Training and motivation: The function of implementation intentions, goal orientation and errors for performance
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Introduction

Training and Motivation

Training and motivation are the two topics which bring together the three studies presented in this dissertation. In a training setting, motivation to learn can express itself in a number of ways (Quiñones, 1997). Motivation can affect whether or not an individual decides to attend a training session in the first place (Maurer & Tarulli, 1994). It can also influence the amount of effort exerted during the training session and therefore influence training outcomes (Fisher & Ford, 1998). The motivation to learn can also arise from contextual factors of the training environment or the training design itself (Mathieu, Tannenbaum, & Salas, 1992).

In this book the topic of training appears first in terms of participants' intentions to participate in a vocational training program. Second, we report a training experiment analyzing different training methods. We deal with motivation at first with respect to the action phases model (Gollwitzer, 1990; Heckhausen, 1989, 1991), which integrates motivational and volitional aspects of goal development and goal pursuit into one theoretical framework. Second, we analyze the concept of goal orientation with regard to its factor structure and its relation to other motivational concepts. We also test the influence of goal orientation on training and transfer performance.

The various aspects which arise from the presented studies, namely, goal intentions and implementation intentions, goal realization, different motivational orientations (learning-, prove- and avoidance goal orientation), training and development of competence, and errors and feedback, can be integrated into a process-oriented perspective towards behavior: the action theory (Frese & Zapf, 1994; Hacker, 1985, 1986).
**Action Theory**

Action theory is a cognitive theory centered around goals as the starting point for the action process and sees cognition as action-regulating (Frese & Zapf, 1994). The action process consists of the following steps: first, the *development of a goal*, in which a goal starts out as being a wish and is then translated into a want. Action-guiding goals arise when these wants are translated into intentions (Heckhausen & Kuhl, 1985). Second is the *orientation* towards something new or within a system. This includes collecting information, developing good analogies and using abstract schemata. The third step is *plan generation*, which is comprised of everything from ideas on how to proceed or a list of sub-goals to a sophisticated plan or an action program. Fourth, a *decision* must be made as to which goal or plan should be pursued. Fifth, the planned action one has decided on must be put into action, *execution*, and this execution process must be *monitored*. Sixth, at the "end" of an action *feedback* must be processed. Feedback is a relational concept since it refers to the goal one had in mind while acting. Feedback is therefore information about how far one has progressed toward the goal.

**Goal Orientation**

We have used this process model (action theory) while considering relevant factors in training that need to be researched in training. With regard to goals, a relevant question in recent research on training is whether different goals influence the training process and training outcomes (Baldwin & Ford, 1988). Training analysts in the past have too often focused in their pretests on measuring the requisite KSAs (knowledge, skills and abilities). These baseline measures of KSAs were then compared to the KSA level reached after training in order to estimate training effectiveness. Training analysts have neglected to include measures of the motivational antecedents of trainees (Goldstein, 1992). Now the motivation or readiness to learn has been identified as an important precondition for training success and deserves detailed analyses (Baldwin & Ford, 1988; Kanfer & Ackerman, 1989; Noe & Schmitt, 1986). Recent research in the area of training with regard to motivation has begun to look at trainees' goal orientation (Brown & Kozlowski, 1997; Cannon-Bowers, Rhodenizer, Salas, & Bowers, 1998; Colquitt & Simmering, 1998; Fisher & Ford, 1998; Ford, Smith, Weissbein, Gully, &
Salas, 1998; Stevens & Gist, 1997). The interesting question then emerges as to which role trainees’ goals or goal orientations play in training effectiveness and trainees’ behavior during training.

As action theory implies, goals are the starting point for actions. Therefore, it makes sense to look in detail at different goals trainees can pursue when placed in a learning environment. Different goals, for example learning goals or performance goals, will directly effect trainees’ interest in training and their behavior during a training situation; consequently, different goals will also indirectly effect training outcomes.

Action theory assumes further that action-guiding goals emerge when wishes are translated into wants and when these wants are transformed into intentions (Frese & Zapf, 1994). If one knows that goals or intentions are guiding actions, one may also want to know how they set the intended goal directed behavior in motion.

Goal Intentions and Implementation Intentions

The action phases model by Gollwitzer (1990) and Heckhausen (1989, 1991) shares the same perspective towards goal setting in the action process. It is assumed that goals are derived from wishes, which must be evaluated with regard to their valence \( x \) expectancy or desirability and feasibility, respectively. Only those wishes which are evaluated as highly desirable and feasible become a goal. The action phases model goes one step further and extends these motivational considerations to include volitional considerations within the same theoretical framework. It predicts that goals are more often put into action if these goals are combined with action plans about the when, where, and how to act in pursuit of a goal (implementation intentions). The benefits of planning in the way of these implementation intention are assumed to operate via automatic processes. When the person encounters the anticipated opportunity, the intended goal-directed action is initiated immediately, efficiently, and without conscious intent (Gollwitzer, 1993).
Another important question in training research refers to the design of training methods in order to maximize learning and transfer performance (Baldwin & Ford, 1988; Gist, 1997; Smith, Ford, & Kozlowski, 1997). Considerations about training-design must include, among other details, how to deal with errors and how to provide trainees with feedback. Action theory offers a specific perspective on these issues.

**Feedback**

Feedback holds an important position within the action process by providing information about how far one has progressed toward the goal. One cannot continue within the action process due to a lack of action regulation without feedback processing. Therefore, feedback plays an important role in training. Recent research in the area of training with regard to feedback revealed, for example, that people preferred immediate over delayed feedback in training (Reid & Parsons, 1996); that feedback increased self-efficacy and performance during training (Karl, O’Leary Kelly, & Martocchio, 1993), and that positive feedback had a positive effect on test performance and affective outcomes of training (Martocchio & Dulebohn, 1994; see also Martocchio & Webster, 1994).

**Errors**

Errors can be perceived as feedback information. Errors present the opposite of a correct action. Errors in a learning environment can show what still needs to be learnt and that the current status of knowledge is not yet appropriate. Therefore, one can speak of the positive function of errors in learning. This positive function of errors represents a main characteristic of the error management approach (Frese, 1991; Frese & Altmann, 1989). An error management approach differentiates between the error per se and the negative error consequences. Only the negative error consequences should be avoided by effective error handling strategies. Effective error handling strategies imply fast error detection, error explanation and complete error recovery. The error training approach has been developed from this theoretical framework (Dormann & Frese, 1994; Frese, Brodbeck, Heinbokel, Mooser, Schleiffenbaum, & Thiemann, 1991). Contrary to this approach, most training programs still do not integrate a positive attitude towards errors.
in the learning process, but rather focus on error prevention instead of error management. The fact that errors can never be avoided completely represents the natural limits of any error prevention program.

As described above, action theory can integrate very different aspects such as goals and intentions, feedback and errors - which are related to training and motivation – into one theoretical framework. The three studies presented in this book were conducted upon this theoretical background.

Chapter 2 describes a longitudinal approach testing the action phases model (Gollwitzer, 1990; Heckhausen, 1989, 1991) in an applied setting. The intention to continue one’s education by participating in a training program was the goal we were interested in.

Chapter 3 deals with the concept of goal orientation (Dweck & Leggett, 1988). Goal orientation is a motivational concept which structures the way individuals perceive learning and achievement situations. We tested its dimensional structure and its relationship with the related concepts of achievement motivation, fear of failure and hope for success.

Chapter 4 describes an extensive training experiment which analyzed the effectiveness of different training methods. The focus of this experiment is the method of error training (Frese, 1991, 1995) and the importance of error heuristics. Here motivation appears again in terms of participants’ goal orientation, both as antecedent of behavior in a learning context and as a consequence of the experiences during training.

A final note to the reader: Although the three studies are related through the theoretical framework of the action theory, each study has a separate focus and can stand alone. That is, each chapter can be read independently.
Chapter 1

Action theory offers a specific perspective on these issues. Feedback provides information about how one has performed in the action process due to a lack of action regulation without feedback processing. The reliability of this feedback depends on the quality of the action process itself. In the context of training, its quality and performance during training depend on whether feedback had a positive effect on test performance and adherence.