

From Weighing to Willing: Approaching a Change Decision through Pre- or Postdecisional Mentation

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In order to investigate what makes people feel closer to making a change decision, female undergraduates were asked to employ mental exercises on two unresolved personal problems, one being easy to implement (e.g., subscribing to a newspaper) and one being difficult to implement (e.g., breaking up with a boyfriend). In an exhaustive *predecisional* exercise subjects deliberated on the expectancies and values of making a change decision. Two less exhaustive *predecisional* exercises required that subjects imagine enjoying the incentives of having made a change decision either in a realistic or fantasy-like manner. In an exhaustive *postdecisional* exercise subjects had to come up with a plan on how to implement the decision not yet made and were to imagine themselves executing it. Two less exhaustive *postdecisional* exercises required subjects either to imagine the execution of one single implemental action, or to deliberate solely on various possible action steps. Both the exhaustive pre- and postdecisional exercises were found to be more effective in increasing subjects' perceived proximity to the act of a change decision than the respective nonexhaustive exercises. This effect was not less pronounced for difficult-to-implement problems than for easy-to-implement problems. In both exhaustive cases, the facilitative effect was not mediated by increases in outcome value or outcome expectancy. For the exhaustive *postdecisional* exercise, however, the effect was mediated by the formation of implemental intents. Results are interpreted in terms of a phase model of action which conceives of decisions as volitional acts that propel the individual from a deliberative state of mind (weighing) to an implemental state of mind (willing). © 1990 Academic Press, Inc.

The questions focused on by prescriptive and descriptive models of decision making (Baron, 1988) regard how people should or do decide in choice situations in order to maximize their goals. In the present paper, a different question is addressed: What factors increase people's readiness to make a decision, in particular a change decision. According to expectancy-value theories of motivation (see Atkinson, 1964; Feather, 1982) or

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utility theory (Edwards, 1961), the feasibility and desirability of the implied change should be the major determinants. However, there may be further critical variables that are unrelated to the expected value or utility of making a change decision.

One such variable may be the amount of effort invested in deliberating on the question of making a change. The research of Janis and Mann (1977) demonstrates that people feel ready to make a (change) decision when they have processed all available relevant information and do not expect to acquire additional information. Moreover, people's readiness to make a change decision may also be positively affected by the amount of prospective planning with respect to the implementation of the change decision yet to be made. As Beach and Mitchell (1987; Beach, Smith, Lundell, & Mitchell, 1988) point out in their image theory, one's readiness to make a change decision is also a question of whether one already entertains compatible strategies and tactics of implementation. According to image theory, decision makers hold four different images (self-image, trajectory image, action image, and projected image) that are informational representations of their principles, goals, plans (strategies and tactics), and anticipated states, respectively. Accordingly, progress toward a change decision may be conceived of in terms of compatibility between images; in particular, the adoption of a new goal (change decision) requires that it be compatible not only with the decision makers' self-images (existing principles) and trajectory images (existing goals), but also with their action images (existing strategies and tactics).

In our view, one's readiness to make a change decision depends on the individual's state of mind. We maintain (Heckhausen, 1987a, 1987b; Heckhausen & Gollwitzer, 1987) that a change decision is an intentional act that makes for a transition from one type of psychological functioning to another, each governed by unique principles. To highlight this perspective, we refer to the point of transition as the "Rubicon." The Rubicon metaphor¹ refers to a phase model of action. Rather than conceiving of the course of action in terms of a progression from abstract, superordinate goals to concrete, subordinate goals, as is common to vertical, hierarchical models of action (e.g., Carver & Scheier, 1981; Gallistel, 1980; Hacker, 1985), the Rubicon model segments the course of action into a number of consecutive phases. The first phase of this horizontal, temporal model is the *predecisional* phase in which the individual faces the task of choosing the most appropriate action goal. When a firm commitment to pursue a certain goal is formed (Rubicon transition), the *postdecisional* phase is

¹ When Julius Caesar made the decision to cross with his legions the Rubicon river, located in Northern Italy, he had actually instigated civil war; he commented on this irrevocable act with "alea iacta est!"

entered and the individual now needs to solve the problem of proper implementation. The corresponding mindset of determination is particularly conducive to effective performance when a challenging goal is being pursued, as Locke has convincingly demonstrated (Locke, 1968; Locke, Shaw, Saari, & Latham, 1981). The postdecisional individual may not immediately initiate a course of action that is instrumental for the attainment of the chosen goal; therefore this phase may remain preactional for quite some time.

Experimental work in our laboratory has shown that the predecisional mindset does, in fact, differ from the postdecisional one in content and style of information processing, both styles being functional in terms of meeting the requirements of the phase-typical tasks encountered. In a thought sampling study (Heckhausen & Gollwitzer, 1987, Study 1), predecisional subjects reported comparatively more thoughts related to the incentive values of goal options and the expectancies of performance outcomes, whereas postdecisional subjects reported comparatively more implemental thoughts. Most prominent among the latter were implemental intents as to when and where to initiate appropriate actions and how to perform them. In a memory experiment (Gollwitzer, Heckhausen, & Steller, 1988, Study 2), predecisional subjects recalled information related to expected values better than postdecisional subjects; the reverse was found for implementation-related information. Finally, predecisional subjects processed information on the available goal options in a more impartial manner than postdecisional subjects (Beckmann & Gollwitzer, 1987); when asked to contemplate change decisions, predecisional subjects spent an equal amount of thought on both the positive and negative consequences of making this decision, thus demonstrating impartiality (Gollwitzer & Heckhausen, 1987, Studies 2 and 3). Moreover, subjects in a predecisional state of mind were more accurate in judging action-outcome expectancies than subjects in a postdecisional state of mind (Gollwitzer & Kinney, 1989).

In the present experiment we explored various ways of helping people make change decisions. Subjects had to indicate unresolved personal problems (e.g., problems at home), in which they did not know yet whether they should commit themselves to making a change (e.g., moving from home). In order to increase subjects' readiness to make a change decision, we had our subjects perform mental exercises on the basis of the presented Rubicon model of action phases.

We figured that subjects who are made to solve predecisional tasks should experience a deliberative state of mind. This state of mind should be the more pronounced the more of the predecisional tasks are solved, indicating to subjects that the predecisional phase is completed and that they can now move on to the postdecisional phase of implementation. It

follows that subjects who are made to solve all possible predecisional tasks should experience a full-blown deliberative state of mind and thus feel closer to making a change decision than subjects who only solved a partial set of these tasks.

The Rubicon model suggests an additional possibility with respect to helping people approach a change decision. If predecisional people are mentally placed into the next, i.e., postdecisional phase, it should also make them feel that the predecisional phase is already completed. To test this hypothesis some subjects would need to perform an exhaustive postdecisional mental exercise and solve all of the various tasks characteristic of that phase, whereas others would perform nonexhaustive exercises, solving only a fragmentary set of postdecisional tasks.

Yet, even if changes in subjects' readiness to make a change decision should occur as predicted, these effects might actually be mediated by changes in subjects' likelihood estimates and value judgments. A recent experiment by Maddux, Norton, and Stoltenberg (1986) shows that increases in outcome expectancy and outcome value each contribute to making decisions. Therefore, we also measured the potential mediators of *outcome expectancy* and *outcome value* before and after subjects performed their mental exercises. Changes in outcome expectancy and outcome value represent potential alternative explanations for the postulated effect on increased readiness to make a change decision. To the extent these variables can be considered to mediate the expected effects, they will weaken or invalidate our hypothesis that exhaustive mentation on pre- or postdecisional concerns directly induces progression toward a change decision.

Besides the motivational variables of expectancy and value, there is a potential mediator of a volitional (willing) nature, namely implemental intents as to when or where to initiate appropriate action and how to perform it in the face of anticipated difficulties. The formation of such implemental intents might well facilitate the act of decision. And, the exhaustive postdecisional exercise should most successfully stimulate the forming of implemental intents. Accordingly, we measured this potential mediating variable before and after subjects performed their exercises.

Finally, we also wanted to know whether the expected effects of exhaustive exercises would hold true for all types of personal problems, no matter whether the perceived instrumentality of one's actions for achieving the desired goal is low or high. To check on this potential moderator variable, we had subjects indicate two different personal problems, one of which should imply an easy-to-implement change decision, the other a difficult-to-implement change decision.

We tried to measure the effects of the mental exercises in a way that would most sensibly capture "moving toward making a change decision."

We figured that simply counting the number of actual change decisions in each exercise condition would be too crude a measure, since pilot findings suggested that immediate change decisions cannot be expected as a result of the mental exercises. Accordingly, we asked subjects to rate the perceived proximity to making a change decision at three different times—prior to engaging in the mental exercise, immediately after performing the exercise, and 3 weeks later—thus allowing for a change measure of perceived proximity. We did not make explicit predictions as to immediate and delayed effects. However, exhaustive mental exercises were expected to produce lasting positive effects.

OVERVIEW AND DESIGN

Female undergraduates indicated two different, unresolved personal problems for which they were currently deliberating a change decision. Subjects then performed one of seven mental exercises that involved solving pre- or postdecisional tasks related to both personal problems indicated. All of these exercises focused on making the change decision. Subjects' perceived proximity to making this decision was measured prior to engaging in the mental exercise, immediately after performing the exercise, and 3 weeks later.

We designed three *predecisional* exercises, one exhaustive and two nonexhaustive exercises. The *exhaustive* exercise required subjects to thoroughly contemplate potential short-term and long-term consequences of making a decision to change. Subjects had to estimate the probabilities of bringing about the necessary action outcome as well as the ensuing immediate and delayed consequences and judge their subjective value (Heckhausen, 1977). In the *first nonexhaustive* exercise subjects focused solely on the positive consequences (incentives). In the *second nonexhaustive* exercise thoughts about relevant positive consequences were excluded by having subjects fantasize about unrealistic incentives.

Three additional groups of subjects performed *postdecisional* exercises. In the *exhaustive* exercise subjects had to decide on a complete implemental course of action and, in addition, were stimulated to form implemental intents. The *first nonexhaustive* exercise focused subjects' attention on one single step of implementation, namely the step which is least amenable to being reversed (point of no return) and thus is most indicative of having made up one's mind. The *second nonexhaustive* exercise required that subjects only list various potential implemental actions and contemplate their instrumentality.

Finally, subjects in the *control group* were distracted from thinking about their personal problems. This control group is crucial since people's readiness to make a change decision tends to diminish over time (see

Beach, Campbell, & Townes, 1979; Davidson & Beach, 1982). As compared to the control group and the *nonexhaustive* exercise groups, we expected the *exhaustive* pre- and postdecisional exercise groups to show an increase in perceived proximity to the act of a change decision, unmediated by changes in expectancies or outcome values. We expected this effect for both types of personal problems.

METHOD

Subjects

The 154 participants of the present study were female students at the University of Munich. Subjects arrived at the Institute in groups consisting of 8 to 12 participants and were randomly assigned to one of seven experimental conditions; each experimental condition was used at least once in every session. Subjects were separated by partitions, such that they could easily view the experimenter, but none of the other participants. They were told that they would be paid 20,- DM (\$12) for participation in a 2-h experiment and that the study was designed to investigate the question of how people achieve clarity in handling personal problems.

Procedure

Subjects were told that researchers at the Institute were in the process of developing a procedure that allows people to more clearly see where they stand with respect to whether they should pursue a certain goal. The present study would focus solely on decisional problems pending a change decision (*Should I do "x?"*). Accordingly, subjects were asked to indicate two unresolved personal problems of the type "Should I do x?" and then to apply a mental exercise designed by the researchers.

Subjects received a stack of numbered envelopes that contained different questionnaires and instructions. After completing the tasks required, subjects placed the materials back into the envelope, sealed it, and then continued with the next envelope. After sealing the last envelope, they were told to busy themselves by reading from the magazines provided until all subjects were finished.

For *Envelope 1*, subjects were required to indicate two personal problems of the type "Should I do x?" These problems should be of present concern, and subjects should not yet have reached a change decision. In addition, the two problems should be different in nature. Whereas the first problem should be such that—once a change decision has been made—its implementation was rather simple (subscribing to a newspaper was given as an example), making a decision with respect to the second problem should confront the subject with difficult implemental issues (starting one's M.A. thesis was given as an example). Once subjects had indicated

a problem of each type, they were asked to answer the following questions: "How many days have you spent contemplating this problem?" "How thoroughly (13-point scale) did you contemplate this problem?" "Is there a final date by which you have to make a change decision on this problem?" "Does the problem at hand imply an easy-to-implement change decision or a difficult-to-implement change decision?"

In *Envelope 2* subjects found *baseline* questionnaires designed to measure *how close they felt to making change decisions*. The following three questions had to be answered for each of the problems indicated: (1) "How determined do you feel at the moment?" (13-point scale ranging from "not at all" to "absolutely" determined), (2) "How much resolution will it still take for you to arrive at a change decision?" (13-point scale ranging from "none" to "a whole lot"), and (3) "On the line below please indicate the point which best represents your distance towards the act of a change decision." For this purpose, a horizontal line of 13 cm was provided: The starting point was labeled "far from having made a change decision," the 10-cm mark "act of change decision," and the end point "past having made a change decision."

Moreover, subjects were requested to answer questions tapping *outcome expectancy* and *outcome value* associated with making the change decision: (4) "How certain are you that you will reach what you intend to reach after having made a change decision?" (5) "How important is it for you to reach what you intend to reach after having made a change decision?" A final question probed for *implemental intents*: (6) "Do you feel that you have committed yourself to a certain implemental course of action?" (All items were accompanied by 13-point scales ranging from "not at all . . ." to "very . . .").

Envelope 3 contained two exercise booklets. One of these booklets had already been completed by a presumed former subject who faced the decisional problem of going on a vacation. This exercise booklet served as a model for subjects' practice exercise, which was to be conducted on the following fictitious problem: Should I pursue advanced educational training abroad? An unmarked booklet was provided for this practice exercise. For each of the seven conditions, this set of exercise booklets (the model booklet and the booklet for the practice exercise) differed not only in format but also in the instructions given on how to complete them. All of these exercise booklets and the respective instructions had been previously tested on pilot subjects. In a number of different pilot sessions the instructions were reworded until they could be easily understood and readily followed. This pilot work paid off: in the main experiment all subjects worked on the exercise booklets as instructed, as evidenced by the written material subjects handed in at the end of the experiment.

There were three *predecisional exercises*:

1. *Deliberation on expected values (DEV)*. This exhaustive exercise required subjects to deliberate positive or negative consequences of making the decision to study abroad. First, subjects thought of the *immediate*, and then the *delayed* positive and negative consequences of studying abroad and estimated the likelihood that these would actually occur. Second, subjects listed potential hindrances to studying abroad and estimated the probability that the desired action outcome could still be obtained. Third, subjects considered positive and negative (immediate as well as long-term) consequences of *failing* to make the decision to study abroad and estimated the probability of their occurrence. Finally, the four most important positive or negative (immediate or long-term) consequences of making a decision (or failing to make a decision) were selected from the several consequences listed.

2. *Imagination of realistic incentives (IRINC)*. In the first nonexhaustive exercise, subjects were asked to anticipate a positive experience that might occur once the decision to study abroad has been implemented and to compose a story describing this experience in detail with themselves as the main actor. Subjects were told that *no* activities required to implement the decision to study abroad should appear as part of the story. Finally, subjects had to vividly imagine themselves experiencing the events described.

To make it easier to follow instructions, subjects were asked to study the model exercise booklet (vacation problem). It contained a story that described a pleasant evening stroll through a Mediterranean city, the final destination of the former subject's vacation trip. The story was written in the first person and included much detail. Subjects had to read through this story and then engage in the following "imagery" exercise: Starting with the first sentence of the story, subjects pictured themselves as actors in the scene described as vividly as possible. While imagining, subjects were asked to lean back and close their eyes (this request allowed the experimenter to check whether subjects followed his instructions). Thereafter, vividness of the experienced image was rated on a scale ranging from 1 (not at all vivid) to 10 (very vivid), and the first sentence was assigned the corresponding number. Subjects then started to work on the second sentence and continued with the rest until they had imagined all of the scenes described.

3. *Imagination of fantasized incentives (IFINC)*. The second nonexhaustive exercise was patterned after the "imagination of realistic incentives" exercise. The only difference was that subjects were encouraged to give free rein to their fantasy. As if in a daydream, they were instructed to imagine a positive experience which could occur after the decision to go abroad had been implemented and to enjoy this image to the fullest. When fantasizing in this manner, subjects were told to disre-

gard any constraints by reality with respect to the problem at hand, such as personal limitations or external pressure.

The three *postdecisional exercises* had to be performed as follows:

4. *Imagination of implementation (IIMP)*. In the exhaustive exercise, subjects listed a number of different activities that could serve the purpose of implementing the decision to study abroad and then were instructed to decide on a certain course of action by writing a detailed story in the first person. Finally, subjects applied the imagery exercise to these stories to further their commitment to the implemental route chosen, that is, to form implemental intents. The model exercise booklet (vacation problem) listed such activities as doing one's laundry, packing one's suitcase, making a hotel reservation, buying traveller's checks, and so forth. All of these activities were incorporated into a consecutive sequence of events.

5. *Imagination of the "point of no-return" (IPNR)*. In the first nonexhaustive exercise subjects described only *one* implemental action. This critical action was defined as follows: Executing this action means that the decision to study abroad can no longer be reversed; the implementation of the decision will take its course and can no longer be stopped. The model exercise booklet (vacation problem) described in detail the boarding of an airplane. The rest of the exercise had the same form as the other imagination conditions.

6. *Deliberation on implementation (DIMP)*. In the second nonexhaustive exercise, subjects filled out a detailed questionnaire on how to implement the decision to study abroad. First, they listed various (up to 8) activities that served to implement the decision; then they ranked the instrumentality of these activities, i.e., which activity needed to be completed before others could be undertaken, and also estimated the urgency of each of the activities listed. Second, subjects had to indicate how much time and money would be needed in order to complete each activity successfully and the degree to which everyday life would be disrupted by these activities. Third, subjects indicated potential difficulties and obstacles for each activity listed. Throughout, subjects had to abstain from forming a coherent action plan.

7. *Control group: Computing arithmetic problems (C)*. Control subjects were told that people are at times unable to clearly see whether they should become active on a certain issue, particularly if they get too involved in the problem at hand. Accordingly, a mental exercise that takes subjects' minds off the decisional problem at hand might actually prove beneficial to the process of making certain decisions. Therefore, instead of contemplating the question of whether to study abroad, subjects were instructed to concentrate on computing a list of arithmetic tasks that required subjects' full concentration.

In *Envelope 4* subjects found the same exercise booklets used in working on the "studying abroad" problem (*Envelope 3*). This time, however, subjects were told to apply the mental exercise they had practiced on their own problems, that is, on the two personal problems requested in *Envelope 1*. Subjects were asked to start with the problem they had indicated first. In addition, they were reminded to proceed exactly as they had learned in the "studying abroad" problem.

Envelope 5 contained questionnaires (one for each personal problem) designed to measure whether subjects' perceived distance from the act of a change decision had changed as an *immediate result* of the mental exercise performed. In addition, changes in outcome value and outcome expectancy, as well as incidence of implemental intents, were obtained. Finally, subjects were asked for their names and home address, paid for participating, and dismissed.

Three weeks later, we mailed *Envelope 6* to their homes. This envelope contained the baseline questionnaires (the outcome expectancy, the outcome value, and the implemental intents items were deleted), so that we could measure the *delayed effects* on subjects' perceived proximity to the act of decision. In a final questionnaire subjects were asked about the "true" purpose of the mental exercises. Subjects had to indicate whether they thought these exercises were designed to help people find clarity with respect to personal problems, or whether they were perhaps designed to make people form resolutions to act. The first purpose was stated in the cover story, and we wanted to know whether subjects believed it. Subjects were asked to fill out the questionnaires immediately and return the completed forms to us without delay. Eighty-eight percent of the subjects (i.e., 136 participants) actually did so within a week. Shortly after the receipt of these questionnaires, we sent a detailed debriefing letter to subjects.

RESULTS

Manipulation Checks

As expected, subjects considered change decisions related to the easy-to-implement problem named first to be easier to implement than change decisions related to the difficult-to-implement problem named second, $F(1,147) = 111.8, p < .01$. The difficult-to-implement problems were also contemplated more thoroughly, $F(1,146) = 18.7, p < .01$, and more extensively, $F(1,135) = 23.3, p < .01$, than the easy-to-implement problems. But both types of problems were coupled with a deadline with roughly equal frequency, $F(1,146) = .4, ns$.

Equivalence of Groups

For both types of problems none of these variables was affected by the

experimental group factor, indicating that the problems named in each group had been contemplated with approximately equal thoroughness and extensiveness, and that their resolutions were equally urgent.

To check on the content areas of subjects' problems, both types of problems were classified according to three categories (career-related, life-style-related, and interpersonal). χ^2 analyses revealed that these different content areas were about equally distributed across the seven experimental groups: easy-to-implement problem, $\chi^2(12, N = 154) = 14.2, p > .25$; difficult-to-implement problem, $\chi^2(12, N = 154) = 6.6, p > .80$.

Contents of Personal Problems

Of the easy-to-implement problems, 20.8% were career-related, 57.8% were life-style-related, and 21.4% were of an interpersonal nature. Of the difficult-to-implement problems, 55.8% were career-related, 19.5% were life-style-related, and 24.7% touched upon interpersonal issues. The most frequent easy-to-implement problem (20%) was "Should I buy skis, a car, a stereo, etc.," whereas the most frequent difficult-to-implement problem (17%) was "Should I change my place of residence?" Eighteen subjects picked the example given in the model exercise booklet (Should I go on vacation?); these subjects were equally distributed across conditions, $\chi^2(6, N = 154) = 3.0, p > .80$. The same was true of the 7 subjects who chose the problem presented in the practice exercise (i.e., Should I pursue advanced educational training abroad?); $\chi^2(6, N = 154) = 2.3, p > .80$.

Perceived Proximity to Change Decision

Our suspicion was confirmed that crossing the Rubicon as an immediate consequence of the mental exercises employed is a rather rare event. Hardly any of the subjects indicated immediately after completion of the mental exercise that the act of decision had already occurred. On the item (Item 3) where subjects had been asked to check on a horizontal line how far they felt from the "act of a change decision," only 1% of the subjects checked for the easy-to-implement change decision that the act of decision had been passed, and only 4% did so for the difficult-to-implement problem.

Although many subjects had crossed the Rubicon 3 weeks later (70% for the easy problem and 52% for the difficult problem), we decided to analyze subjects' readiness to make a change decision in terms of perceived proximity to the point of decision instead of the actual making of the decision. Accordingly, we computed indices that combined the first three items of Envelope 2 (each item was z-transformed) into a proximity

index. The higher the scores on this index, the closer subjects feel to the act of a change decision. This index was computed for the baseline assessment, the immediate assessment made after subjects had completed the mental exercise, and the delayed assessment made 3 weeks later (Cronbach's α for each of these indices $> .81$).

We then computed change scores from baseline, one score for the immediate assessment and a second score for the delayed assessment. These measures allow assessment of whether subjects' readiness to make a change decision increases or decreases as an immediate consequence of the mental exercise employed and whether these immediate changes are followed—in the 3 weeks after the experiment had been conducted—by approaching the Rubicon or backing off from it (see Fig. 1).

Three-factorial analysis of variance. A 7 (mental exercise group: DEV, IRINC, IFINC, IIMP, IPNR, DIMP, C) \times 2 (type of personal problem: easy-to-implement decision vs difficult-to-implement decision) \times 2 (time of assessment: immediate vs delayed) analysis of variance was conducted. We found a main effect for "mental exercise group," $F(6,129) = 2.3, p < .05$, qualified by a significant "mental exercise group" \times "time of assessment" interaction, $F(6,129) = 2.6, p < .05$. Both "time of assessment" ($F = .0$) and "type of personal problem" ($F = .0$) showed no significant main effects. The latter factor interacted neither with "mental exercise group" ($F = .8$) nor with "time of assessment" ($F =$

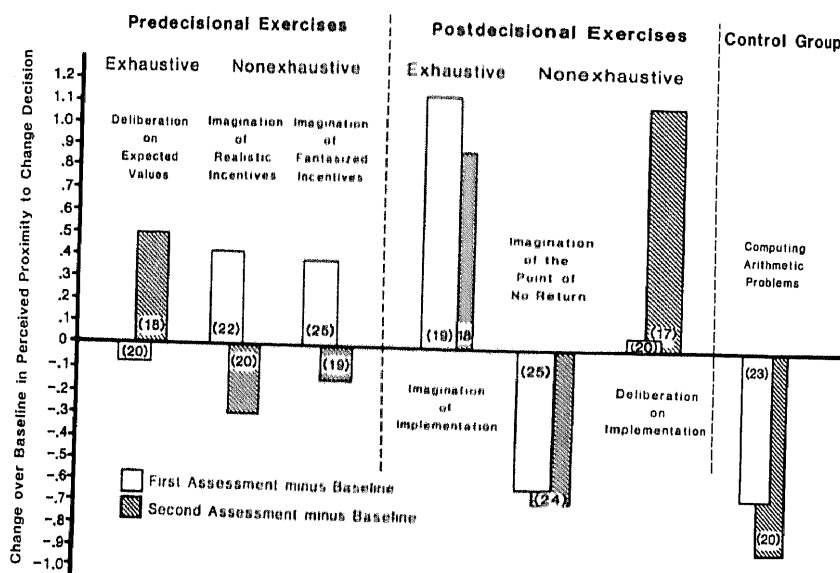


FIG. 1. First and second assessments of perceived proximity to the act of decision (change decision) for each of seven mental exercise groups.

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.0); in addition, it did not affect the significant "time of assessment" \times "mental exercise group" interaction ($F = .8$).

We continued our analysis by computing the single main effects of "mental exercise groups" collapsed over type of problem. As it turned out, the overall $F(6,147) = 2.1$ for immediate assessment and the overall $F(6,129) = 2.4$ for delayed assessment were significant at the .05 level. Follow-up contrasts revealed that for the *immediate assessment* only the "imagination of implementation" group ($M = 1.13$) felt closer to arriving at a change decision than the control group ($M = -.65$), $t(147) = 2.8$, $p < .01$. The difference between the control group and the "imagination of realistic incentives" group ($M = .42$), as well as the "imagination of fantasized incentives" group ($M = .38$), fell short of significance, both $t(147) = 1.8$, $ps < .08$. Contrasting the other experimental groups to the control group revealed nonsignificant differences, all $ps > .25$.

Comparisons of the *delayed assessment* for the experimental groups with the control group showed that the "imagination of implementation" group ($M = .88$), $t(129) = 2.6$, $p < .05$, the "deliberation of expected values" group ($M = .50$), $t(129) = 2.0$, $p < .05$, and the "deliberation of implementation" group ($M = 1.06$), $t(129) = 2.8$, $p < .01$, each differed significantly from the control group, ($M = -.90$). All of the other experimental groups showed nonsignificant differences, $ps > .25$.

Looking at the individual groups, a comparison of the immediate and the delayed assessment by within t tests showed significant differences for the "deliberation of expected values" group, $t(17) = 2.4$, $p < .05$, and the "deliberation of implementation" group, $t(16) = 3.3$, $p < .01$. Similar within comparisons for the other groups did not result in significant t scores (all $ps > .15$). Finally, within t tests were computed for each group, comparing baseline scores of proximity to the act of decision with immediate and delayed scores, respectively. Differences were significant ($ps < .05$) only for the imagination of implementation group when the immediate effect was considered and for the deliberation of implementation group when the delayed effect was compared to the baseline.

Four-factorial analysis of variance. We also conducted a 2 (type of mental exercise: pre- vs postdecisional) \times 2 (exhaustion: exhaustive vs nonexhaustive exercise) \times 2 (time of assessment) \times 2 (type of personal problem) ANOVA. Results revealed a significant "type of mental exercise" \times "exhaustion" \times "time of assessment" interaction effect, $F(1,112) = 9.1$, $p < .01$. No other main effects or interaction effects were significant. Exploring this interaction effect by conducting separate 2 (exhaustion) \times 2 (time of assessment) ANOVAs for pre- and postdecisional exercises respectively showed different results for each type of mental exercise. For predecisional exercises no significant main effect for "exhaustion" was found, $F(1,55) = .0$. However, a significant interaction

with "time of measurement" was observed, $F(1,55) = 7.7, p < .01$, indicating that the nonexhaustive exercises show stronger immediate than delayed effects, whereas the reverse is true for the exhaustive exercise.

Looking at the postdecisional exercises, the exhaustive exercise was found to be more effective than the nonexhaustive exercises, $F(1,57) = 3.6, p < .06$. This effect of exhaustion did not interact with "time of assessment," $F(1,57) = 2.0, p > .15$.

Perceived proximity to change decision and actual decisions to change. Since many subjects had actually crossed the Rubicon 3 weeks after the mental exercises had been conducted, we computed a 2 (pre- vs postdecisional exercise) \times 2 (exhaustive vs nonexhaustive exercise) \times 2 (type of personal problem) ANOVA on the dichotomous dependent variable of having made up one's mind (i.e., whether subjects checked on Item 3 that the act of decision had been passed). Exhaustive exercises led to more change decisions than nonexhaustive exercises, $F(1,112) = 2.8, p = .09$; 68.1% of the subjects who performed exhaustive exercises had made up their mind, as compared to 57.3% of the subjects who performed nonexhaustive exercises. This effect was not qualified by an interaction either with "type of task," "pre- vs postdecisional exercise," or both of these factors.

A parallel analysis of variance with the continuous measure of perceived proximity as the dependent variable revealed the same pattern of data. Subjects who completed exhaustive exercises moved closer to making a change decision than those who completed nonexhaustive exercises, $F(1,112) = 3.1, p = .07$; this effect was not qualified by any interactions. It appears, then, that perceived proximity to a change decision captures people's readiness to actually make this decision quite well. This is also supported by the significant correlation between the proximity measure and actually making up one's mind: $r(137) = .32, p < .01$, for the easy-to-implement problem; and $r(137) = .21, p < .01$, for the difficult-to-implement problem.

Experimenter demand. It is conceivable that the effects observed are due to subjects' guessing the experimenter's hypotheses; that is, subjects might have believed that the experimenter expected them to make a change decision. However, an analysis of subjects' hypotheses about the true purpose of the experiment revealed that only 15% of the subjects (21 individuals) thought that the mental exercises were designed to make them form the resolution to act. More importantly, these subjects were equally distributed across conditions; $\chi^2(6, N = 154) = 6.8, p > .30$. When we deleted these subjects from the 7 (mental exercise groups) \times 2 (type of personal problem) \times 2 (time of assessment) ANOVA reported above, the pattern of results did not change, and the "mental exercise

groups" \times "time of assessment" interaction effect was still significant at the .05 level.

Differences in quality of imagination. The scenarios subjects had to produce in the four imagination conditions might have differed not only in content, but also in vividness or explicitness. Accordingly, the differential effects observed on perceived proximity to the act of decision might not have been due solely to the different content that was imagined. To account for this alternative explanation, we computed a *vividness* score and an *explicitness* score for each subject in the four imagination conditions. Explicitness was estimated by counting the number of sentences the subjects had written. A vividness score was obtained by taking the mean of subjects' self-ratings. No differences between the four imagination groups were observed when separate ANOVAs were computed on each of these variables—vividness: $F(3,87) = .1$, ns, overall $M = 8.2$ on a 10-point scale; explicitness: $F(3,87) = .7$, ns, overall $M = 5.8$ sentences per story. The rather high means of the vividness and explicitness variables suggest that subjects complied with the experimenter's instructions to write explicit stories and imagine them vividly.

Potential Mediators

For all of the mental exercises that produced immediate effects (IIMP, IRINC, IFINC) and those that produced delayed effects (DIMP, DEV, IIMP), we wanted to know whether mediation through outcome expectancies or outcome value had occurred. To this end, we conducted the following path analyses.

Outcome expectancy. In order to test whether changes in outcome expectancy mediated the *immediate effects* observed in the imagination of implementation group (IIMP), we proceeded as follows: First, we computed a change score for outcome expectancy (immediate assessment minus baseline). We then transformed the manipulation into a dichotomous variable, coded 1 for subjects assigned to this manipulation (IIMP) and 0 for subjects assigned to the control group (C). Correlating this newly created variable with immediate changes in perceived proximity to the act of decision revealed a significant correlation coefficient ($r = .41$, $p < .01$), reflecting the significant contrast (t test) between the imagination of implementation group and the control group. Following a procedure outlined by Kerlinger and Pedhazur (1973, pp. 317–331), we then "decomposed" this correlation into a direct effect of the manipulation on subjects' perceived proximity and an indirect effect, as mediated by changes in outcome expectancy.

The *direct effect* is reflected in the coefficient of the path leading from the imagination manipulation to the dependent variable of perceived prox-

imity. This coefficient is the regression β weight of the manipulation when perceived proximity is regressed on both the manipulation and the outcome expectancy variable (for a similar analysis see Shelder & Manis, 1986). A significant β weight of .42 ($p < .05$) was observed, indicating that there is a significant direct effect of the imagination manipulation.

The *indirect effect* through outcome expectancy is computed by multiplying the coefficient of the path from the manipulation to the outcome expectancy variable with the coefficient of the path from outcome expectancy to perceived proximity. These coefficients are the β weight (.12, $p > .40$) of the outcome expectancy variable (when perceived proximity is regressed on both the manipulation and the outcome expectancy variable) and the β weight ($-.11$, $p > .50$) that is obtained when outcome expectancy is regressed on the manipulation. The product amounts to $-.01$, a score that attests to a negligible indirect effect of the manipulation through outcome expectancy. Note that the direct effect of the manipulation and its indirect effect add up to the correlation coefficient observed for the relation between the manipulation and the dependent variable of perceived proximity.

For the "imagination of realistic incentives" group (IRINC) and the "imagination of fantasized incentives" group (IFINC) the same procedure was followed in order to assess the direct and indirect effects of the imagination manipulation on immediate perceived proximity to the act of decision. Again, the direct effects were found to be significant (IRINC: .29, $p < .05$) or to approach significance (IFINC: .25, $p < .06$), whereas the indirect effects were negligible (in both cases: $-.01$).

One could argue, however, that the outcome expectancy measure was simply an unreliable measure. This implies that although mediation through outcome expectancy has occurred, it is not reflected in the present analyses. However, the significant correlation between outcome expectancy and immediate perceived proximity observed for the whole sample renders this possibility implausible, $r(154) = .26$, $p < .01$.

Finally, we checked whether the *delayed effects* observed in the imagination of implementation group (IIMP), the deliberation of implementation group (DIMP), and the deliberation of incentives group (DEV) were mediated by immediate changes in outcome expectancy. Again, the *indirect effects* through outcome expectancy were negligible (IIMP: .00; DIMP: $-.00$; DEV: $-.01$). The correlation between immediate changes in outcome expectancy and delayed perceived proximity for the whole sample was, however, rather weak, $r(136) = .13$, $p < .07$.

Outcome value. To test whether mediation through changes in outcome value had occurred, we computed parallel analyses. Regardless of whether we considered the mental exercise groups in which immediate effects on perceived proximity had occurred (IIMP, IRINC, IFINC) or

the groups in which delayed effects had been observed (IIMP, DIMP, DEV), the *indirect effects* (through outcome value) were all negligible (all effects $< .04$). However, we found that the correlation between immediate changes in outcome value and perceived proximity for the whole sample was close to zero, no matter whether the immediate assessment of perceived proximity, $r(153) = .06, p > .25$, or the delayed assessment, $r(135) = .09, p > .15$, was considered. Apparently, outcome value did not relate systematically to subjects' estimates of perceived proximity and might not have been measured reliably in our study.

Implemental intents. Finally, we tested whether the immediate and delayed effects of the exercises, particularly of the imagination of implementation exercise (IIMP), were mediated by forming implemental intents. This variable was measured by asking subjects whether they felt committed to a specific route of executing the change decision not yet made. When decomposing the significant correlations between the postdecisional IIMP manipulation and immediate or delayed perceived proximity, strong indirect effects through implemental intents were observed (immediate effect: .25; delayed effect: .26). Significant β weights were found for the path from the imagination manipulation to the implemental intent variable (.38, $p < .05$), as well as for the paths from the latter variable to the dependent variables of immediate (.65, $p < .01$) or delayed (.68, $p < .01$) perceived proximity, respectively. Because of these strong mediation effects, the direct effects of the imagination manipulation on the dependent variables only showed nonsignificant β s (immediate perceived proximity: .18, $p > .16$; delayed: .10, $p > .44$).

When decomposing the correlation between delayed perceived proximity and the postdecisional exercise of deliberation of implementation (DIMP), a rather strong indirect effect (.18) through implemental intents was observed. The respective direct effect of the manipulation variable fell short of significance (.21, $p = .10$). However, the delayed effect of the deliberation of incentives exercise (DEV) was *not* mediated by the implemental intent variable (a negligible indirect effect through this variable was observed: .01).

Similar analyses for both predecisional imagination of incentives groups (IRINC, IFINC) revealed that the observed marginally significant immediate effects are in part mediated through increases in the implemental intent variable. When the dependent variable of immediate perceived proximity is regressed on both the implemental intent variable and the imagination manipulation, the β s for the predecisional manipulation (direct effect) no longer approach significance (IRINC: .14, $p > .30$; IFINC: .19, $p > .19$).

When the whole sample was considered, increases in the implemental intent variable were found to be strongly related to heightened immediate,

$r(154) = .57, p < .01$, as well as delayed perceived proximity, $r(136) = .44, p < .01$. Finally, in comparison to the control group (C) only the imagination of implementation group (IIMP) showed significantly higher scores on the implemental intent variable, $t(147) = 2.52, p < .05$; as compared to the latter group (IIMP), only the imagination of the point-of-no-return group (IPNR) showed significantly lower scores on this variable, $t(147) = 2.53, p < .05$.

DISCUSSION

We conceive of making a change decision as the transition from a state of mind oriented toward weighing expectancies and incentives to a qualitatively different state of mind oriented toward implementing the chosen goal (willing). This Rubicon model of action phases has guided us in constructing a number of different pre- and postdecisional mental exercises. We examined whether people who entertain some unresolved personal problems move toward making a change decision upon performing these exercises.

Dwelling on Predecisional Issues

Compared to the control group, only the exhaustive predecisional exercise (*deliberation of expected values*) group showed a significantly greater proximity to the act of change decision 3 weeks after the exercise had been performed. This effect was obtained, no matter whether easy- or difficult-to-implement problems were considered. We can therefore conclude that the perceived instrumentality of one's actions for achieving the desired goal does not moderate the effect of the exhaustive motivational exercise.

Path analyses revealed that the effect was also not mediated by an increase in outcome expectancy, outcome value, or implemental intents. These findings are consistent with our hypothesis that having experienced a full-blown predecisional state of mind allows individuals to move toward making a change decision.

Immediately after subjects had performed the deliberation of expected values exercise, perceived proximity to the act of change decision was not strongly affected. At this point in time, subjects were probably still in a predecisional state of mind. That is, they were still thoroughly contemplating both the positive and negative consequences of making a change decision, thus being hesitant to commit themselves to making a change. Consequently, a significant increase in perceived proximity to the change decision could only be observed after a 3-week delay, when the predecisional deliberative state of mind had vanished.

As expected, the two nonexhaustive predecisional exercises (*imagina-*

tion of incentives) did not result in substantial, stable progress toward a change decision. This was true regardless of whether the positive consequences imagined were of a realistic or unrealistic nature. Apparently, when people contemplate change decisions, only a complete, impartial deliberation of positive and negative consequences of making such a decision makes for a full-blown predecisional state of mind. The exercises in both imagination of incentives groups were nonexhaustive since the likelihood of the imagined consequences was not considered, and potential negative consequences were completely disregarded. Accordingly, no proper predecisional state of mind originated and no progress toward making the decision occurred. Imagining positive incentives therefore failed to lure subjects into making a change decision, even when those incentives were fantasized to be highly positive.

For both imagination of incentives groups we observed an immediate, albeit nonsignificant, increase in perceived proximity. One might be tempted to attribute these immediate effects to heightened availability of the positive consequences imagined (Tversky & Kahneman, 1973, 1974). However, our mediation analyses revealed that outcome expectancy was not positively affected by the imagination exercises and thus does not qualify as a potential mediator.

Our mediation analyses cannot rule out the possibility that immediate increases in outcome value mediated some of the effect observed, since outcome value might not have been measured reliably in our experiment. As in a study by Gregory, Cialdini, and Carpenter (1982, Study 4), in which imagining the benefits of subscribing to cable television led to more positive attitudes toward this type of entertainment, subjects in our study may have perceived the positive consequences imagined to be more valuable. Accordingly, a momentary increase in outcome value might have stimulated subjects to make up their minds.

Most interestingly, the results of our mediation analyses point to the implemental intent variable as a potential contributor to the immediate effects observed. Apparently, vividly imagining a certain positive consequence triggers the formation of an intent on how to create this consequence, or at least creates the feeling that one has committed oneself to a certain behavioral route on how to get there. However, this sense of having committed oneself does not seem to be very stable; otherwise the imagination of incentives exercises should have also produced lasting effects.

Dwelling on Postdecisional Issues

We expected the exhaustive postdecisional exercise (*imagination of implementation*) to induce a greater readiness to make a change decision.

This hypothesis was clearly corroborated. Compared to the control group, subjects reported a greater proximity to the act of change decision, not only immediately after they had performed the imagination exercise but also 3 weeks later. Path analyses revealed that this effect was not mediated by changes in outcome value or outcome expectancy; rather, mediation through forming implemental intents had occurred. In addition, the effects held for both types of personal problems, indicating again that implemental difficulty (i.e., perceived instrumentality of one's actions for achieving the desired goal) did not moderate the effects of the exhaustive exercise.

It is important to note that the nonexhaustive postdecisional exercise of *imagining the point-of-no-return* did not move subjects closer to the act of decision, although the action imagined was highly indicative of having made up one's mind. As our mediation analyses suggest, this exercise did not lead subjects to form implemental intents and thus failed to move them closer to the change decision.

The effect of imagining behavioral scenarios on one's willingness to execute the imagined target behavior has been analyzed before in a number of intriguing experiments by Anderson (1983; Anderson & Godfrey, 1987), in which subjects were asked to create behavioral scenarios concerning such topics as donating blood, changing one's academic major, or taking a trip over spring break. When subjects had to imagine scenarios with themselves as the main character successfully completing the target behavior, an increase in "willingness" to execute the target behavior was observed. As in our study, these effects of imagining behavioral scenarios were *not* mediated by changes in outcome value (measured in terms of positivity of consequences), and they were found to be stable over time.

Anderson conceives of an intention as a self-expectancy concerning the implied target behavior and therefore refers to Tversky and Kahneman's availability hypothesis to explain his findings. This explanation finds further support in a recent study by Anderson and Godfrey (1987), in which ease of imagination of the behavioral scenario was found to correlate positively with subjects' willingness to execute the imagined behavior. It seems possible that parts of the effects observed in Anderson's studies were mediated by changes in outcome expectancy and/or by forming implemental intents. On the other hand, the role of availability remains unclear in our study. We would suggest, however, that imagining an implemental route leads to forming implemental intents. And this effect may be assumed to be the stronger the greater the ease of the respective imagination (cf. Anderson & Godfrey, 1987).

The second nonexhaustive postdecisional exercise (*deliberation of implementation*) group confirmed our expectation only with regard to the

first, but not the second assessment. Since subjects were asked to think about implemental issues without subsequently forming implemental intents, we did not expect this exercise to increase perceived proximity to the act of decision. This was in fact the case for the immediate assessment; however, after 3 weeks a significant increase was observed.

Our mediation analyses suggest that much of the delayed effect is due to having committed oneself to a certain way of executing the change decision in question (i.e., to having formed implemental intents). Apparently, the exercise we designed did not succeed in making our subjects *solely* deliberate implemental steps; that is, subjects did not refrain from committing themselves to some of these steps, thus turning this nonexhaustive postdecisional exercise into an exhaustive one. Assuming that people were still in a deliberative state of mind right after the exercise, the implemental intents formed (as a consequence of the mental exercise) did not immediately acquire much of a binding quality. After 3 weeks, however, this state had vanished, and the implemental intents formed could finally unfold their properties with respect to making people move closer to a change decision.

Moreover, it seems possible that subjects formed additional implemental intents during this time period. Since they had already been concerned with implemental issues during the exercise, albeit in a deliberative manner, they might have proceeded to the "next" step of committing themselves to one or the other implemental course of action.

Goal Intentions vs Implemental Intentions

The Rubicon model of action phases conceives of a change decision in terms of forming a *goal intention*; that is, the individual forms the resolution to pursue the desired goal (e.g., to move from home). Committing oneself to when, where, and how to enact the chosen goal, however, is referred to as forming *implemental intents* (Heckhausen, 1987b; Lewin, 1926/1951). It is assumed that the question of whether a goal intention will be formed is *not* solely a function of the expected utility of a goal. Even when expected utility is comparatively high, individuals are *not* expected to feel automatically committed to the respective goal. As Michotte and Prüm pointed out long ago, a decision implies a consenting act of will with the preferred choice option (Michotte & Prüm, 1910).

This view clearly departs from traditional motivation theory (Atkinson, 1964) and decision theory (Edwards, 1961), for these theories equate high expected value or utility with a commitment to the respective action goal. Our Rubicon model also departs from those theories of intention that conceive of an intention as an attitude (Ajzen & Fishbein, 1980; Fishbein

& Ajzen, 1975) or a self-expectation (Anderson, 1983) toward behavior, since these notions also do not incorporate the concept of committing oneself. The same holds true for the so-called control theories (e.g., Miller, Galanter, & Pribram, 1960), which define intentions as activated action plans.

In the present study, we stimulated the formation of goal intentions (change decisions) by placing subjects into a full-blown predecisional or postdecisional state of mind. We tried to achieve this by having subjects perform exhaustive pre- or postdecisional mental exercises. However, it is conceivable that for certain types of problems these exercises need not be completely exhaustive to elicit the respective states of mind. For instance, if a pressing deadline needs to be met, a predecisional state of mind might already originate from a less exhaustive predecisional exercise than that performed by our subjects. As Beach and Mitchell (1978) pointed out in their contingency model for the selection of decision strategies, how thoroughly a decision is contemplated depends on the type of problem, the surrounding environment, and the personal characteristics of the decision maker. Such variables have been explored successfully in numerous experimental studies—e.g., complexity of decision (Lanzetta & Driscoll, 1968), importance (Irwin & Smith, 1957), accountability and reversibility (McAllister, Mitchell, & Beach, 1979), deadlines and analytic aptitude (Christensen-Szalanski, 1980), mood (Isen & Means, 1983), or superordinate commitments (Toda, 1976). We believe that all of these variables may heighten or relax people's standards with respect to the question of whether predecisional deliberation is exhaustive or not.

More recently, Beach and Mitchell have advanced the distinction between optional and nonoptional change decisions (see Mitchell, Rediker, & Beach, 1986). Optional change decisions are those in which it is possible to continue with the status quo, whereas nonoptional change decisions are those in which the status quo terminates as a result of outside, often unforeseen, events. The decision maker has only marginal control over these events and thus cannot undo them. This distinction is relevant here, since the deliberation of optional change decisions might need to meet much higher standards than the deliberation of nonoptional change decisions before it is considered exhaustive. If so, people should readily move toward making change decisions whenever problems of optional change turn into problems of nonoptional change. In the present study, we neither obtained data on whether the change decisions indicated by subjects were optional or nonoptional in nature, nor did we inquire about possible transformations of subjects' decisional problems (from optional to nonoptional). Such transformations might have occurred during the 3 weeks following the experiment, that is, prior to our second assessment. Accordingly, our data are mute to the question of whether optional and

nonoptional change decisions differ in their standards of exhaustive deliberation; further studies are required to clarify this issue.

Returning to the postdecisional state of mind, it is conceivable that postdecisional mentation which does not imply the formation of implemental intents might sometimes suffice for creating this state of mind. For many goals, the route of implementation either is self-evident or has become overlearned and automated. Accordingly, no implemental intents concerning a particular course of goal implementation need to be formed (Heckhausen, 1987a; Toda, 1976). The individual simply calls upon the respective course of behavior when the appropriate time and situation (opportunity) is encountered. To place individuals into a postdecisional state of mind with respect to such goals might require nothing more than having them imagine the use of appropriate opportunities; in other words, one only needs to remind them of the implemental intents formed long ago.

CONCLUSION

Our findings suggest that people may move closer to making a change decision with respect to unresolved personal problems by engaging in certain kinds of mentations. Either they may try to achieve a full-blown predecisional state of mind by engaging in exhaustive predecisional mentation, that is, weighing the desirability and feasibility of the goal under consideration, or they may start to plan the implementation of the change decision not yet made, thus creating a postdecisional state of mind. Particularly effective is the formation of implemental intents, that is, committing oneself to when, where, and how to enact the desired goal.

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