

Goals need implementation intentions: The model of action phases tested in the applied setting of continuing education

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In the present study, the model of action phases (Heckhausen & Gollwitzer, 1987) was applied to the area of continuing education. A subsample of 136 East German participants in the larger study "Active Actions in a Radical Change Situation" rated the expected value of further education, indicated whether they had taken a decision to continue their education (goal intention) and whether they were planning goal-directed actions (implementation intention). Two years later, it was ascertained whether participants had initiated vocational retraining. Findings support the core assumptions of the model. Postdecisional participants endorsed the positive aspects of further education more strongly (implemental mindset) than predecisional participants, who looked at its pros and cons impartially (deliberative mindset). Second, participants were more successful in initiating vocational retraining when they had a goal intention that was additionally furnished with an implementation intention. Findings are discussed with respect to theoretical and practical implications of the distinction between goal setting and goal implementation.

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In this article, we examine processes of goal setting and goal implementation over the course of time in an applied setting. More specifically, we analyse the intention to continue one's education in a situation (East Germany after the collapse of communism in 1990) where improving one's chances in the labour market by acquiring new knowledge and skills was and still is crucial. The theoretical framework for this longitudinal study is based on the model of action phases (Heckhausen & Gollwitzer, 1987; for a summary, see Gollwitzer, 1990; Gollwitzer & Bayer, 1999), which offers a time perspective on goal striving and thus takes a comprehensive view by analysing both goal setting and self-regulatory processes in goal implementation.

In a survey conducted in East Germany shortly after the reunification of East and West Germany, the majority of people expressed an interest in continuing their education. However, only 26% of those persons interviewed who had intended to receive further education actually participated in a training course within the next 6 months (Frese & Immler, 1994). Obviously, having an intention is not a sufficient condition for implementing the respective goal.

In traditional theories on goal striving, the intention to achieve a certain goal is seen as an immediate determinant of goal achievement. For decades, research dealt with the factors that determine the formation of strong intentions (goal-setting theories: Ajzen, 1985; Atkinson, 1964; Fishbein & Ajzen, 1975; Heckhausen, Schmalt, & Schneider, 1985; Vroom, 1964) and little attention was paid to the self-regulatory processes mediating the effects of intentions on behaviour. As Gollwitzer and Bayer (1999) put it, "theories ..., which have traditionally analyzed issues of goal setting ..., are ... ill-suited to describe and predict phenomena that occur at later phases of goal pursuit" (p. 404). It is modern self-regulation theories (e.g., Bandura, 1991; Carver & Scheier, 1990; Gollwitzer, 1993, 1996; Hacker, 1986; Kuhl, 1984, 1992; Wright & Brehm, 1989) that are concerned with the self-regulatory processes supporting goal implementation. These theories stress the fact that setting a goal is just one prerequisite for successful goal striving as there are a host of subsequent implemental problems that need to be solved. The core assumption of self-regulation theories according to Kuhl (2002) is that "a person can believe in his or her self-efficacy or can be highly motivated and still might not be able to enact intentions he or she is committed to if self-regulatory abilities are insufficient" (p. 114).

THE MODEL OF ACTION PHASES

One approach that stands out is the model of action phases by Heckhausen and Gollwitzer (1987; for a summary, see Gollwitzer, 1990; Gollwitzer & Bayer, 1999) as it encompasses both theoretical views by analysing goal setting and self-regulation in goal implementation within a single theoretical framework. It extends from the awakening of a person's wishes and their setting a goal, through

the self-regulatory processes necessary for successful action initiation, to the evaluative thoughts people have once goal striving has led to some outcome. The course of goal striving is construed as consisting of four action phases with their specific functional characteristics: predecisional, preactional, actional, and postactional phases (see Figure 1). There are, of course, other models of action regulation (e.g., Hacker, 1986) that could be taken into account in the present context. However, it is the model of action phases that deals most clearly and explicitly with the sequence of intentions (goal intention and implementation intention) and the cognitive processes involved that seem essential in transforming what people want to do into what they do actually do.

Predecisional phase

As people normally harbour more wishes and desires than they can possibly realize, the first task is to choose among those competing wishes and turn some of them into binding goals (i.e., forming so-called goal intentions). Goal intentions have the structure "I intend to reach Z!" whereby "Z" may relate to a certain outcome or behaviour to which the individual feels committed. Goal intentions are the type of intentions that theories on goal setting have traditionally been concerned with (e.g., Ajzen, 1985; Atkinson, 1964; Bandura, 1991; Feather, 1982; Locke & Latham, 1990; Vroom, 1964). As in these theories, an expectancy-value framework is employed to explain the forming of a goal intention. People are thought to deliberate on the feasibility and desirability of relevant action outcomes and, finally, commit themselves to a valued outcome when the subjective probability of achieving it is sufficiently high (i.e., high expected value of the goal).

Forming a goal intention represents a crucial transition point as it causes a thorough change in the cognitive functioning (mindset) of a person. The cognitive orientation in the predecisional phase, the so-called *deliberative mindset*, is characterized by an impartial analysis of a goal's feasibility and desirability. In contrast, the so-called *implemental mindset*, the predominant cognitive orientation in the preactional and actional phases, is characterized by a biased perception of the goal's desirability and feasibility (Gollwitzer, 1990; Gollwitzer & Bayer, 1999). The cognitive characteristics of the different mindsets are thought to be functional for the solution of the specific task at hand (i.e., goal setting vs. goal implementation). There is ample evidence for the postulated characteristics of the deliberative and implemental mindsets (e.g., Gollwitzer, Heckhausen, & Steller, 1990b; Gollwitzer & Kinney, 1989; Heckhausen & Gollwitzer, 1987; Taylor & Gollwitzer, 1995; for a summary, see Gollwitzer & Bayer, 1999). For example, in a study by Taylor and Gollwitzer (1995, Study 3), participants were asked to report their thoughts after deliberating on either an unresolved decision or a goal they already felt committed to. While predecisional participants listed an equal number of

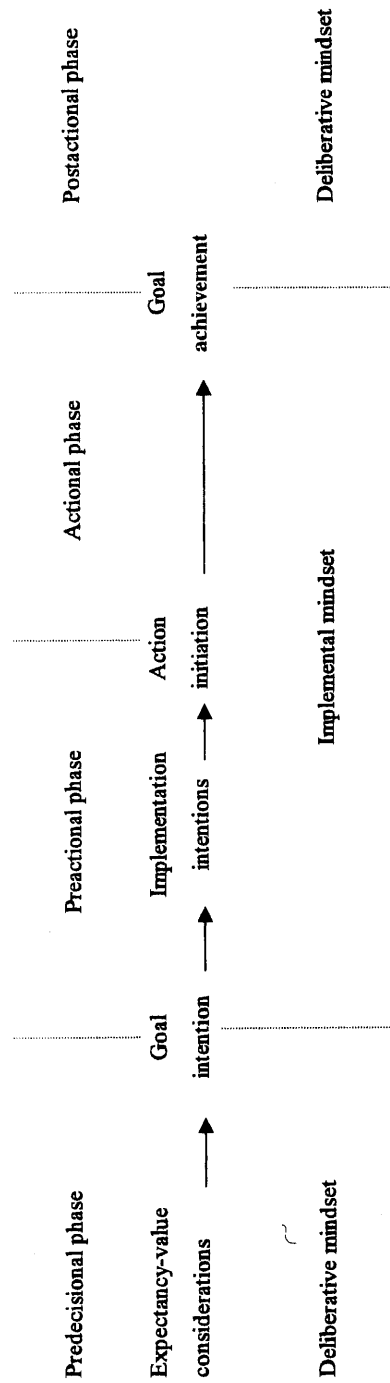


Figure 1. Postulated sequence of action phases with their specific cognitive characteristics (mindsets).

advantages and disadvantages with respect to the goal in question, postdecisional participants listed significantly more advantages than disadvantages (see also Heckhausen & Gollwitzer, 1987).

Preactional phase

After forming a goal intention, the second task is initiating goal-directed actions. Getting started on a goal pursuit is rather simple when the necessary actions are well-practised or routine and the relevant situational contexts release the critical behaviour in a more or less automatic fashion. Often, however, this fails to be the case as many behaviours are not part of an everyday routine (cf. the concept of levels of action regulation in Hacker's, 1986, theory). Also, goal intentions often cannot be realized immediately and people procrastinate. There are several reasons for this. First, relevant opportunities to act may not yet be available (e.g., no courses for the desired training are currently offered) or may sometimes escape a person's attention (e.g., one is absorbed by a competing goal pursuit; one is wrapped up in demanding ruminations). Moreover, one may fail to seize opportunities because one did not respond in time (e.g., when the opportunity to enrol in a course is available only for a short period of time). Second, there may be conflicts between alternative courses of action towards achieving the goal intention (e.g., one cannot make up one's mind about which kind of training one would like to participate in).

It is assumed that these implementational problems may be alleviated by the self-regulatory tool of forming implementation intentions (Gollwitzer, 1996, 1999). They represent a specific type of intention and take the form of "If situation X is encountered, then I will perform behaviour Y!" In an implementation intention, a mental link is created between a specific future situation and the intended goal-directed response. Holding an implementation intention commits a person to the performance of a certain goal-directed behaviour once the critical situation is actually encountered. Implementation intentions are formed in the service of goal intentions and specify the when, where, and how of goal-directed responses. For instance, a possible implementation intention in the service of the goal intention "to enrol in a course for vocational retraining" would link a suitable situational context (e.g., next Wednesday at 3 pm at home) to an appropriate behaviour (e.g., calling the enrolment office of the college).

With respect to the functional characteristics of implementation intentions, Gollwitzer (1993, p. 173) speaks of a general principle called the "delegation of control to the environment" that is associated with crucial features of automatic responding. The situational context specified in the implementation intention is thought to elicit the respective goal-directed behaviour immediately, efficiently, and without conscious intent (Brandstätter, Lengfelder, & Gollwitzer, 2001).

There is converging evidence from both laboratory and field experiments for diverse goal intentions that implementation intentions support swift action initiation (Brandstätter et al., 2001; Gollwitzer & Brandstätter, 1997, Study 3) and thereby promote goal achievement (e.g., Gollwitzer & Brandstätter, 1997, Studies 1 and 2; Chasteen, Park, & Schwarz, 2001; Milne, Orbell, & Sheeran, 1999; Oettingen, Hönig, & Gollwitzer, 2000, Studies 2 and 3; Orbell, Hodgkins, & Sheeran, 1997; Orbell & Sheeran, 2000; Sheeran & Orbell, 2000; Verplanken & Faes, 1999).

Actional and postactional phases

The third task is bringing goal-directed actions to a successful end. Especially in the case of long-term projects, the individual has to deal with repeated interruptions and possible setbacks. As research conducted by Lewin (1926) and colleagues (e.g., Mahler, 1933; Ovsiankina, 1928) shows, once an intended goal pursuit has been initiated, interruptions do not lead to withdrawal but to resumption of the respective behaviour. Finally, in the fourth task, the individual has to evaluate what she or he has achieved and to decide whether further action is necessary. This is done by comparing the intended outcomes with the actual achieved outcomes (cf. Carver & Scheier, 1990).

In summary, then, the model of action phases speaks of two crucial transition points in the course of traversing the different action phases: the forming of a goal intention and the initiation of goal-directed actions. The forming of a goal intention (goal setting) is thought to be determined by the feasibility and desirability (i.e., expectancy and value) of the goal in question. In forming a goal intention the individual commits him- or herself to a desired end-state, which may be defined rather abstractly (e.g., continuing one's education) or concretely (e.g., participating in a language course). The consequence of having formed a goal intention is a feeling of commitment to achieve this end-state. Forming a goal intention sets the stage for a variety of self-regulatory mechanisms (e.g., discrepancy reduction, Bandura, 1991; action control strategies, Kuhl, 1984, 1992). Thus, a goal intention supports successful goal striving over and above the expected value of the goal at hand.

Moreover, it is postulated that forming a goal intention causes a thorough change in the cognitive orientation of the individual, that is, a change from the deliberative to the implemental mindset. The initiation of relevant actions (goal implementation) is thought to be regulated by implementation intentions specifying the when, where, and how of goal-directed behaviour.

THE PRESENT STUDY

Even though there has been abundant research on individual facets of the model (e.g., on the cognitive characteristics of predecisional and postdecisional phases, Gollwitzer & Bayer, 1999; on the effects of implementation intentions on action

initiation, Gollwitzer, 1999), to date the postulated sequence of goal setting and goal implementation processes has not yet been tested empirically. In this longitudinal study we set out to fill this gap by analysing the interplay of the expected value of the goal, the forming of a goal intention, and of implementation intentions, as well as their effect on the initiation of goal-directed actions after implementation intentions have been formed.

A second aim of this study is to apply the action phase model originating from basic research to a complex everyday context of high practical relevance, that is, the intention to continue one's education. Following the famous tenet of Kurt Lewin "There is nothing so practical as a good theory" we aim to combine basic and applied theoretical work here by testing a basic theoretical model in an applied context.

In doing so, we have formulated hypotheses on the basis of the model of action phases. Our first hypothesis centres on the change in mindset after having formed a goal intention. We predict that individuals who have not yet taken a decision to continue their education (deliberative mindset of the predecisional phase) are more balanced with regard to this goal and will thus report an equal number of advantages and disadvantages of continuing their education. In contrast, individuals who have already made up their mind to continue their education (implemental mindset of the postdecisional phase) are predicted to be more biased with respect to this goal and thus report more advantages than disadvantages of continuing one's education (*hypothesis 1*).

The second hypothesis focuses on the postulated sequence of expected value considerations, goal intention, implementation intention, and initiation of goal-directed actions. It is predicted that individuals will be more likely to initiate action in continuing their education if they not only evaluate the goal as highly desirable and feasible (high expected value), but also commit themselves to the goal by forming a goal intention and finally furnish their goal intention with an implementation intention. The postulated sequence implies that the portion of variance accounted for in action initiation increases continuously by adding expected value, goal intention, and implementation intention step by step (*hypothesis 2*).

Because the incentives as well as the opportunities for continuing education are presumably higher for people of higher socioeconomic status and younger age, both had to be included as covariates for controlling demographic characteristics.

Ideally, each person's action phases should be tracked by means of repeated observations that capture the individual transitions from stage to stage and reveal how far he or she gets (i.e., what stage he or she reaches). This is virtually impossible. We had to rely on a more realistic approach by assessing the expected value of the goal of continuing one's education and by asking all participants at the same time (as part of the interviews of wave 5), whether they had already formed a goal intention and an implementation intention, and (in wave 6)

whether they had initiated goal-directed behaviour since. In the present study we interviewed a representative sample in an East German city on their intentions to continue their education. Two years later it was probed whether they had acted on their intention.

METHOD

The present study is part of the project AHUS, Aktives Handeln in einer Umbruchsituation ["Active Actions in a Radical Change Situation"], a larger longitudinal study. The main objective of the longitudinal study was to document the work-related changes that took place in the transition from tight bureaucratic socialism to a social market economy.¹

Sample

The longitudinal study was carried out in Dresden, the capital of Saxony, in former East Germany. The data we present in this study are based on interviews conducted during the fifth (1993) and the sixth (1995) wave of the longitudinal study, which began in 1990 directly after the monetary unification of East and West Germany. The sample for the general longitudinal study was generated by randomly selecting streets, then selecting every third house, and then in each house, every fourth apartment (in smaller houses every third one). Native Germans between the ages of 18 and 65 were invited to participate. The refusal rate of 33% was quite low for a study of this kind. Further details on the random sampling procedures and general sample characteristics have been reported by Frese et al. (1996) as well as Garst et al. (2000).

The subsample of this study consists of 136 individuals who participated in the AHUS project (with the total number of participants being 478). In wave 5 of the interviews, all 478 participants of the longitudinal study were asked about their job-related plans. The decision whether to include individuals from the 478 participants in the fifth wave of the longitudinal study in our subsample (investigating the intention to continue one's education) was based on participants' answers to the following two questions. First, "What are your plans for the near future with respect to your professional career?" and second, "Have you ever thought of continuing your education?" We included those participants in our subsample who either spontaneously mentioned further education when asked the first question, or gave an affirmative answer to the second question. This led to the inclusion of 136 individuals in the subsample.

Of the 136 participants who were included in our subsample, 57% were female. Their mean age was 39 years, ranging from 20 to 64 years. Of the

participants, 74% had a job, 11% were unemployed, 3% were in early retirement, 1% worked less than 10 hours a week, 2% studied at the university, 5% were participating in a (vocational) retraining course, 2% were on parental leave, and 2% of the participants were in unclassified situations. The following facts give an indication of the radical changes people went through in East Germany: 59% of the participants had experienced unemployment during the last 4 years, and 65% of those who had a job expected to lose it sometime in the future.

We compared the 136 participants who indicated an interest in continuing their education with the remaining 342 individuals who did not with respect to the following demographic and job-related variables. Unless stated otherwise, the differences were significant ($p < .05$, two-tailed). Our subsample included more women (57% in the subsample compared with 43% in the other sample) and younger people ($M_{\text{sub}} = 39$ years vs. $M_{\text{other}} = 44$ years). Participants in our subsample had more complex jobs ($M_{\text{sub}} = 3.6$ vs. $M_{\text{other}} = 3.4$) and jobs with a higher degree of control ($M_{\text{sub}} = 3.8$ vs. $M_{\text{other}} = 3.6$). Participants with the goal of continuing their education expressed a stronger desire for a better job ($M_{\text{sub}} = 2.4$ vs. $M_{\text{other}} = 2.1$) and had more frequently participated in some further education in the past (58% in the subsample vs. 39% in the other sample). However, there were no significant differences with respect to their level of education and to their prior occupational training. Both samples had equal experiences with unemployment and job changes during the previous year. Participants from both samples reported the same level of expectancy of becoming unemployed in the near future.

Those 134 participants who declared they had considered continuing their education without actually engaging in such activities at the present time were interviewed in more detail. Two years later, in the sixth wave of the study, we were able to contact 126 (94%) of them. They were asked whether they had actually started some skill improvement training in the previous 2 years.

Interview procedures

The complexity of the whole study's research question as well as the heterogeneity of the sample (i.e., a representative sample of Dresden) called for a flexible research methodology. An interview allows those aspects that are relevant for a specific participant to be tapped more flexibly. Above all, compared with a questionnaire an interview seemed more conducive to understanding how participants experience the change in the transition to a radically different socioeconomic system and how they cope with the hardships of such a change. Interviewers took part in a 2 day course, training every step of the interview with the help of a role-playing procedure. They were given a detailed manual with the standardized questions and rating scales, and practised the use of the interview manual several times under the supervision of an experienced interviewer.

¹Other publications within this project are Frese (1995), Frese, Fay, Hilburger, Leng, and Tag (1997), Frese, Kring, Soose, and Zempel (1996), Garst, Frese, and Molenaar (2000), Rybowski, Garst, Frese, and Batinic (1999), Speier and Frese (1997). Training was not yet an issue.

Participants were interviewed in their homes by undergraduate and graduate students who had been thoroughly trained in giving structured interviews. Besides a variety of questions on participants' occupational situation, the interview covered different aspects of intentions to continue their education. Additionally, participants filled out a questionnaire tapping a number of personality dimensions and demographic information. They were paid for participating in the study (approximately \$25 per wave). Here, we are only reporting that part of the interview that is relevant for the present study. Participants' answers were written down by the interviewers in a short form² that was later typed and used as the basis for the numerical coding system. In order to facilitate the cooperation of the respondents in answering sensitive questions in a difficult time of socioeconomic and political transition, the interviews were not tape-recorded. Short transcripts of the interviews were coded by the interviewer him- or herself and by a second coder according to detailed guidelines, which included rating anchors to every item (see below). The median interrater agreement for the items analysed in the present study is .78. The means of the scale values of both raters were the measures used in our analyses.

Measures

In order to tap the different theoretical constructs of the action phase model, a number of questions were asked. The order in which these questions are described here differs somewhat from the order in which they were addressed in the interview.

Advantages and disadvantages of continuing one's education. Participants were asked to spontaneously name the advantages and disadvantages of receiving further education. Their open answers were rated as absolute numbers of pros and cons.

Expected value. This scale included perceived feasibility (expectancy) and desirability (value) of participants' goals to continue their education. Interviewees' answers were coded on a 5-point scale (1 = not at all, 2 = somewhat, 3 = medium, 4 = much, 5 = very much). Four questions addressed the feasibility aspect of the goal: (1) How certain is it that you will successfully finish the training programme once you have started it? (2) How likely is it that you will face difficulties? (3) How successfully do you think you will cope with these difficulties? (4) How many local opportunities for further education are there? These items were averaged to form an index of the goal's feasibility (Cronbach's

$\alpha = .64$). Similarly, we measured the perceived desirability of the goal with three items: (1) How important is it for you to continue your education? (2) How important is further education for your professional development? (3) How likely is it that further education will lead to an improvement of your professional situation? These items were averaged to form a desirability scale ($\alpha = .41$).³ Finally, we formed a composite score called the expected value of the goal by multiplying the indices of feasibility and desirability.⁴ Feasibility and desirability ratings did not correlate, $r = .01, n.s.$, which replicates a well-known result of research in the tradition of expectancy-value theories (e.g., Feather, 1982).

Goal intention. In order to ascertain whether subjects had already formed a goal intention to continue their education or not, they were asked to mark an 80 mm horizontal line with "I am thinking of doing so" at the beginning of the line, "I am determined to do so" at 45 mm, and "I have already started to do so" at the end of the line. In the action phase model, a goal intention is conceptualized as a discrete transition point. Using a continuous line instead of asking participants directly whether or not they had made up their minds to continue their education made answering easier for our participants (cf. Gollwitzer, Heckhausen, & Ratajczak, 1990a). According to the theoretical view of a goal intention as a discrete transition point, we dichotomized this variable at the point "I am determined to do so" creating a group of people who had already made up their minds (i.e., having formed a goal intention) and another one who had not made up their minds yet (i.e., not having formed a goal intention). Only 2 out of the 136 participants indicated that they had already started activities towards continuing education. They were excluded from the further analyses.

Implementation intention. All participants were asked the following two questions: (1) Have you already committed yourself to when you will start to act on the goal to continue your education? (answers coded on a 3-point scale ranging from 1 = not at all, 2 = rough idea of the time, 3 = commitment to an exact time) and (2) Have you already committed yourself to where you will act on the goal to continue your education? (answers coded on 3-point scales ranging from 1 = not at all, 2 = rough idea of the place, 3 = commitment to an exact place). The rated answers to these two items were averaged for the implementation intention

²For reasons of research economy, we did not use verbatim transcripts of the interviews. However, the interviewers were thoroughly trained in deciding what to write down in order to make coding possible.

³The three questions tap different aspects of the desirability (value) construct (i.e., different incentives associated with continuing one's education, which do not necessarily go hand in hand). Therefore, the rather low internal consistency does not really pose a problem. It is a quite common misunderstanding that low internal consistency implies low stability.

⁴Multiplying feasibility and desirability instead of adding them fits the model of expected value.

scale ($\alpha = .48$).⁵ In line with the theoretical propositions, we dichotomized the implementation intention scale for the analyses. Participants with a value equal to 1 (not at all) on this composite scale were regarded as lacking an implementation intention, participants with a value greater than 1 were regarded as having formed an implementation intention. Conceptually, there is a clear distinction between goal intention and implementation intention that to some extent parallels Hacker's (1986) distinction between levels of action regulation. As we will see in the Results section, the constructs are not only distinct in a theoretical sense; they can also be separated in terms of unique contributions to action initiation.

Action initiation. Two years later, in the sixth wave of the longitudinal study, it was ascertained whether participants had initiated the process of obtaining further education. Again, an interview approach was used. Participants were asked whether they had started to act on the goal to continue their education. Additionally, it was probed what kind of continued education they were getting. Courses covered all kinds of different vocational areas (e.g., technical, medical, language, behavioural training, etc.) varying a lot in the time invested. Answers were coded on a 5-point scale (1 = no further education whatsoever initiated, 2 = a course of at most a few days initiated, 3 = a course of a few weeks initiated, 4 = a course of several months initiated, 5 = a course of at least 1 year initiated). The distribution between the five categories was 36, 12, 28, 30, and 22 participants. Again, for theoretical reasons, we dichotomized this variable resulting in two groups of participants—one group that had not initiated getting further education (participants with a value equal to 1), and one group that had initiated getting further education (participants with values greater than 1).

Socioeconomic status. Socioeconomic status was measured as the average of the z -transformed level of occupation (e.g., unskilled worker, skilled worker, senior employee, etc.) and z -transformed monthly net income ($\alpha = .73$).

RESULTS

Cognitive characteristics of pre- and postdecisional phases (hypothesis 1)

Our first hypothesis focused on a specific cognitive orientation (mindset; Gollwitzer, 1990; Gollwitzer et al., 1990b; Gollwitzer & Kinney, 1989) of participants in the pre- and postdecisional phases. We expected that participants who had already formed a goal intention would spontaneously list more

⁵Since the two questions tap different aspects of implementation intentions (i.e., time and place, which do not necessarily coincide), the rather low internal consistency coefficient does not preclude validity. The highest alpha coefficients would have been achieved had the participants been asked the same question content with somewhat different words—a quite common, but nevertheless highly problematic practice (see Cortina, 1993, for common misunderstandings and misuses of coefficient alpha).

advantages (pros) of further education than disadvantages (cons) compared with those participants who had not yet formed a goal intention. This pattern should result in a more positively tuned ratio of advantages to disadvantages. There was an overall tendency in participants to name more advantages than disadvantages. Therefore, we calculated the natural logarithm of the advantages/disadvantages ratio for each person. An ANOVA was run with this ratio measure as the dependent variable and the dichotomized measure of having formed a goal intention or not as the independent variable. An equal number of advantages and disadvantages was represented by $\ln(\text{advantages/disadvantages}) = 0$. Pre-decisional ratios were closer to zero ($M = 0.92$) than postdecisional ratios ($M = 1.46$), $F(1,134) = 4.91$, $p < .05$. This result speaks for a more positively biased cognitive orientation in participants during the postdecisional phase—implemental mindset.

Prediction of action initiation based on expected value, goal intention, and implementation intention (hypothesis 2)

Means, standard deviations, and correlations of the relevant variables are given in Table 1 together with age and socioeconomic status of the participants. Age is negatively correlated ($r = -.17$) with action initiation, whereas socioeconomic status is positively correlated with goal intention ($r = .18$), implementation intention ($r = .25$), and action initiation ($r = .32$). Therefore, age and socioeconomic status are used for covariance control. The participants' gender is uncorrelated with any of the action phase variables and will not be included in the regression analysis presented below.⁶

TABLE 1
Mean, standard deviation, and correlation coefficients of the control
and action phase variables ($N = 126$)

| | <i>M</i> | <i>SD</i> | (1) | (2) | (3) | (4) | (5) |
|------------------------------|----------|-----------|------|------|-----|-----|-----|
| (1) Age | 36.81 | 10.23 | | | | | |
| (2) Socioeconomic status | -.06 | .90 | .17 | | | | |
| (3) Expected value | 15.24 | 4.32 | -.02 | -.06 | | | |
| (4) Goal intention | .59 | .49 | .14 | .18 | .12 | | |
| (5) Implementation intention | .70 | .46 | .06 | .25 | .16 | .22 | |
| (6) Action initiation | .71 | .45 | -.17 | .32 | .13 | .24 | .34 |

Goal intention, implementation intention, and action initiation are dichotomized in congruence with theory. Correlation coefficients $r > .17$ are significant ($p < .05$).

⁶This is also true for the personality measures "action vs. state orientation" (Kuhl & Beckmann, 1994) and "generalized self-efficacy" (Bandura, 1977). Thus, it can be excluded that the effects of action phases are caused by personality differences.

As the action phase model proposes, the independent variables expected value, goal intention, implementation intention, and the dependent variable action initiation are all positively correlated (Table 1). However, the crucial point is to show that expected value, goal intention, and implementation intention each make a unique contribution to the prediction of action initiation. Thus, the portion of variance accounted for in action initiation should increase continuously when expected value, goal intention, and finally implementation intention are successively added in.

The hypothesis was tested by way of a logistic hierarchical regression analysis with action initiation as the dependent variable (Hosmer & Lemeshow, 1989). Table 2 presents the results of this analysis with age and socioeconomic status as control variables in the first step, expected value in the second, goal intention in the third, and implementation intention in the fourth step. Looking at the second column from right, one can see that adding goal intention and then im-

TABLE 2
Action initiation predicted by age, socioeconomic status, expected value, goal intention, and implementation intention (logistic regression)

| | <i>B</i> | <i>SE</i> | <i>Wald</i> | <i>df</i> | <i>p</i> | <i>Exp(B)</i> | <i>Delta R²</i> | <i>p change</i> |
|--------------------------|----------|-----------|-------------|-----------|----------|---------------|----------------------------|-----------------|
| Step 1 | | | | | | | | |
| Age | -0.05 | .02 | 6.62 | 1.00 | .010 | 0.95 | | |
| Socioeconomic status | 1.02 | .27 | 14.13 | 1.00 | .000 | 2.78 | | |
| Constant | 3.09 | .85 | 13.36 | 1.00 | .000 | 22.04 | .15 | .000 |
| Step 2 | | | | | | | | |
| Age | -0.05 | .02 | 6.50 | 1.00 | .011 | 0.95 | | |
| Socioeconomic status | 1.05 | .27 | 14.68 | 1.00 | .000 | 2.85 | | |
| Expected value | 0.09 | .05 | 2.85 | 1.00 | .091 | 1.09 | | |
| Constant | 1.79 | 1.12 | 2.56 | 1.00 | .110 | 6.01 | .02 | .083 |
| Step 3 | | | | | | | | |
| Age | -0.06 | .02 | 7.67 | 1.00 | .006 | 0.94 | | |
| Socioeconomic status | 1.01 | .28 | 12.82 | 1.00 | .000 | 2.74 | | |
| Expected value | 0.08 | .05 | 2.03 | 1.00 | .154 | 1.08 | | |
| Goal intention | 1.05 | .46 | 5.29 | 1.00 | .021 | 2.86 | | |
| Constant | 1.68 | 1.15 | 2.12 | 1.00 | .145 | 5.34 | .04 | .019 |
| Step 4 | | | | | | | | |
| Age | -0.07 | .02 | 8.19 | 1.00 | .004 | 0.94 | | |
| Socioeconomic status | 0.91 | .29 | 9.76 | 1.00 | .002 | 2.49 | | |
| Expected value | 0.06 | .06 | 0.97 | 1.00 | .325 | 1.06 | | |
| Goal intention | 0.87 | .48 | 3.37 | 1.00 | .066 | 2.39 | | |
| Implementation intention | 1.23 | .49 | 6.32 | 1.00 | .012 | 3.41 | | |
| Constant | 1.48 | 1.20 | 1.51 | 1.00 | .219 | 4.40 | .04 | .011 |

The Wald statistic is the square of the ratio of *B* to its standard error *SE* and follows a χ^2 -distribution with 1 degree of freedom (*df*). *Exp(B)*, i.e., the antilogarithm of *B*, indicates that the odds for the probability of action initiation p_a (i.e., $p_a/[1-p_a]$) are, for example, 3.41 times higher with than without implementation intention.

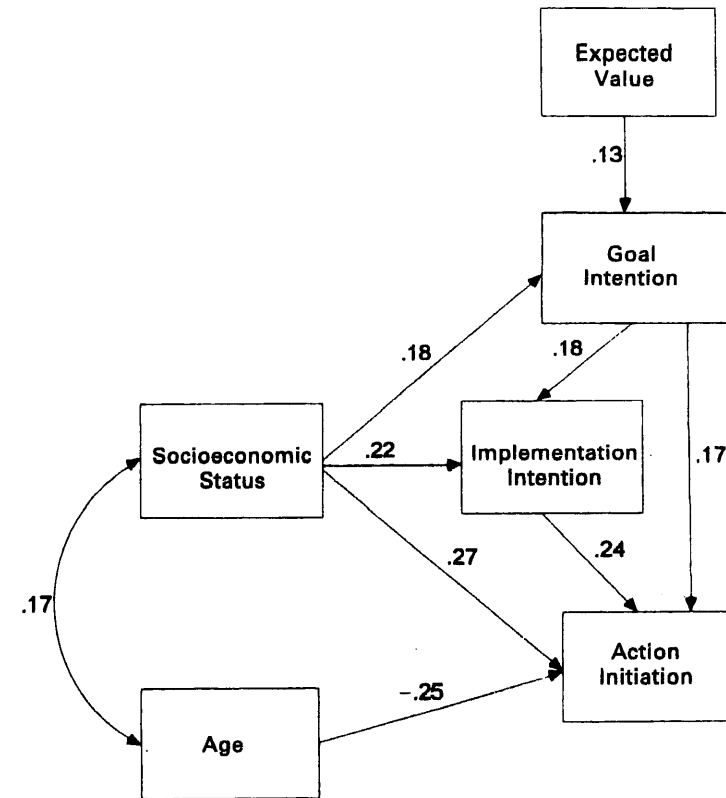


Figure 2. Path diagram of demographic and action phase variables. Path analysis was run with goal intention, implementation intention, and action initiation as dichotomized variables.

plementation intention significantly increases the portion of variance accounted for in action initiation by 2%, from 15% to 17% (by adding expected value to the control variables), by 4% to 21% (by adding goal intention), and finally by 4% to 25% (by adding implementation intention).

The results of an ordinary least square path analysis with the variables of Table 2 (goal intention, implementation intention, and action initiation dichotomized) are presented in Figure 2. The sequence of variables displayed in Figure 2 follows the theoretical assumptions of the action phase model. Socioeconomic status has a direct positive influence on action initiation ($\beta = .27$; $p = .000$)⁷ and an indirect positive influence through the paths to goal intention ($\beta = .18$, $p = .017$) and implementation intention ($\beta = .22$, $p = .005$). The only

⁷Because the direction of the effects had been predicted, we are reporting one-tailed significance tests. Indicating exact probabilities for type I errors is preferable to the traditional significance levels and is increasingly becoming accepted practice (American Psychological Association, 2001, pp. 24–25).

significant path from age goes to action initiation ($\beta = -.25, p = .000$). Younger people more often initiate activities in continuing education. Expected value exerts some direct influence on goal intention ($\beta = .13, p = .061$). Goal intention has a direct influence on action initiation ($\beta = .17, p = .016$) and an indirect influence mediated by the path of goal intention on implementation intention ($\beta = .18, p = .017$) and by the path of implementation intention on action initiation ($\beta = .24, p = .001$). This result underlines the importance of self-regulatory processes (i.e., forming implementation intentions) for successful action initiation beyond goal setting. Overall, 25% of the variance of action initiation is explained by the set of independent variables.

DISCUSSION

In the present study we successfully applied the model of action phases (Gollwitzer, 1990; Heckhausen, 1991) to a complex everyday goal such as the intention to continue one's education. The results of the present longitudinal field study corroborate the basic propositions of the action phase model with respect to goal setting and goal implementation processes.

First, we demonstrated that participants who had formed a goal intention perceived the goal's desirability differently from participants who had not yet formed a goal intention. As predicted, predecisional participants in the deliberative mindset were more balanced with respect to pros and cons of further education than postdecisional participants in the implemental mindset who showed a stronger bias toward positive aspects of continuing their education. The impartial analysis of a goal's desirability in the deliberative mindset favours the effective choice of goals (goal setting), whereas the implemental mindset's focusing on the positive aspects of the goal at hand supports effective goal implementation by creating an unequivocal action orientation that hinders calling the goal into question again. Alternatively, one might argue that the prevalence of advantages in the postdecisional phase is not so much an effect as a cause for forming a goal intention. Even though we cannot rule out this possibility on the basis of our data, these differences in the cognitive orientation of pre- vs. postdecisional participants is in line with earlier mindset research (see Gollwitzer & Bayer, 1999). Indeed, it seems unlikely that people would form a goal intention if the deliberation of pros and cons did not come up with some positive balance. Even if forming a goal intention is in part facilitated when the positive aspects of the goal outweigh its negative aspects, it is a fact well established by experimental research that after a person has decided to pursue a goal, its positive aspects are experienced as being more frequent and more important than its negative aspects. Since the experimental literature on mindsets (e.g., Taylor & Gollwitzer, 1995, Study 3) and research in the tradition of dissonance theory on postdecisional dissonance (e.g., Festinger, 1957) clearly supports the postulated

causal path from goal intention to a positivity bias, we are prepared to take it as supporting our hypothesis if we find that people focus more strongly on the advantages after having formed a goal intention than people who have not yet formed a goal intention.

Second, we have empirical evidence for the assumption that expected value, goal intention, and implementation intention, respectively, make a unique contribution to the prediction of action initiation. The amount of variance explained in action initiation increased by 4% when taking into consideration not only expected value but also goal intention, and by another 4% when implementation intention was included. The latter result underscores that goal intention and implementation intention are conceptually distinguishable constructs. The causal model presented in Figure 2 is based on theory and fits the data better than any other sequence of independent variables as analyses not presented here in detail have shown. Moreover, since neither goal intention nor implementation intention were correlated with personality measures of action vs. state orientation (Kuhl, 1984, 1992) and generalized self-efficacy (Bandura, 1977), we can be sure that the relationships between goal intention, implementation intention, and action initiation are not caused by a common variance with personality dispositions. Because we controlled for influence of age and socioeconomic status, it can also be ruled out that these variables produced the observed effects.

Socioeconomic status may affect the action phase variables goal intention, implementation intention, and action initiation in two principal ways. First, it is very likely that continuing education is more familiar to people with higher socioeconomic status (commonly connected also with more years of schooling). Consequently, they are better prepared for taking advantage of the opportunities of continuing education. Second, in our industrial society, characterized by an accelerating technological development with its increasing complexity of work, opportunities for acquiring new knowledge and skills are mostly and more extensively offered to and used by people with higher socioeconomic ranking (Centre for Educational Research and Innovation, 2002, p. 248). That older participants start skill improvement training less often than younger ones, but do not differ in their goal and implementation intentions, could indicate that they encounter fewer opportunities and less encouragement.

The results are remarkable with regard to the rather long time-frame in which the data were collected as well as with regard to the heterogeneity of the sample used. Action initiation was measured 2 years after the interviews on the antecedent conditions (i.e., expected value, goal intention, implementation intention). Thus, the idea that participants just tried to be consistent with previously expressed intentions when reporting on their educational activities can be excluded. Moreover, the first years after the reunification of Germany were times of dramatic change in all areas of public and private life in East

Germany. This makes it all the more remarkable that expected value, goal intention, and implementation intention were predictive of goal-directed behaviour initiated later.

Participants for the study were drawn from a representative sample of the city of Dresden. Obviously, the action phase model's assumptions can be generalized from the usual student samples to a more representative sample covering a great variety of occupations and social background variables.

The relationships examined here have received a great deal of attention under various theories (e.g., dissonance theory, Festinger, 1957; theory of reasoned action, Fishbein & Ajzen, 1975; theory of planned behaviour, Ajzen, 1985; action regulation theory, Hacker, 1986; action control theory, Kuhl, 1984, 1992; goal-setting theory, Locke & Latham, 1990; valence-instrumentality-expectancy theory, Vroom, 1964). However, unlike these theories, the action phase model takes a comprehensive view on goal striving while at the same time considering goal setting and goal implementation processes with their specific cognitive and self-regulatory characteristics (cf. Ajzen, 2001, p. 47). Having shown that the postulated interplay between variables related to goal setting and goal implementation holds even in a complex applied context lends further evidence to the validity of the theoretical propositions of the action phase model. Although we do not contend that other expectancy-value models like those of reasoned action or planned behaviour would be less viable in predicting the realization of intentions, we see an advantage in the theoretical background of the action phase model. It goes beyond prediction by directing experimental research on the mediating processes (Brandstätter et al., 2001; Gollwitzer, 1999). Elaborating and testing the hypotheses of our study is based on this kind of experimental research, even if the field setting and interview approach is better suited for prediction than for process analysis.

In addition to their theoretical significance, our findings have several interesting implications for applied areas. The postulated sequence of action phases offers a rich perspective for developing practical interventions to promote successful goal striving. For example, in the realm of continuing education, if one wants to encourage people to continue their education they do not only need to be informed about potential courses but also to be provided with training in forming goal intentions and implementation intentions. Most importantly, people who have positive attitudes towards further education but are still undecided should be encouraged to form a binding goal intention. This might be achieved by stressing the advantages of further education and the disadvantages of refraining from getting further education (Brandstätter, 2003). Beyond that, people should be instructed to form implementation intentions with respect to a concrete situation when they intend to initiate goal-directed actions. As experimental research shows, even short instructions to form implementation intentions were successfully adopted by the participants (for a review, Gollwitzer, 1999).

LIMITATIONS AND FUTURE DIRECTIONS

A number of limitations of this study should be acknowledged. First, because we were primarily concerned with testing the core assumptions of the action phase model, we focused on global assessments of expected value, goal intention, and implementation intention as predictors. Yet, in further studies, it would be worthwhile to examine the antecedents of the valence and feasibility of continuing one's education. For example, one might speculate that individual difference variables such as motives (e.g., achievement motive, McClelland, 1985), work-related values (Holland, 1997; cf. Spieß & Wittmann, 1999), and personal work goals (Maier & Brunstein, 2001) might determine the attractiveness of participating in vocational retraining. In the same vein, situation-specific determinants (e.g., distance to the college, attitude of important others towards continuing education) might influence the valence of continuing one's education as well.

Second, although our study provides preliminary evidence for the postulated sequence of expected value, goal intentions, and implementation intentions as predictors of action initiation, the correlational nature of the data do not allow for definite conclusions about the direction of causality. It is the first time that the action phase model has been tested in a field setting. Obviously, inferences about antecedent conditions and consequences are less convincing whenever the alleged causal variables (expected value, goal intention, and implementation intention) are not experimentally manipulated, but assessed by interview or questionnaire. As already mentioned, we cannot completely rule out the possibilities that the preponderance of positive expected values with people who have formed a goal intention (compared to those who have not) is not an effect, but at least in part also a cause, of goal intentions. Moreover, it is quite possible that goal intention, though generally preceding implementation intention, is strengthened and made more explicit after and because of having elaborated on an implementation intention. There might also be some other third variables beyond those assessed that could have affected both the antecedent conditions of action initiation and action initiation itself. Finally, it cannot be completely ruled out that the answers to the goal intention question (on a graphic rating scale anchored in the verbal labels "I am thinking of doing so"—"I am determined to do so"—"I have already started to do so") influenced the interviewers' interpretation and coding of the answers to the implementation intention question.

A third limitation of the present study is that it was solely based on respondents' self-reports. Research on the motivational determinants of continuing one's education might substantially benefit from multimethod approaches, including observational and experimental methods. In future studies one might collect more objective data, for example, asking participants to show a confirmation of enrolment in a training programme or their notes taken in the

courses. Also, the use of diary studies might be a promising avenue of approach to illuminate how expected value, goal intention, and implementation intention affect participants' engagement in continuing their education over time.

Finally, in the sixth wave of the longitudinal study we enquired solely whether participants had begun a vocational retraining, and we have no data on whether they have finished it or have in fact broken it off. Action initiation is one of the crucial transition points on the way to goal accomplishment. There is evidence that, once goal pursuit is under way, disruptions caused by difficulties or barriers do not lead to retreat but to resumption of goal pursuit (Lewin, 1926; Mahler, 1933). Nevertheless, in future studies one might want to collect more detailed data on the degree of goal realization and the performance of participants in a vocational retraining course.

In conclusion, the purpose of our research was to link the model of action phases to the study of continuing education in East Germany after the collapse of communism in 1990. The study yielded encouraging results, suggesting that expected value, goal intention, and implementation intention have a conjoint influence on initiating vocational retraining. We therefore regard the conceptual distinctions drawn in the action phase model between goal setting and goal implementation as being very important ones to apply to the field of continuing education. It helps to shed light on basic motivational mechanisms involved in pursuing an important goal such as advancing one's professional career.

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