

To plan or not to plan? Goal achievement or interrupting the performance of mundane behaviors

HENK AARTS^{1*}, AP DIJKSTERHUIS²
and CEES MIDDEN¹

¹*Eindhoven University of Technology,
The Netherlands*

²*University of Nijmegen, The Netherlands*

Abstract

The present experiment investigated cognitive and behavioral effects of planning (i.e. forming implementation intentions) on goal pursuit during the performance of mundane behaviors. Participants received the goal to collect a coupon halfway the hall from the lab to the cafeteria. Later, they were also given the task to go from the lab to the cafeteria. Thus participants had to attain a new goal by interrupting a mundane behavior. Some participants enriched their goal with implementation intentions, others did not. Results showed that participants who formed implementation intentions were more effective in goal pursuit than the control group. Importantly, the data suggest that the effects of planning on goal completion are mediated by a heightened mental accessibility of environmental cues related to the goal completion task. Copyright © 1999 John Wiley & Sons, Ltd.

The achievement of goals—the wish or desire to perform an action associated with the anticipation of some kind of outcome—is fundamental to human functioning. Striving for goals provide structure to our lives (e.g. Carver, 1996; Locke & Latham, 1990). However, striving for goals and goal completion are two different things. Sometimes the completion of goals is postponed for minutes, hours, days or even weeks, simply because goal attainment often requires the interruption of everyday habitual behavior, something that is easier said than done. A few weeks ago, on a Monday morning, one of the authors decided to mail a letter on his way to work. On Tuesday evening, upon discovering that the letter was still in the pocket of his jacket, he wrote ‘letter!’ on his hand, hoping to be able to remind himself to mail the letter the next morning. An act to restore personal hygiene wiped out this reminder though and

*Correspondence to: Dr Henk Aarts, Department of Psychology and Language, Building DG 0.23, Eindhoven University of Technology, PO Box 513, 5600 MB Eindhoven, The Netherlands. e-mail: h.a.g.aarts@tm.tue.nl

goal attainment finally took place on Thursday night. In the pouring rain, he walked to the nearest box and managed to just make the deadline. In other words, many goals have to be enacted upon while being engaged in behaviors that take on a habitual character and are under control of the physical and social environment (e.g. James, 1890; Ouellette & Wood, 1998). As our example suggests, the chances to materialize relatively simple and straightforward goals can be surprisingly low. To interrupt habits, conscious attention on the pending goal is required and experience shows that this is often hard.

Research on effective goal pursuit suggests that the mere act of planning—the ability to anticipate a course of action intended to culminate in the achievement of a goal—may help to interrupt the proceeding of habitual, mundane behaviors. Specifically, forming implementation intentions as to when, where and how one will enact the intended behavior enhances the probability of successful goal pursuit in everyday life (Gollwitzer, 1993). These intentions connect a goal-directed behavior to an anticipated situational context. Such intentions take the format of ‘I will do *y* when situation *z* is encountered’ and can be strategically formed by the individual in the implemental phase to promote the initiation and successful execution of goal-directed actions. For instance, someone intending to mail a letter on his way to work (a goal-directed action that is often insufficiently implemented) increases the probability of goal attainment by actively planning this intended action.

Planning is the volitional act of connecting the achievement of a goal (e.g. ‘I intend to mail a letter on my way to work’) to the anticipated environmental context in which that goal should be enacted (e.g. as soon as I reach the corner with the coffee shop, I turn left). This way, action ignition is facilitated as the formation of implementation intentions leads to strong mental associations between situations and behavior. In addition, increased accessibility of the environmental context in long-term memory enhances the probability of goal completion, because the mere perception of specified environmental features is capable of bringing the previously formulated goal into mind (and hence the activation of the resulting action itself; see Gollwitzer, 1993). A few studies have demonstrated that goals are indeed more likely to be achieved when they are furnished with implementation intentions (e.g. Gollwitzer & Brandstätter, 1997; Orbell, Hodgkins & Sheeran, 1997; Verplanken & Faes, in press). For instance, in a study on breast self-examination (BSE), Orbell *et al.* (1997) found that among 33 women who had formulated the goal to perform BSE 100 per cent actually said they did so when they made implementation intentions in advance compared with 53 per cent of the control group.

However, although these findings point at the powerful effects of planning on goal achievement in everyday life, there is no direct evidence available that shows that these effects are indeed caused by the enhanced accessibility of the situational features (such as the corner with the coffee shop). Therefore, the present experiment examined the underlying cognitive changes that result from implementation intentions and the relation between these changes and goal completion. It is anticipated that planning (1) heightens the accessibility of mental representations of situational features associated with the intended action, (2) increases the completion rate of the intended action, and that (3) the effects of planning on goal completion are caused by the heightened cognitive accessibility of the specified situations related to the intended behavior.

To test these ideas, we provided all participants with the same goal (collecting a coupon at a specified location). Later, they were instructed to perform a mundane

behavior (walking from the lab to the department cafeteria). Two different planning procedures were designed. Participants in the experimental condition were instructed to plan the collection of the coupon, while participants in the control condition were required to plan a different act, namely to spend the coupon. This procedure ensured us that we did not make the term coupon more accessible for one group than for the other. Next, we assessed the accessibility of specified situations related to the intended action by measuring the speed of responding to these situational cues in a lexical decision task (see, Neely, 1991). Later, we observed whether participants collected the coupon or not.

METHOD

Participants and Design

Because the present experiment focused on goal achievement during the performance of mundane behavior in a specific environmental setting (i.e. walking from the lab via a central hall to the department cafeteria), only university students were recruited who were regular visitors to the building. Forty undergraduate students of the University of Eindhoven participated in the experiment receiving 5 Dutch Guilders in return. They were randomly assigned to one of the two experimental conditions: a related planning condition and an unrelated planning condition (control).

Experimental Task and Procedure

On arrival at the laboratory, participants were placed in separate cubicles. The experiment was run at computers and the computer program provided all the instructions. Participants were told that they would take part in research conducted by the faculty of Technology Management. Moreover, it was stressed that the study consisted of separate tasks, designed by different research teams of the faculty. For instance, one task was designed by a research team interested in formal operations of human planning, a second task designed by a team studying language comprehension, and another task was developed by a team focusing on consumer behavior in cafeterias. Accordingly, it was told that the experiment started on the computer in the laboratory, and would finish in the cafeteria of the faculty building. In reality, the first task served as the manipulation phase for goal activation and planning, the second task to assess the speed of recognition of environment-related words, while the third task was designed to observe the effects of planning on the completion of the given goal.

Goal Activation and Planning Manipulation

In the first task, participants learned that the study was conducted by the department of Operation and Statistics. First, participants received the goal to collect a consumption coupon. The coupon was to be collected at the secretaries office of the

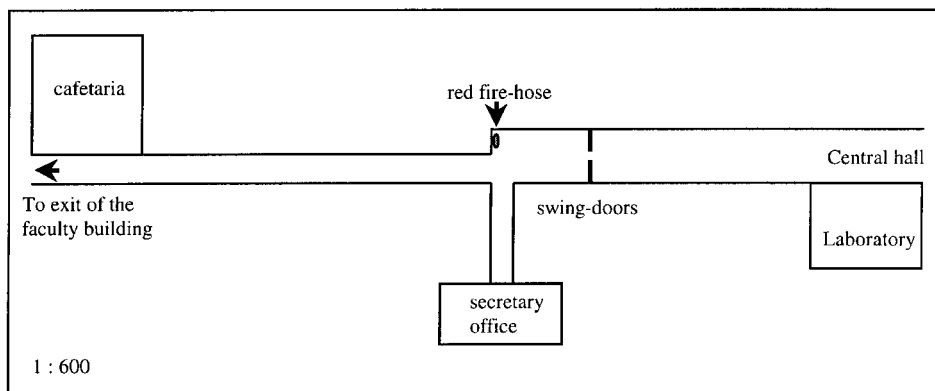


Figure 1. Simplified map of the building environment

department of Operation and Statistics. To ensure that all participants were potentially able to find this office, it was told that the office was located on the left side in a small corridor halfway the central hall from the lab to the cafeteria, directly after the first swing-doors and near a red fire-hose. Furthermore, it was emphasized that they were required to collect the coupon before they arrived in the cafeteria, that is, before the last task of the study started. Figure 1 depicts a simplified map of the building environment, showing the details described above (note: this map was not provided to the participants).

Subsequently, participants were told that the task was about the formal procedures of planning in daily life, and that they would be requested to mentally plan the steps (i.e. where, when and how) that are required to perform a certain mundane activity. To stress the importance of the planning task, it was told that the study was designed to gather information about the similarities and differences as to how students plan mundane activities.

Furthermore, to keep up with the cover story participants learned that activities related to the collection of the coupon were taken as an example for the planning task. At this point the instructions for the two conditions started to differ.

Half of the participants were requested to plan the steps that are required to collect the coupon. This experimental condition is referred to as the related planning condition. They were given a booklet, containing a sheet with three steps of collecting the coupon. Accordingly, participants were requested to write down when (time of the day), where (describing the location to collect the coupon) and how (route of walking) to execute it.

The other half of the participants were requested to plan the steps that are required to spend the coupon. This condition is referred to as the unrelated planning condition and can be treated as a control condition, because participants are requested to plan activities that are not directly related to the collection of the coupon. These participants were also provided with a booklet, however, this time containing the assignment to write down when (time of the day), where (describing a location) and how (procedure) to spend the coupon. This was done to keep the working load and procedure similar to the related planning condition. Based on a pilot study, participants were given 3 minutes to complete the planning task.

After the planning task, all participants filled out an unrelated questionnaire developed by colleagues of the division of ergonomics. The questionnaire comprised several items assessing individual differences concerning self-reports of physiological and physical indices (e.g. body weight). This questionnaire served as a filler task to remove participants' thoughts about the planning task from working memory.

Lexical Decision Task

After the planning task and the unrelated questionnaire participants learned the word-recognition task, designed by the team of 'language comprehension and communication'. Participants were told that 90 words would appear on the screen, and that 45 words were existing Dutch words and the other 45 were nonsense words. For every word appearing on the screen they were asked to decide as fast and as accurately as possible whether the word was a meaningful word or a nonsense word. Responses were collected from the PC's keyboard. Participants pressed keys marked 'yes' or 'no'. To obtain maximum speed during the task, participants were instructed to keep their fingers above the keys throughout the task. All words appeared at the same location on the screen, preceded by a row of asterisks (i.e. fixation point) for 500 ms. The word remained on the screen until the participant responded. Response latencies were measured in milliseconds from the onset of the words to the time participants pressed a button. Two seconds after participants pushed the button, the next word-trial appeared on the screen. The words were presented in random order, and preceded by four practice trials.

Among the existing words there were five target words, i.e. 'left', 'corridor', 'swing-door', 'red', and 'fire-hose'. These five words were specified in the previously given description of the place where the coupon should be collected, and thus are crucial environment-related words of the completion of the goal. Hence, these five words comprise the experimental target words of the lexical decision task.

Collection of the Coupon

After participants completed the word-recognition task they were provided with a second, unrelated pilot test on mobility patterns (e.g. participants were asked to list different locations they had visited on their bicycle in the last month), which served as another filler task. After this test they were introduced with the last task of the experiment. For this task they were instructed to go to the cafeteria of the faculty. As a cover story, participants were told that they first had to list seven articles from the cafeteria, and that the last task in the cafeteria was allegedly dealing with consumer aspects of these articles (e.g. price, quality). By employing this consumer cafeteria task we deemed that participants were more preoccupied with the task of walking to and doing things in the cafeteria. Consequently, all participants were randomly presented with the same seven articles (e.g. apple pie, coffee) on the screen for 5 seconds, and requested to write them immediately down on a piece of paper. Then, they were instructed to put the piece of paper in their pocket, to take all their belongings, and to go to the waitress in the cafeteria without having further contact with the experimenter. However, a second experimenter, who was seated at a hidden

place in the central hall, observed whether they collected the coupon or not. Participants who collected the coupon were subsequently thoroughly debriefed, thanked and paid. Participants who did not collect the coupon by themselves (and thus tended to walk to the cafeteria immediately) were called by the second experimenter and asked to collect their coupons. After these participants were handed the coupon, they were also debriefed, thanked and paid.

The debriefing indicated that participants were unaware of the hypotheses under investigation. Moreover, although some participants expressed that some tasks were related, they were not able to predict in what form or direction this might have influenced their responses. Therefore, we may conclude that participants had no idea about the true nature of the experiment. Not surprisingly, some participants spontaneously asked whether they were still supposed to go to the cafeteria, revealing more or less that we succeeded in creating a phoney task. Of course, we told all participants that the instruction to go to the cafeteria were only given to test our hypotheses, but we added that they were free in going to the cafeteria whenever they wanted to go.

RESULTS

Completion of the Goal

As the main dependent variable, we assessed whether participants succeeded in collecting the coupon by themselves (coded as 1) or not (coded as 0). Thus we obtained a proportion measure of the completion of the goal. This proportion measure was subjected to a Chi-square test.

First, the mean proportion of goal completion was 65 per cent, demonstrating that 26 out of 40 participants succeeded in interrupting the task of walking from the lab to the cafeteria by collecting the coupon. However, the analysis revealed that participants who formed related implementation intentions were far more successful in doing this ($M = 80$ per cent) compared with the control group ($M = 50$ per cent), as indicated by a significant effect of Planning, $\chi^2(1) = 4.05$, $p < 0.05$. These results show that planning (or the formation of implementation intention) provides significant benefits as to the completion of goals (in the present case, interrupting mundane behaviors).

Response Latencies

Only latencies concerning 'yes' responses across the five target words in the lexical decision task were included in the analyses (98 per cent out of all responses). We computed the average response latency across the 5 target words for each participant. As suggested by Fazio (1990), we subsequently conducted logarithmic transformations of latencies to reduce the skewness of the response distribution. The transformed response latencies were subjected to a 2 (Planning: unrelated versus related) between-participants ANOVA.

This analysis showed that the effect of Planning was significant, $F(1,36) = 8.03$, $p < 0.01$. Participants' transformed response latencies in the related planning

condition were reliably faster ($M = 597$ ms) than participants' responses in the unrelated planning condition ($M = 684$ ms). These results show that the formation of implementation intentions enhanced the speed of participants' responses on target words, while this was not (or to a lesser extent) the case for participants in the control condition.

Mediation

To confirm that it is accessibility of situational cues (measured with the lexical decision task) that mediated the effects of Planning on the completion of collecting the coupon, we performed a hierarchical logistic regression analysis. In this analysis, the measure of goal completion is first controlled for the transformed response latencies. Next, the effect of Planning on goal completion is tested. For each step, χ^2 , regression coefficient (B) and Wald significance test were obtained. Mediation holds if the independent variable has no effect on the dependent variable when the mediator is controlled (Baron & Kenny, 1986, p. 1177). In the present experiment this means that the effect of Planning on the proportion of completion of the goal should be no longer significant after the response latency on the target words is partialled out.

First, the logistic regression analysis revealed a significant effect of the response latencies on the participants' completion of the goal, $\chi^2(1) = 7.53$, $p < 0.01$ ($B = -17.51$, $p < 0.03$), indicating that faster recognition of the environment-related target words coincides with a higher completion rate of collecting the coupon in that environment. As anticipated, however, after controlling for the latencies the effect of Planning on the (corrected) proportion of goal completion was no longer reliable, $\chi^2(1) = 1.03$, ns. ($B = 0.81$, ns). This pattern of results suggests that the effect caused by planning is indeed produced by an increase of the accessibility of environmental cues related to the completion of the goal.

It may be argued that the observed effects of planning on response latencies and goal completion are produced by some kind of repetition priming effect, and not by the act of planning *per se*. Specifically, participants in the related planning condition might have written down the target words during the planning phase more frequently than those in the unrelated planning condition. Therefore, writing down the target words during planning might have enhanced the accessibility of these words and subsequently facilitated goal completion.

In order to test whether differences in response latencies could be attributed to differences in the extent to which target words were written down, the frequency of appearance of these target words in the protocols were counted. Subsequently, the response latencies were subjected to an analysis of covariance (ANCOVA), using the frequency measure of target words written down as covariate. First, the analysis of covariance revealed a non-significant effect of the covariate on the participants' response latencies, $F < 1$, indicating that the number of times the environment-related target words appeared in the protocols is not related to the speed of recognizing the target words in the lexical decision task. Furthermore, the effect of Planning was smaller, but remained statistically significant, $F(1,35) = 4.58$, $p < 0.04$. This suggests that some repetition priming effect may have been present, but was not sufficiently strong to provide an account for the effect of planning on the response latencies.

We also tested whether differences in the frequency of target words written down in the protocols are responsible for the effects of Planning on goal completion by running a similar hierarchical logistic regression analysis as described before, only this time we controlled for the frequency measure. This analysis showed that the effect of the frequency measure on the completion of the goal was not reliable, $\chi^2(1) = 0.14$, ns ($B = 0.06$, ns), implying that the number of target words written down in the protocols is not related to the completion rate of collecting the coupon. Importantly, after controlling for the frequency measure the significant effect of Planning on the (corrected) proportion of participants who completed their goal was retained, $\chi^2(1) = 7.34$, $p < 0.01$ ($B = 3.31$, $p < 0.03$).

DISCUSSION

The reported results supported the idea that the formation of implementation intentions promotes goal achievement during the performance of mundane behavior. Specifically, participants who supplied their goal with implementation intentions were better at interrupting the ongoing mundane behavior, and consequently completed their goal more often. This conclusion coincides with findings from other studies in which goal achievement in everyday life is investigated as a function of volitional planning (e.g. Gollwitzer & Brandstätter, 1997; Orbell *et al.*, 1997). In addition, participants who enriched their goal with implementation intentions showed more enhanced access to environment-related words associated with the attainment of the goal. Based on the assumption that the formation of implementation intentions creates a strong link between situations and behavior in memory, these findings point at the fact that planning increased the probability of goal achievement through a heightened accessibility of the mental representations of situational features related to the goal-directed behavior. This conclusion was further confirmed by mediator analyses.

The present findings underscore the idea that implementation intentions are so effective because of enhanced accessibility of environmental cues associated with the goal-directed behavior in memory (Gollwitzer, 1993). As a result, the mere perception of these cues upon entering the environment brings the previously formulated goal into mind (and hence the activation of the resulting action itself). Presumably, the formation of implementation intentions gives a goal a mental status more or less comparable to that of a habit. There is other evidence showing that the formation of implementation intentions can simulate the automaticity in habitual behaviors (Aarts & Dijksterhuis, 1998, Habits as knowledge structures: Automaticity in goal-directed behavior. (Manuscript under review, Eindhoven University of Technology); Gollwitzer, 1993; Orbell *et al.*, 1997). For instance, by employing a response latency paradigm, Aarts and Dijksterhuis established that only in the absence of habits do individuals benefit from planning in the sense of a speed-up effort of responding to specified situations with the intended goal-directed behavior. In this case, mental associations between situation and action are not the consequence of frequent and consistent use (as in habits). Instead, associations arise because of a planning process. Yet whether these intentionally formed associations between situation and action can be seen as completely functionally equivalent to habitual associations and hence, whether such behaviors are—as habits—automatically activated, constitutes an

interesting and important avenue for further exploration. If it does, that is, if implementation intentions can give goals a mental status completely equivalent to that of habits, mailing a letter may become much easier in future.

ACKNOWLEDGEMENTS

We would like to thank three anonymous reviewers and Leonel Garcia-Marques for their helpful comments on earlier versions of this paper.

REFERENCES

- Baron, R. M. & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistic considerations. *Journal of Personality and Social Psychology*, **51**, 1173–1182.
- Carver, C. S. (1996). Some ways in which goals differ and some implications of those differences. In P. M. Gollwitzer & J. A. Bargh (Eds), In *The Psychology of action: Linking cognition and motivation to behavior* (pp. 645–672). New York: Guilford Press.
- Fazio, R. H. (1990). A practical guide to the use of response latencies in social psychological research. In C. Hendrick & M. S. Clark (Eds), *Research methods in personality and social psychology* (pp. 74–97). Newbury Park, CA: Sage.
- Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. In W. Stroebe & M. Hewtone (Eds), *European review of social psychology* (Vol. 4, pp. 141–185). Chichester: Wiley.
- Gollwitzer, P. M. & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology*, **73**, 186–199.
- James, W. (1890). *The principles of psychology*. London: Macmillan.
- Locke, E. & Latham, G. P. (1990). *A theory of goal setting and task performance*. Engewood Cliffs, NJ: Prentice Hall.
- Neely, J. (1991). Semantic priming effects in visual word recognition: A selective review of current findings and theories. In D. Besner & G. Humpreys (Eds), *Basic processes in reading: Visual word recognition* (pp. 264–336). Hillsdale, NJ: Erlbaum.
- Orbell, S., Hodgkins, S. & Sheeran, P. (1997). Implementation intentions and the theory of planned behavior. *Personality and Social Psychology Bulletin*, **23**, 945–954.
- Ouellette, J. & Wood, W. (1998). Habit and intention in everyday life. The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, **124**, 54–74.
- Verplanken, B. & Faes, S. Good intentions, bad habits, and effects of forming implementation intentions on healthy eating. *European Journal of Social Psychology*, (in press).

Copyright of European Journal of Social Psychology is the property of John Wiley & Sons Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.