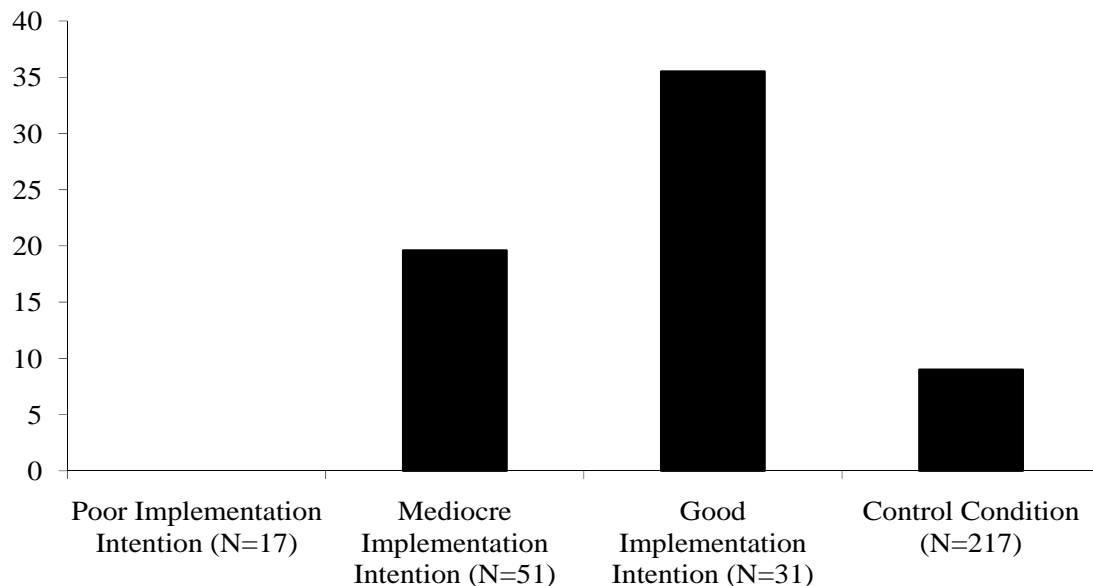


Figure 4 Percentage of participants who made an appointment in the three groups based on the quality of the implementation intention and the control condition

The effect of the strength of the goal intention on the quality of the formation of the implementation intention is to be seen in Figure 5. One of the most notable differences is that participants with a weak intention form relatively more bad plans, while participants with a strong intention form relatively more good plans. The main concern was to test the assumption that the strength of the intention determines whether or not a participant forms a good implementation intention. This hypothesis was confirmed, being statistically significant, $\chi^2(1) = 4,520, p \leq .05$; a strong intention led to significantly more good plans than a weak intention.

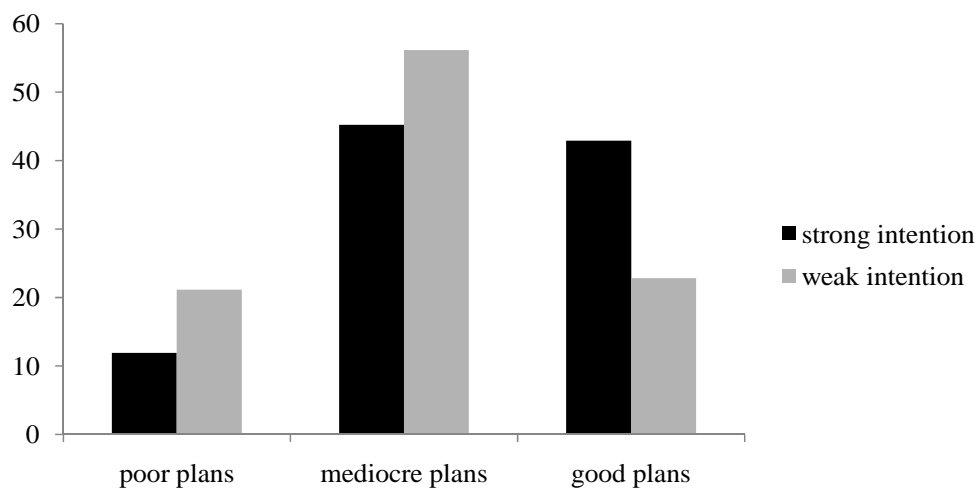


Figure 5 Percentage plans formed of a poor, mediocre or good plan, dependent of the strength of the intention to make an appointment for a HBV vaccination.

Discussion

The present study investigated the efficacy of forming implementation intention on goal attainment in a less controlled environment than the majority of the previous research did in the area.

It was hypothesised that both intention and implementation intentions had an independent effect on goal attainment. This was confirmed by the results. The strength of intention had a positive effect on the chance of goal attainment, while people who formed implementation intentions were almost three times more successful in making an appointment for a hepatitis B

vaccination. Further, the combined effect of the strength of intention and the effect of implementation intentions on goal attainment proved to be statistically significant. Confirming the idea that furnishing strong intentions with implementation intentions leads to the highest chance on goal attainment. These first three findings were consistent with the ideas proposed by Sheeran et al. (2005).

Another concern of this study was to find out to what extent people are able to form plans which will benefit goal achievement. Based on how many of the three questions in the implementation intention condition were answered according the instruction, the participants were divided into groups of individuals who formed either good, mediocre or poor implementation intentions. Subsequently, the effect of the quality of the formed plan on the change of goal attainment was tested. The results indicated that mediocre and good implementation intentions were valuable in ensuring effective goal striving compared to the control group and that bad implementation intention were not. So, it appears to be important to form if-then plans of at least mediocre quality in order to be effective in decreasing the intention-behaviour discrepancy. Although the difference in percentage of goal attainment between participants who formed mediocre if-then plans (19.6%) and those who formed good (35.5%) implementation intentions was substantial, it was not proven to be statistically significant. This may be due to the relatively small amount of participants.

To uncover one of the sources of the fact that some people were not able to form implementation intentions as instructed, the role of intention was considered. As expected the strength of the goal intention proved to be a predictor of the quality of the formed plans; stronger intentions led to more good plans.

When confronted with limited freedom people tend to form good implementation intentions which has a strong positive influence on the likelihood of goal attainment (e.g., Sheeran, Webb, & Gollwitzer, 2008). However, as shown in the present study, in a less controlled environment people appear to have difficulty making a good if-then plan to help them enact upon their intentions; approximately 31% of our sample succeeded in doing so. At the same time it proved to be important for these plans to be of good quality in order to have the strongest effect on goal striving.

Brickell and Chatzisarantis (2007) mentioned the idea that people have to regulate the implementation intentions, something which does not occur in laboratory-based design. In a naturalistic setting, attention and effort are required to form good if-then plans. Hence, a person has to be motivated in order to form an implementation intentions, which perhaps isn't as obvious as it might appears to be. For instance, when someone isn't convinced the method

is effective in helping this person attain his/her goal, this may prevent him/her to use the effort required to form a good plan. The strength of one's goal intention has a direct effect on the quality of the formed plan, though it is to be expected that other factors, like self-regulatory processes, play a role as well.

Based on the finding in the current study, it is proposed that future research addresses the issues involved in forming implementation intentions in more naturalistic settings (Brickell et al, 2006). To be able to overcome the problems individuals encounter when forming if-then plans, the factors that determine the quality of the implementation intentions need to be revealed. This study already uncovered goal intentions as a predictor of the quality of the formed plans, but to what extent intentions do this and how much of the variance in the quality is determined by other factors is still unknown. The method of forming implementation intentions has got great potential in helping to overcome the intention-behaviour gap (Gollwitzer & Sheeran, 2006), but further research and possible refinement is required for a broad practical applicability.

Some limitations of the present study need to be addressed. First, the sample of participants consisted of men who have sex with men (MSM). This group may differ from the general population, but it is expected that this group reflects the capacity of people to form good implementation intentions better than a student-based sample. The latter will probably have more experience participating in these kinds of experiments, and will likely have a higher average cognitive capacity, which can be of influence on the results.

Further, the question about the intention to make an appointment for a HBV vaccination could only be answered by 'yes, later' or 'maybe later'. Hence, the goal intention was measured by a two point scale. A more detailed tool to measure intention would provide a more accurate image of the effect of intention on the quality of the formed implementation intention.

The final issue that needs to be addressed is the environment in which participants took part in the experiment. Even though it provides a reflection of a possible medium through which interventions using implementation intentions can function, it is also submissive to a lot of environmental distractions. However, the goal of this study was not to control or to monitor these influences, but to test whether people, who are trying to form implementation intentions in such an uncontrolled environment, may have some problems in doing so. The source of these problems are yet to be determined.

In conclusion, the present study showed that forming implementation intentions can provide an effective tool in order to promote goal attainment. Moreover, it appears to be

important to have a strong intention to accomplish the goal in order to be successful. Furnishing strong goal intentions with implementation intentions proved to be most effective in goal striving. In an uncontrolled environment people tend to have difficulties forming proper implementation intentions, which effects the likelihood of goal attainment. This is partly due to the strength of the goal intention, although other factors such as self-regulatory problems are likely to play a significant role. These finding indicate that it is essential to research these factors, for the method of forming implementation intentions to reach its maximal potential in less controlled environments than laboratory based settings.

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