

Deliberative and Implemental Mind-Sets: Cognitive Tuning Toward Congruous Thoughts and Information

Peter M. Gollwitzer, Heinz Heckhausen, and Birgit Steller
Max-Planck-Institut für psychologische Forschung
Munich, Federal Republic of Germany

Study 1 established either deliberative mind-set by having Ss contemplate personal change decision or implemental mind-set by having Ss plan execution of intended personal project. Ss were subsequently requested to continue beginnings of 3 fairy tales, each describing a main character with a decisional conflict. Analysis revealed that deliberative mind-set Ss ascribed more deliberative and less implementational efforts to main characters than implemental mind-set Ss. In Study 2, Ss were asked to choose between different test materials. Either before or after making their decision, Ss were given information on deliberative and implementational thoughts unrelated to their task at hand. When asked to recall these thoughts, predecisional Ss recalled more deliberative and less implementational thoughts, whereas for postdecisional Ss the reverse was true. These findings suggest that deliberative and implemental mind-sets tune thought production and information processing.

A course of action may be conceived rather narrowly as extending from its initiation (starting point) to its termination (end point). Alternatively, one may adopt a broader perspective that embraces the motivational origins of an action as the actual starting point and the individual's evaluative thoughts about the achieved action outcome as the final end point. In the present article, we take this broader perspective and segment the course of action into four distinct, sequential phases (Heckhausen, 1986).

The first segment is the *predecisional* phase, where potential action goals entailed by a person's many wants and wishes are deliberated. When a decision to pursue one of these goals is made, a transition to the *postdecisional* (preactional) phase takes place, where the individual becomes concerned with implementing the chosen goal. However, this phase ends and the *actional* phase starts when actions geared toward achieving the chosen goal are initiated. Once these actions have resulted in a particular outcome, the *postactional* phase is entered and the individual proceeds to evaluate the achieved outcome.

We postulate that each of these phases is accompanied by a distinct mind-set (Gollwitzer, 1990). Following the lead of the Würzburg School (Külpe, 1904; Marbe, 1901; Watt, 1905; for reviews, see Boring, 1950, pp. 401–406; Gibson, 1941; and Humphrey, 1951, pp. 30–131), we assume that the characteristics of each of these mind-sets are determined by the unique qualities of the different tasks to be solved within each phase. That is, the different mind-sets tailor a person's cognitive appa-

ratus to meet phase-typical task demands, thus creating a special preparedness for solving these tasks. This preparedness should extend to a person's thought production, to the encoding and retrieval of information, and to the inferences drawn on the basis of this information. In this article, we explore the issue of mind-set congruous thought production as well as the encoding and retrieval of congruous information. As was done in a previous analysis of mind-set effects on a person's inferences (see Gollwitzer & Kinney, 1989, on illusion of control), we limit the analysis of cognitive tuning toward mind-set congruous thoughts and information to the *deliberative* mind-set of the predecisional phase and the *implemental* mind-set of the postdecisional, but preactional, phase.

What are the issues to which deliberative as compared with implemental mind-sets are attuned? To answer this question, one must consider the specific tasks that need to be tackled in the respective action phases. In the predecisional phase, people's task is to choose between action goals suggested by their wants and wishes. The likelihood of a "good" choice should be enhanced when the individual thoroughly ponders the attractiveness of the expected consequences (i.e., expected value) of these goals. Clearly, failing to think about the attractiveness of proximal and distant consequences will lead to problematic decisions associated with unexpected negative consequences. Accordingly, the deliberative mind-set should gear a person's thinking toward the expected values of potential action goals.

In the postdecisional (preactional) phase, however, people are confronted with quite a different task: The chosen goal awaits successful implementation. Postdecisional individuals should therefore benefit from an implemental mind-set that guides their thoughts toward the questions of *when*, *where*, and *how* to implement the chosen action goal. In this phase, thoughts about the goal's expected value should be distractive rather than useful, because they are not immediately related to implementational issues.

The classic definition of mind-set ("Einstellung") as ad-

The help of Eva-Maria Detterbeck, Andrea Ennerst, Roswitha Flüge, and Angelika Lengfelder in collecting and analyzing the data reported is greatly appreciated. We thank Christine Liu, Gabriele Oettingen, Fritz Strack, Robert Wicklund, and four anonymous reviewers, all of whom made valuable comments on an earlier version of this article.

Correspondence concerning this article should be addressed to Peter M. Gollwitzer, Max-Planck-Institut, Leopoldstrasse 24, D-8000 Munich 40, Federal Republic of Germany.

vanced by the Würzburg School suggests that mind-set effects are based on cognitive processes that promote solving the task that stimulated the rise of the mind-set. With respect to deliberative and implemental mind-sets, these may be conceived of as cognitive procedures relating to how one chooses between various goal alternatives or to the planning of actions one must take in order to attain a chosen goal, respectively. A deliberative mind-set should, for instance, entail procedures of weighing pros and cons, whereas an implemental mind-set should entail procedures of timing and sequencing of goal-oriented actions.

As Smith and Branscombe (1987) pointed out in their procedural model of social inferences, cognitive procedures may transfer from a training (priming) task to a subsequent (test) task. If these procedures are sufficiently strengthened through intensive practice in the training task, and if there is overlap in the applicability of procedures, transfer is very likely. This model suggests the following test of the postulated effects of deliberative and implemental mind-sets: If we succeed in creating strong deliberative and implemental mind-sets by either having subjects intensively contemplate potential goals or plan the execution of a chosen project (training task), we should find the postulated mind-set effects in an unrelated subsequent task (test task). A prerequisite would be that the subsequent task allows for those cognitive procedures that were strengthened in the training task, that is, the cognitive procedures characteristic of a deliberative or implemental mind-set.

Experiment 1, testing the postulate of mind-set congruous thought production, was designed along this premise. Subjects' first task (training task) was to either thoroughly contemplate an unresolved decisional problem of their own (deliberative mind-set) or to make a detailed plan of how to pursue a pressing personal project (implemental mind-set). Then they were confronted with a second, allegedly unrelated task (test task) that requested the spontaneous production of ideas. Because these ideas could be deliberative or implementational in nature, we expected both deliberative and implemental mind-sets to guide thought production in a mind-set congruous direction.

This transfer assumption allowed us to go beyond a recent experiment reported by Heckhausen and Gollwitzer (1987), where the thoughts of deliberative and implemental mind-set subjects were sampled during the training task. In this study, the classification of the reported thoughts clearly evidenced cognitive tuning toward mind-set congruous thoughts. This study, however, lacks an unrelated test task, and therefore the results might be based on experimenter demands.

Experiment 1: Ascribing Deliberative and Implementational Efforts to Others

Asking subjects to deliberate unresolved personal problems that are pending a change decision should create strong deliberative mind-sets. Alternatively, asking subjects to plan the execution of chosen projects should evoke strong implemental mind-sets. Other experiments have indicated that deliberative and implemental mind-sets can reliably be produced through such a procedure (Gollwitzer, Heckhausen, & Ratajczak, 1990; Gollwitzer & Kinney, 1989). Accordingly, in the present experiment one third of the subjects were first asked to name an unresolved personal problem (e.g., Should I move from home? or Should I

terminate my college education?) and then asked to contemplate whether or not to make a respective change decision. Another third of the subjects were to indicate a personal goal or project they planned to execute in the near future (e.g., moving from home or terminating one's college education) and then were to plan when, where, and how they wanted to accomplish it. The final third, a control group, were asked to passively view nature slides.

We tested whether deliberative and implemental mind-sets tune people's thought production in a mind-set congruous direction by asking subjects to fabricate ideas on an unrelated second task. To this end, we presented subjects with the beginnings of three fairy tales in which the main character of each story faced a different decisional conflict (e.g., a king had to go to war, but had nobody to whom he could entrust his young daughter). Subjects were asked to spontaneously compose the next three sentences for each of these fairy tales.

The mind-set congruency hypothesis implies that deliberative efforts (i.e., contemplating possible goals) are most frequently ascribed to the main characters of the stories in the deliberative mind-set condition, less frequently in the control condition, and even less so in the implemental mind-set condition. In contrast, implementational efforts (i.e., executing a chosen solution to the conflict) should be most frequently ascribed in the implemental mind-set condition, less frequently in the control condition, and least frequently in the deliberative mind-set condition.

Method

Subjects

The 97 participants were male students at the Ruhr-Universität Bochum. Up to 4 subjects were invited to each experimental session and randomly assigned to one of three conditions. Subjects were recruited on the premise that they were willing to participate in two different studies, one on people's personal problems and projects, the other a test of their creativity. Subjects were separated by partitions, such that they could easily view the experimenter but none of the other participants. They were paid DM 10 (approximately \$5.50) for participating.

Design

Subjects in either a deliberative or implemental mind-set were asked to continue three different, incomplete fairy tales. Subjects' stories were analyzed with respect to whether deliberative or implementational efforts were ascribed to the main characters of the fairy tales. Subjects in the control condition passively viewed photographs of various outdoor scenes before receiving the fairy tales.

Procedure

Cover story. The female experimenter explained that subjects would take part in two different experiments. In the first experiment, subjects would be requested to reflect on personal issues or on nature photographs. Subjects were told that this study was designed to answer the question of whether intense reflection on personal issues would help people act more effectively in everyday life. In the second experiment their creativity would be tested. For this purpose, three different creativity tasks would be used, all of which would request the spontaneous creation of ideas.

In order to ensure that subjects perceived the two experiments as unrelated, the format of the written materials was different in each study (e.g., typeface, color of paper, and writing style). In addition, the materials of each alleged experiment were distributed and collected separately.

Deliberative and implemental mind-set manipulation. Deliberative mind-set subjects were asked to weigh the pros and cons of making or not making a personal change decision. First, they had to indicate an unresolved personal problem (e.g., Should I switch my major?). Then they were to list both potential positive and negative, short-term and long-term consequences (i.e., to elaborate on the expected value). In contrast, implemental mind-set subjects were asked to plan the implementation of chosen personal projects. They were instructed to first name a personal project they intended to accomplish within the following 3 months (e.g., to move from home). Then they had to list the five most crucial implementational steps and commit themselves to when, where, and how to execute these steps.

As a manipulation check, both groups of subjects were then asked to fill out a final questionnaire consisting of the following items:

1. "On the line below, please indicate the point that best represents your distance from the act of 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 6.5-cm mark "act of change decision," and the end point "past having made a change decision.")

2. "How determined do you feel at this moment?"

3. "Do you feel that you have committed yourself to a certain implementational course of action?"

4. "Do you feel that you have committed yourself to make use of a certain occasion or opportunity to act?"

Items 2-4 were accompanied by unipolar 9-point answer scales ranging from *not at all* to *very*.

Control subjects. Subjects in the control condition received a booklet containing numerous black-and-white photographs depicting various nature scenes. Subjects were instructed to passively view the pictures for about 30 min (i.e., the amount of time deliberative and implemental subjects needed to complete their tasks). Thereafter, the alleged second experiment was started.

Dependent variable. The experimenter began the alleged second study by distributing three different fairy tales, the order of which was counterbalanced across conditions. Subjects received the following instructions:

All of these fairy tales end at a certain point in the plot. You are to fill in the next three sentences of each fairy tale. You should *not* write a "novel," and the fairy tales need not have an ending. When continuing the stories, give free rein to your fantasy and don't hesitate to write down your own creative thoughts, however unusual they may be. After you have finished the three sentences, please go on to the next fairy tale.

The first fairy tale read as follows:

Once upon a time there was a king who loved the queen dearly. When the queen died, he was left with his only daughter. The widowed king adored the little princess who grew up to be the most beautiful maiden that anyone had ever seen. When the princess turned 15, war broke out and her father had to go to battle. The king, however, did not know of anyone with whom he could entrust his daughter while he was away at war. The king . . .

The second fairy tale was about a king who had a huge forest by his castle. One day he had sent out a hunter into the forest who did not return. The two hunters he sent to look for the lost hunter also failed to return. The third fairy tale described a rather hedonistic tailor who had attended a christening party out of town. Late at night and after a

few drinks too many, he was on his way home and got lost in a dark forest. He suddenly found himself standing in front of a huge rock wall with a passage just large enough to permit a person to pass.

Thought production scoring. Subjects' stories were scored by two independent blind raters. The raters proceeded as follows: First, they underlined verbs relating to the main characters of the three fairy tales. Then, they classified the episodes denoted by these verbs with respect to whether the main character tackled the predecisional task of choosing between action goals or the postdecisional task of implementing a chosen action goal. For this purpose, a coding scheme was developed; two mutually exclusive categories are depicted in the Appendix. Each category could be check-marked as often as necessary, depending on how many relevant episodes the subjects' stories contained. Eighty-one percent of the episodes could be placed into the categories provided by the coding scheme; the rest formed the category "unassignable episodes" (19%). Agreement between raters was determined by counting the number of "hits," defined as classifications on which the two raters agreed. Interrater reliability was high, with 91% of the ratings being hits.

Debriefing. When the subjects had finished working on the third fairy tale, the experiment was terminated and the subjects were debriefed. During the debriefing session, we probed whether subjects perceived the two experiments as related or not. As it turned out, subjects were only concerned with how well they had performed on the creativity task. None of the subjects raised the issue of the two experiments being potentially related or reported suspicions after being probed.

Results

Equivalence of Groups

Deliberative and implemental mind-set subjects did not differ in the domains covered by their problems and projects, respectively. Unresolved personal problems (deliberative mind-set subjects) and personal projects (implemental mind-set subjects) were classified according to three different domains: career-related (42%), lifestyle-related (31%), and interpersonal (27%), the percentages being basically identical for both unresolved personal problems and personal projects.

The three groups of subjects also did not differ significantly in the number of words they wrote when continuing the three fairy tales: $M = 110.2$ for the deliberative mind-set group, $M = 112.5$ for the implemental mind-set group, and $M = 119.7$ for the control group, $F(2, 84) = .52, ns$.

Manipulation Checks

Subjects had indicated their proximity (in time) to the act of making a change decision on a horizontal line. Nearly all (24 of 26) deliberative mind-set subjects indicated that they had not yet made the decision. The reverse was found for implemental mind-set subjects; 25 of 26 subjects indicated that they had already made the decision. In addition, deliberative mind-set subjects ($M = 4.6$) felt less determined than implemental mind-set subjects ($M = 8.2$), $F(1, 50) = 50.8, p < .001$. Implemental mind-set subjects ($M = 7.6$) felt more committed to executing a certain implementational course of action than deliberative mind-set subjects ($M = 5.0$), $F(1, 50) = 26.6, p < .001$; the same pattern held true for feelings of commitment with respect to making use of a certain occasion or opportunity to act ($M = 6.7$ vs. $M = 5.1$), $F(1, 50) = 4.6, p < .04$.

Table 1
Mean Deliberative and Implementational Efforts Ascribed to the Main Characters of the Three Fairy Tales

Type of ascribed efforts	<i>F</i>	<i>r</i>	Mind-set conditions		
			Deliberative (<i>n</i> = 26)	Control (<i>n</i> = 35)	Implemental (<i>n</i> = 26)
Deliberative	4.06*	.21*	1.00	0.71	0.38
Implementational	8.48**	.29**	5.81	6.94	7.85

Note. Means reflect the number of episodes in which subjects ascribed either deliberative or implementational efforts.

* $p \leq .05$. ** $p \leq .01$.

Dependent Variables

To analyze subjects' stories, episodes ascribing deliberative efforts to the main characters (i.e., deliberating action goals and turning to others for advice) were added together to create a deliberative efforts index; actual acting on a chosen goal and thinking about the implementation of the chosen goal were added together to form an implementational efforts index (see Appendix). Scores on these indices were submitted to further analyses.

To test the hypothesis that ascribing deliberative and implementational efforts varies in a mind-set congruous direction, two one-way analyses of variance (ANOVAs) with linear contrast weights (see Rosenthal & Rosnow, 1985) were conducted. For ascribing deliberative efforts, these weights tested the hypothesis that the highest frequencies would be obtained among deliberative mind-set subjects, followed by control subjects and then implemental subjects; for implemental efforts, the highest frequencies would be observed among implementational mind-set subjects, followed by control subjects and then deliberative subjects. These analyses revealed that ascribing deliberative and implementational efforts significantly varies in a mind-set congruous direction, $F(1, 84) = 4.06$, $p < .025$ (one-tailed), and $F(1, 84) = 8.48$, $p < .005$ (one-tailed), respectively. Pearson coefficients obtained by correlating ascribing deliberative and implementational efforts with the respective linear contrast coding of mind-set conditions underlined these results (see Table 1).

When the frequencies of ascribing deliberative and implementational efforts were submitted to an ANOVA with ascribed effort (deliberative vs. implementational) as a within-subjects variable and condition (deliberative, implemental, and control group) as a between-subjects variable, a significant main effect of ascribed effort emerged, $F(1, 84) = 322.5$, $p < .001$, which is qualified by the predicted interaction effect, $F(2, 84) = 4.65$, $p = .015$. We checked whether the pattern of data is different for each of the three fairy tales by computing a $3 \times 2 \times 3$ (Fairy Tale \times Ascribed Effort \times Condition) ANOVA. The significant Ascribed Effort \times Condition interaction effect was *not* qualified by an interaction with fairy tale; that is, the three-way interaction did not reach significance ($F < 1.0$). In addition, the order in which the fairy tales were presented also failed to affect the critical interaction ($F < 1.0$). Finally, we explored how the episodes that could not be classified by our coding scheme were

distributed across conditions. There were no significant differences among the conditions ($F < .25$).

Discussion

Subjects requested to ponder a personal problem in order to determine whether or not they should make a change decision fabricated fewer implementational and more deliberative ideas when writing a creative fairy tale than subjects who had been asked to plan the execution of a chosen personal goal. Deliberating and planning created distinct mind-sets that persisted even after subjects had turned to the subsequent task of writing creative fairy tales. The ideas that spontaneously entered the subjects' minds when inventing their fairy tales corresponded to their deliberative or implemental mind-sets.

All groups of subjects imputed more implementational than deliberative efforts to the main characters of the fairy tales. Apparently, the task of writing creative endings to unfinished fairy tales predominantly relies on cognitive procedures characteristic of the implemental mind-set. As Rabkin (1979) and Rumelhart (1975, 1977) pointed out, fairy tales seem to follow a certain grammar. A "good" fairy tale is not complete until the problem faced by the main character is solved. Because such solutions commonly require the main character to take action, ascribing implementational efforts is more in the style of a good fairy tale. Still, despite few deliberative efforts ascribed overall, we observed the predicted mind-set congruency effect. However, the scarcity of ascribing deliberative efforts in the present study serves as a reminder that testing the postulated mind-set congruency effects through a subsequent (test) task has its limits. If working on a subsequent task does not allow for the cognitive procedures entailed by a deliberative or implemental mind-set (e.g., solving an arithmetic task), mind-set congruency effects cannot be observed.

Studies conducted on category accessibility effects on social judgments seem relevant to the paradigm used here (Higgins, Rholes, & Jones, 1977; Srull & Wyer, 1979). Assuming that social constructs (e.g., kindness) are stored in memory, these constructs were first primed by confronting subjects either with trait words closely related to the target construct (Higgins et al.) or descriptions of relevant behaviors (Srull & Wyer). Then, in a presumably unrelated second experiment, subjects read descriptions of a target character who shows either ambivalent (Higgins et al.) or vague (Srull & Wyer) indications of possessing

the critical personal attribute. Finally, when subjects were asked to rate the target character, distortions in the direction of the primed category were observed. Both groups of researchers suggested that priming changes some property of the critical construct's representation in memory (i.e., activation or location in a storage bin, respectively) that makes it comparatively more accessible and more likely to be used in interpreting the behavior of the target person.

As in these priming experiments, subjects in Experiment 1 were also exposed to ambiguous information about a target character (i.e., the main character of the open-ended fairy tales) in an alleged second experiment. However, the ambiguity is about the main character's course of action and not about a potential personality attribute. We believe that subjects' ascribing of deliberative or implementational efforts was affected by cognitive procedures (or productions; Anderson, 1983) that have been strengthened through prior deliberation and planning processes. The activation of declarative knowledge (specific episodic and general semantic) through the contents touched by subjects' deliberation and planning should have played a minor role. This assumption is supported by the fact that the observed mind-set effects were rather long-lived (one quarter to half an hour), whereas conceptual priming effects were generally extremely short-lived (a matter of seconds or a few minutes). As Smith and Branscombe (1987) demonstrated, studies on category accessibility effects only manage to produce long-lasting effects (several hours) when procedural strengthening is involved.

Experiment 2: Recalling Deliberative Versus Implementational Thoughts of Others

Experiment 1 demonstrated that deliberative and implemental mind-sets favor the production of congruous thoughts. This should facilitate the task of choosing between goal options and the task of implementing a chosen goal, respectively. However, both of these tasks should also be facilitated by effective processing of task-relevant information. Therefore, one would expect that people in a deliberative mind-set show superior processing of information that speaks to the expected value of goal options, whereas people in an implemental mind-set should show superior processing of information that speaks to the issue of when, where, and how to execute goal-oriented behavior.

Our test of the superior processing of mind-set congruous information was also based on the transfer assumption of Smith and Branscombe's (1987) model of procedural strengthening and transfer. Instead of offering deliberative and implemental mind-set subjects information relevant to their decisional and implementational problem at hand, we offered information on other people's decisional and implementational problems. As this information could easily be identified as either expected value-related or implementation-related, we expected mind-set congruency effects with respect to subjects' recall of this information.

This information was depicted on eight pairs of slides. The first slide of each pair showed a person said to be experiencing a personal conflict of the following kind: Should I do *x* or not (e.g., sell my apartment)? The second slide presented four thoughts entertained by the person depicted on the first slide.

Two of these thoughts were deliberative in nature, as they referred to the expected value of making a change decision. The other two thoughts were of an implementational nature, both addressing the issue of when (timing) and how (sequencing) to execute goal-oriented actions. When constructing these sentences, we used pilot subjects to establish that both types of information (expected value vs. implementation) were recalled about equally well.

A deliberative mind-set was established by asking subjects to contemplate the choice between one of two available creativity tests. An implemental mind-set was assumed for subjects who had just chosen between tests and were waiting to start working. A control group received and recalled the information without expecting to make a decision or to implement one already made.

Deliberative mind-set subjects should show superior recall of the expected value-related information, despite its being unrelated to the decision subjects were contemplating. Implemental mind-set subjects should show superior recall of the implementation-related information, despite its being unrelated to working on the chosen creativity test. Control subjects were expected to recall both expected value-related information and implementation-related information about equally well.

Method

Subjects and Equipment

The participants were 69 male students from the University of Munich. Two subjects were invited to each experimental session. They received DM 15 (approximately \$8.00) for participation. A female experimenter ushered subjects into separate experimental cubicles where they received tape-recorded instructions through an intercom system. Each cubicle was equipped with a projection screen.

Design

Subjects were randomly assigned to one of three conditions. In the deliberative mind-set condition, information on both expected values and implementational issues was received and recalled prior to making a choice between two available creativity tests. In the implemental mind-set condition, subjects received and recalled this information while waiting to begin working on their chosen creativity test. Finally, control subjects received and recalled this information without either expecting to make a choice or having made one.

Procedure

Cover story. Subjects were told that two different personality traits, that is, social sensitivity and artistic creativity, would be assessed during the course of the experiment. The experimenter further explained that for measuring each of these traits two alternative test materials had been prepared. It was stated that subjects would be allowed to choose between test materials, because only if subjects chose the test material more appropriate for them personally would test scores reflect their "true" social or creative potential. The experimenter then distributed a short questionnaire consisting of the following items: (a) "How creative do you think you are?" (b) "How confident are you that you are capable of creative achievements?" and (c) "How important is it for you to be a creative person?" Parallel questions were asked with respect to social sensitivity. (All items were accompanied by 9-point answer scales ranging from *not at all* to *very*)