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Incentives and flow experience in learning settings and the moderating role of individual differences

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1. Introduction

Motivation psychology aims to understand why people behave they way they do. Various approaches to the conceptualization of the reasons explaining the variability of human behavior can be traced (see Heckhausen & Heckhausen, 2008). In this chapter we focus on the role of incentives in human strivings. Following classical conceptualizations, we define incentives as affective states people expect to experience after or while performing a certain behavior. In this sense incentives are anticipated affects that motivate goal-directed behavior (see Beckmann & Heckhausen, 2008; Schmalt, 1996). In a learning context an incentive may be, for example, the anticipated pride (affective goal state) regarding a good performance in an exam. This anticipation is likely to lead to revising for this exam (goal-directed behavior). Depending on the positive (e.g., pride after passing the exam) or negative (e.g., disappointment after failing the exam) value of the anticipated affective state, people develop approach or avoidance tendencies towards the exam situation.

Interestingly, the incentive concept has been used to explain motivation has its origin in experiments with animals. Hull (1943) studied the food-searching behaviour of rats using variables of the organism itself and argued that behaviour can be predicted by the rats' drive (aroused hunger drive) and their habits (number of previous food-searching actions). Later, he improved the model to predict motivated behaviour of rats by additionally considering the quality of the incentive (amount of food). The rats ran the fastest when their drive and habit were strong and when additionally the incentive was attractive. Also for human beings the necessity of incentives to explain behavior is unquestioned, in both classical (e.g. Atkinson, 1957) as well as modern approaches (Beckmann & Heckhausen, 2008; McClelland, 1985; Schneider & Schmalt, 2000).

At first sight, motivated behavior such as the preparation for an exam may seem to be a holistic action unit. Because theoretically the motivational process consists of different components such as incentives, motives, needs and goals, we first need to introduce and differentiate the incentive concept from related concepts.

We will explore the nature of incentives in more depth and will then propose an approach that distinguishes activity-related from purpose-related incentives. Then, we will have a closer look at the flow experience (Csikszentmihalyi, 1990) that can be seen as a specific activity-related incentive. We will introduce the conditions that lead to flow experience and report on moderators of the relationship between flow experience and the challenge-skill balance, which is the most important condition for flow experience. We will conclude by discussing theoretical considerations and empirical results regarding practical implications in learning settings.

With respect to the topic of this volume, we start with a global perspective on the functioning of incentives and proceed with a more local one. Our approach to incentives is rooted in motivation psychology, which aims at finding general mechanisms that predict human behavior. In this respect, incentives are constructs that explain individual behavior regardless of gender, age, culture, or other individual dispositional characteristics. This represents a global approach to incentives in the sense that what is important to understand is the mechanism through which incentives influence behavior. A different approach in the study of incentives is the one that focuses on how individual differences and situational characteristics influence incentives and, particularly, flow experience. An individual difference approach emphasizes the persons' motive dispositions (Atkinson, 1957; McClelland, 1985; Schneider & Schmalt, 2000). Motive dispositions are defined as individual

preferences for particular local conditions and situations (Schneider & Schmalt, 2000). Following such a local perspective, one and the same situation may evoke different motivational tendencies in different individuals. For example, an upcoming examination may evoke fear in individuals with a high fear-of-failure motive. Such individuals may therefore avoid examinations. In individuals with a high hope-of-success motive the same examination will evoke confidence and approach behavior. We argue that there are individual differences in motive dispositions, which are related to flow experience. We argue that not only global mechanisms (e.g., challenge-skill balance), but also local conditions, such as the interaction of situations with motive dispositions (e.g., achievement motive) must be taken into account in order to predict the flow experience.

2. Incentives

As already mentioned, incentives are anticipated affective goal states that stimulate goal-directed behavior in order to reach this valued affective state (Beckmann & Heckhausen, 2008; Schmalt, 1996); for example, a person is doing something just for feeling good, or for feeling good while working for his/her end goal, or for feeling good after achieving his/her end goal (i.e., the desired performance outcome). One and the same situation can activate different anticipated affective goal states, depending on personal characteristics. Incentives are conceptually related to the motivational concepts of motive, need, and goal, but they also show some critical differences.

2.1. The differentiation between incentives, motives, needs, and goals

One characteristic that differs between individuals is one's motive (McClelland, 1985; Schneider & Schmalt, 2000). Motives are defined as a preference or recurrent concern for special incentives (Heckhausen & Heckausen, 2008; McClelland, 1985; Schneider & Schmalt, 2000). For example, for individuals with a high achievement motive the mere anticipation of feeling proud after a sport contest will elicit goal-directed behaviour, such as practising (McClelland, Atkinson, Clark, & Lowell, 1953). In contrast, an individual with a low achievement motive will be less attracted to the same achievement situation and will not show goal-directed behavior. Therefore, a situation offers incentives to the extent there is a general preference of individuals for such a situation. Similarly, individuals high in affiliation or power motive may anticipate affective goal states such as the feeling of belonging or the feeling of being strong and influential in situations like a party or an influential political position. On the other hand, individuals low in these motives may not find any benefit in the same situations (for affiliation see McAdams, Healy, & Krause, 1984; Sokolowski & Heckhausen, 2008; for power see McClelland, 1975; Schultheiss, 2006). Thus, according to McClelland (1985, pp. 180-181) incentives emerge from the interaction of the person (motive) with the environment (situational stimuli). Hence, motives and incentives describe different aspects of the motivational process. Incentives are the apparent reason for action and they emerge from the interplay of situational stimuli and a persons' motive.

The concept need is often used interchangeably with motive and is, therefore, also assumed to vary among individuals. Sometimes the term need describes the fundamental and evolution-based desideratum which is innate to every human being.

The latter perspective is taken in the Self-Determination Theory (SDT) of Deci and Ryan (1985). The authors assume that the need for autonomy (see also DeCharms, 1968), the need for competence (see also White, 1959) and the need for social relatedness are innate human needs and that basic need satisfaction leads to well-being whereas frustration of basic needs results in unhappiness (Deci & Ryan, 1985; Ryan & Deci, 2000). According to the SDT, the basic needs can be satisfied in various situations provided they offer the opportunity to feel autonomous, competent, or socially related. The incentives for the person are derived from the interaction of the three basic needs with situational or personal variables. For example, the incentive to feel proud in sports is based on the human need for competence and on the individual interest for sports. The reason why people get involved in sport activities or not lies in the expected feeling of being proud or not being proud in this case.

Most theorists conceptualize goals as cognitive representations of desired future states; for example, there are personal goals (Brunstein, Schultheiss, & Grässmann, 1998) or achievement goals (Dweck, 1996; Elliot, 2005). Goals are manifestations of motives or "individualized instantiations" of higher-order motives (Emmons, 1989, p. 95). They are an intermediate step that links the abstract motive (e.g., achievement motive) with concrete behaviour (e.g., practicing for a sport contest) (Brunstein et al., 1998; Elliot & Thrash, 2001) and therewith contribute to motive satisfaction. One could argue that both incentives and goals are results of an interaction process between motives and situational stimuli. But it is important to note that both constructs capture different aspects of the motivational process. A goal is a desired end state that normally has various incentives. A student may strive for a good grade (goal) because s/he wants to achieve (motive) and because achievement will make him/her proud of him/herself, or because s/he needs it for job applications, or because s/he wants to avoid negative appraisal from his parents (incentives). These incentives are the reason why the person strives for this goal. The goal again can be seen as a means to reach the incentives.

2.2. Incentives in classic approaches to motivation

A classical approach to motivation is to consider motives and needs and to analyze their interplay with incentives. According to this classical approach incentives are at the core of the motivation process and the reason for action. Another approach stresses the role of expectancies in the motivation process (Bandura, 1997). Yet, another approach considers incentives as well as expectancies (e.g., expectancy-value models; see Eccles & Wigfield, 2002). In this section, we introduce the Risk Taking Model (Atkinson, 1957) and the Expanded Cognitive Model of Motivation (Rheinberg, 2008). The Risk Taking Model is influential in research on achievement motivation (see Brunstein & Heckhausen, 2008) and will be used later on when we present and discuss findings from research on flow experience. We also refer to the Expanded Cognitive Model of Motivation because it distinguishes two types of incentives that are located at different points within the motivational process.

Atkinson's (1957) Risk Taking Model is making predictions about the choice of task difficulty. According to the model the choice depends on incentives related to the task achievement and on the expectancy that the task can be achieved. Incentives and expectancies are interrelated in the achievement context. For an easy task in which achievement is very probable (high expectancy) the incentive is low. There is less reason for being proud when having achieved a task that everybody else would have achieved easily. Vice versa, for a difficult task the incentive is high, but the

probability to manage the task is low (low expectancies). By considering expectancies and incentives simultaneously (expectancy x value), the model predicts that very easy and very difficult tasks will not be chosen. In contrast, for moderately challenging tasks both the probability of success as well as the incentive are on a moderately high level, which will make the choice of such tasks more likely (see Brunstein & Heckhausen, 2008). According to this, moderately challenging tasks evoke the highest motivation to work on them. This assumption is analogous to the flow model by Csikzentmihalyi (1990) and fits with the idea that students should be confronted with challenging tasks in order to be motivated.

The Risk Taking Model further postulates that the choice of the task also depends on the person's achievement motive. For an individual with a high achievement motive the incentive of success is strong (feeling very proud) and this person will therefore be highly motivated by challenging tasks. Because success and failure are equally probable, tasks of moderate difficulty are suitable to determine one's level of competence. People with a high achievement motive typically find it attractive to compare themselves with standards of excellence and seek feedback about their performance. Apart from the approach form of the achievement motive (hope-of-success) Atkinson claimed that people differ in their fear-of-failure. Some people feel especially ashamed when failing. They fear to fail a standard of excellence and thus try to avoid feedback about their anticipated incompetence. Therefore, they feel uncomfortable with moderately challenging tasks and prefer easy or difficult tasks for which failure is either very unlikely (easy tasks) or can be attributed to external reasons (difficult tasks). With these considerations, Atkinson (1957) incorporated individual differences in the achievement motive taking an expectancy-value approach.

The Expanded Cognitive Model of Motivation (Heckhausen & Rheinberg, 1980) also contains expectancy and incentive components. The original model captured the motivational aspects of a whole behavior episode (see Figure 1; without dotted lines).

Insert Figure 1 about here

The model assumes that an individual has various action alternatives in any given situation. Every action will lead to an outcome, which subsequently leads to several consequences. Some of these consequences function as incentives. As noted above, a goal or a performance outcome can have several incentives. The incentives that lie in the consequences of an action are called purpose-related incentives. Purpose-related incentives can be very diverse. Examples of incentives in the case someone is preparing for an exam in school range from self-evaluative incentives (e.g., being proud, feeling good if someone understands things and proves it), to being approved by the teacher, or to getting money from parents (for details see Rheinberg, 1989; see also Eccles & Wigfield, 2002).

Apart from incentives, three different types of expectancies are influential at several steps in the Extended Cognitive Model. The situation-outcome (S-O) expectancy accounts for the possibility that an outcome can ensue without a person's active engagement. For example, a student may expect that an exam will be so easy that he does not have to study. With the action-outcome (A-O) expectancy the model captures the subjective belief about how likely it is that an action will be taken and will influence the outcome. High action-outcome expectancies enhance an action

tendency. The separation into outcomes and consequences, and with this the outcome-consequence (O-C) expectancy, is based on a basic assumption of the Valence-Instrumentality-Expectancy model (VIE; Vroom, 1964). Here it is assumed that an action result, as for example a good grade in an exam, may not necessarily lead to the desired consequences. The model captures the fact that the relationship between outcomes and consequences is not always certain and therefore the expectancy that the outcomes will lead to the desired consequences varies. For example, the anticipated compliment of the parents may not come or the career chances may not be enhanced as the person might have expected. High outcome-consequence expectancies enhance an action tendency. But if high action-outcome and outcome-consequence expectancies come together with low situation-outcome expectancies, an action will not be initiated unless the incentives are highly valuable.

The Expanded Cognitive Model of Motivation and the Risk Taking Model have in common that they conceptualize incentives as being associated with the outcome of an activity. According to these models, the source of incentives lies in the result of the action.

2.3. Activity-related incentives

Rheinberg (1989, 2008) and Csikszentmihalyi (1990) stated that not every behavior can be explained by incentives that lie in the result of an action. For a broad variety of behaviors, such as painting pictures, doing sports, or learning without external rewards, the result of the action often is irrelevant. Thus, the Extended Cognitive Model of Motivation (Heckhausen & Rheinberg, 1980) could predict whether or not students prepare for an examination (Engeser, Rheinberg, Vollmeyer, & Bischoff, 2005; Rheinberg, 1989), but failed to correctly predict the learning behavior of some individuals. According to Rheinberg (1989), the reason for this lies in the fact that the model does not capture the important aspect that activities themselves can be the source of valued experiences: people learn because they like the learning activity; for example, students get absorbed by writing a computer program, musicians make music because they enjoy getting totally involved in the music, athletes do sports because they enjoy the movement, and children play because of the fun they have during the game. A variety of other academic or leisure activities such as reading, writing, chatting and singing are done irrespective of the consequences. Some activities such as risk sports or spending time and money on skiing or diving are performed although the consequences even have negative incentives. These considerations prompted Rheinberg (1989, 2008) to suggest a revision of the Extended Cognitive Model by adding activity-related incentives as a second source of incentives. As represented by the dotted lines in Figure 1, the activity-related incentives are associated with the activity itself. Considering both activity-related as well as purpose-related incentives enhances the prediction of learning behavior (preparation for an exam, e.g., Rheinberg, 1989), given that both are essential to understand motivation.

The differentiation into activity- and purpose-related incentives may remind of the differentiation into intrinsic and extrinsic motivation. Following a suggestion by Rheinberg (2008) we used the terms activity- and purpose-related incentives because in **the literature** the terms intrinsic and extrinsic are **often** used inconsistently. The term intrinsic motivation has been used to describe the need for self-determination and competence (Deci & Ryan, 1980, 1985), but was also used in the sense of a

correspondence between means and ends (Heckhausen, 1989; Shah & Kruglanski, 2000). Individuals were also described as intrinsically motivated "when their behavior is motivated by the actual anticipated, or sought experience of interest" (Sansone & Smith, 2000, p. 343). By using the term "activity-related incentive" we refer to an early conceptualization of intrinsic motivation in the sense that the motivation lies "in the activity itself". According to Bühler (1922) and Groos (1899) incentives in the pursuit of an activity are intrinsic, whereas incentives that occur only when the activity has been completed are extrinsic.

Besides their different location in the behavior episode, activity- and purpose-related incentives differ regarding another aspect. As illustrated in Figure 1, the three different expectancy types can easily interfere with behavior that is driven by purpose-related incentives. Thus, if the situation-outcome expectancy is high or if either the action-outcome or the outcome-consequence expectancy is low, purpose-related incentives lose their motivating power. Activity-related incentives, however, are much more straightforward, because they do not require special expectancies. Thus, behavior that is driven by activity-related incentives is less easy to be disturbed and more robust.

Integrating activity- and purpose-related incentives in one model further has the advantage that both of them can be considered simultaneously. This is of special interest when the two types of incentives are of different direction, that is, one is positive and the other negative. In pedagogical settings, students often have purpose-related incentives to engage in learning activities as, for example, to get a good grade in an upcoming exam. But although most students highly desire a good grade they often show different learning behaviors. This is probably due to differences in activity-related incentives. If the learning activity is associated with fun and interest (positive activity-related incentive) then students will be involved in it with pleasure. However, if the learning activity is a boring or even aversive experience (negative activity-related incentive), students will not get involved or engaged with the desired learning activity. Finally, if a student has strong activity-related incentives and "loses" himself in the learning material without considering the action results, s/he might fail to prepare target-oriented contents for the exam.

3. Flow experience

Rheinberg (1993, 2008) interviewed motor cyclists, windsurfers and musicians and described incentive profiles of these different activities. Apart from some common activity-related incentives of all activities, such as feeling physically fit or feeling strong and leaving worries behind, Rheinberg (1993, 2008) identified specific incentives for different activities. For example, playing music was associated with being creative and expressing fantasy, whereas windsurfing was characterized by the incentive of being alone and fighting with nature. Unlike Rheinberg, Csikszentmihalyi (1975) mainly focused on common characteristics of activities which are done for their own sake. He found that such activities share a positive and enjoyable subjective experience quality that is mainly characterized by an intense experiential involvement in moment-to-moment activity. Because this involvement was described as if a current carries a person along effortlessly, Csikszentmihalyi (1975) called this phenomenon "flow experience". It is as "[…] a subjective state that people report when they are completely involved in something to the point of forgetting time, fatigue, and everything else but the activity itself" (Csikszentmihalyi

& Rathunde, 1992, p. 59). Besides experiential involvement, flow experience has additional characteristics (Csikszentmihalyi, 1975; see also Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005): The person is absolutely concentrated on the activity (concentration on the task at hand) and therefore everything else in the environment and all self-reflective processes are barred from consciousness. The separation between actor and action is faded and action and awareness seem to merge (action and awareness merge). When experiencing flow, individuals feel that they can control the action perfectly (sense of control). No doubts or anxiety about losing control intrudes into awareness. During flow experience time seems to pass faster (altered sense of time).

It is important to note that flow experience is a multifaceted phenomenon including the multiple characteristics described above, and that it is associated with a positive affective experience. This notion partly overlaps with research by Pekrun (2000, 2006) who addressed the role of affective experience qualities in achievement emotions. In line with Rheinberg's (1989) activity- and purpose-related incentives, Pekrun (2000, 2006) distinguished between positive and negative emotions experienced while studying (e.g., enjoyment or frustration) and outcome-related emotions (e.g., hope, pride in case of success, as well as shame and anger in case of failure). Stressing the similarities of both approaches one could say that the achievement emotions in Pekrun's model are anticipated before an action is initiated. Thus, achievement emotions can become the reason for goal-directed behaviour (e.g., learning because the activity or its consequences promise to be associated with enjoyment or pride). In this case, they are like incentives according to the classical definition of incentives as anticipated affects (Beckmann & Heckhausen, 2008; Schmalt, 1996) and therewith are also in accordance with Rheinberg's (1989, 2008) concept of activity- and purpose-related incentives. In case achievement emotions occur without being anticipated and therefore are not the main reason for the initiation of the goal-directed behavior, they might be an accompaniment of a complex learning process while being conceptually different from the incentive concept.

A further research domain that overlaps with research on flow experience is the analyses of task involvement and of its effects on learning activities (Harackiewicz & Sansone 1991). Task involvement is defined as "[…] the degree to which an individual concentrates on or becomes cognitively immersed in an activity" (Elliot & Harackiewicz, 1996, p. 463) and was found to be an important condition of intrinsic motivation (Harackiewicz & Sansone, 1991). According to this definition, task involvement highlights a phenomenological relation to the intrinsically rewarding experiential involvement which is so characteristic of flow experience (Csikszentmihalyi et al., 2005). Flow experience also shares characteristics with some conceptualizations of interest. For example, Sansone and Smith (2000) described interest as a positively charged cognitive and affective experience that is characterized by a deep involvement into the activity. However, the educational theory of interest (Krapp, 1990) interpreted the purpose of interest-driven learning as an engagement with an object (e.g., being interested in biology). The motivated student is eager to learn more about that object. Because knowledge is the outcome of an activity, interest in this sense is strictly speaking extrinsic or purpose-related but not intrinsic or activity-related.

The research fields described above support the importance of emotions and task for learning activities. The unique feature of research on flow experience is that it comprises multiple characteristics such as cognitive phenomena (e.g., deep

involvement in an activity) as well as affective experience qualities. This multifaceted character of flow brings along a broad variety of consequences such as enhanced motivation, high performance and well-being. Thus, because of its positive affective quality, "the phenomenological experience of flow is a powerful motivating force" (Csikszentmihalyi et al., 2005, p. 602) working as a reward that enhances the likeliness to perform the rewarded activity again and the competences in performing the activity further improve. Additionally, some characteristics of flow experience, such as high concentration and high sense of control, directly foster performance. Several studies confirmed that flow experience predicts academic or work performance (Eisenberger, Jones, Stinglhamber, Shanock, & Randall, 2005; Engeser et al., 2005), learning behavior (Cskiszentmihalyi, Rathunde, & Whalen, 1993; Lee, 2005) and creativity (Perry, 1999; Sawyer, 1992). For example, Engeser et al. (2005) measured the flow experience of students at the beginning of a semester during a lesson of a foreign language course and an elementary statistics course and found that it predicted exam performance at the end of the semester, even when skill was controlled for. Also studies in the domain of sport revealed associations between flow experience and sports performance (Jackson & Roberts, 1992; Jackson, Thomas, Marsh, & Smethurst, 2001; Pates, Karageorghis, Freyer, & Maynard, 2003; Stein, Kimiecik, Daniels, & Jackson, 1995).

Apart from having a positive effect on motivation and performance, Moneta and Csikszentmihalyi (1996, p. 277) stated that flow is a psychological state "[…] in which the person feels simultaneously cognitively efficient, motivated and happy" and Csikszentmihalyi (1999; Csikszentmihalyi et al., 1993) added that repeated experience of flow has a pervasive incremental effect on positive mood. Empirical research confirmed that flow experience is associated with positive affect during a working day (Csikszentmihalyi & LeFevre, 1989) and in an academic learning context (Schüler, 2007). Given the importance of flow for motivation, performance and well-being, it is interesting to have a closer look at its antecedents.

3.1. The antecedents of flow experience

Antecedents of flow experience can be analyzed by either taking a "global" perspective by assuming that conditions are generally valid for all individuals or by taking a "local" perspective arguing that some conditions are valid for some individuals under some circumstances, but not for others. We will discuss both perspectives separately and will then outline how global and specific conditions can be considered simultaneously.

3.1.1. "Global" antecedents of flow experience

Three global conditions are of key importance for the flow experience (Csikszentmihalyi et al., 2005). The first is the clarity of the goal. At first sight this does not seem compatible with the conceptualization of flow as an activity-related incentive, because a goal is in essence a focus on the action result. But taking a closer look it seems plausible: Clear goals direct behavior and help to focus attention on goal-relevant behavior. This again facilitates getting absorbed by the action and focussing all energy and attention that otherwise would get lost. Goals structure the activity without being the only or the actual reason for performing the activity, and by this, they foster flow (Rheinberg, Manig, Kliegl, Engeser, & Vollmeyer, 2007). The second global condition is clear and immediate feedback. Feedback signals whether a

course of action is still on its way to the desired end-state or whether correction of the action is necessary. Without clear feedback the individual is not informed about how well s/he is progressing and doubts may arise about whether the present course of action should be maintained. The third global condition is the challenge-skill balance. Because it is assumed to be the most important condition for flow experience (Csikszentmihalyi, 1975, 1990), it is described in more detail in the following paragraph.

The challenge-skill balance is the subjective perception of a balance between the challenge of a task and the perceived own skills which can be used in order to cope with the challenge. Later, Csikszentmihalyi postulated that the challenge and the skill must both be on a high level to arouse flow experience (see quadrant model, Csikszentmihalyi & Csikszentmihalyi, 1991). If the challenge and the skills are balanced but low, this could result in boredom instead of flow experience. On the other hand, a challenge that is too high for a person's skills could arouse anxiety. If the skills exceed the demands of a task, people feel relaxed.

If there is a causal relation between the challenge-skill balance and flow experience, as Csikszentmihalyi expected, then variations of the challenge-skill balance must lead to variations in flow experience. This idea was the basis of an experimental study conducted by Rheinberg and Vollmeyer (2003). Undergraduate students were asked to play a computer game for which the level of difficulty could be easily manipulated. As expected, the authors found that flow was most likely experienced when the difficulty was at a level that participants perceived as a challenge-skill balance. At difficulty levels that were rated as too low or too high for their skills less flow was reported. This curvilinear trend indicates that the balance between the challenge and the skill indeed is a precondition for flow experience, whereas an imbalance is a predictor of low scores of flow experience.

Engeser and Rheinberg (2008) identified moderators that were important in the relationship between challenge-skill balance and flow experience. The authors hypothesized that it depends on aspects of the task, whether or not the challenge-skill balance leads to flow experience. They suggested instrumentality to be such a relevant aspect and argued that tasks have a high instrumentality when success or failure has important consequences (important purpose-related incentives). In this case individuals should experience flow when their skills exceed the challenge of the task. In other words, here individuals prefer an imbalance of the challenge and their skills. Tasks have a low instrumentality when their consequences are not important. With such tasks flow should best be experienced when a challenge-skill balance is given. To test this hypothesis, the authors asked for the perceived instrumentality in three different activities: learning for a final examination in a statistics course, playing a computer game, and learning French in a non obligatory course. The results confirmed the hypothesis. When the instrumentality of task was perceived to be high, participants experienced the highest amount of flow when their skills exceeded task difficulty. When the perceived instrumentality was low, flow experience was most likely when individuals felt that their skills and the challenge were balanced. This moderating role was found in all of the three activities. The results showed that the effect of the challenge-skill balance on flow experience is moderated by the instrumentality of the task and that this moderation holds for all different activities. Later in this chapter we will suggest that the relationship between challenge-skill balance and flow experience is also moderated by individual characteristics.

3.1.2. "Local" antecedents of flow experience

In this section we take a "local" perspective on flow antecedents by considering individual differences. We will discuss the autotelic personality, motivational competence, self-concept, and self-regulation skills.

Csikszentmihalyi showed that individuals generally differ in the intensity and frequency with which they experience flow (Csikszentmihalyi & Csikszentmihalyi, 1988). Csikszentmihalyi and Rathunde (1992) suggested that an autotelic personality might explain these individual differences. "An autotelic person is one who finds intrinsic motivation and flow in everyday life […], who finds enjoyment in activities that would make others bored or anxious" (Csikszentmihalyi & Rathunde, 1992, p. 88). A longitudinal study with talented teenagers revealed that students who scored high on the personality factors achievement motive, endurance, sentience and understanding reported more flow during the week. Csikszentmihalyi and Rathunde (1992) suggested that those personality factors are similar to the autotelic qualities of being energetic and capable, and being open to new challenges (Csikszentmihalyi & Rathunde, 1992). In order to specify Csikszentmihalyi's description of an "autotelic personality", Kimiecik and Jackson (2002, p. 515) defined the autotelic person as an individual who generally does things for their own sake, rather than to achieve some later external goals (Kimiecik & Jackson, 2002, p. 515). They studied flow experience in sportsmen and sportswomen and suggested that dispositional factors constitute an autotelic personality. They suggested that task orientation (rather than ego orientation), high perceived ability, low trait anxiety, and high intrinsic motivation (operationalized by a high need for autonomy according to Deci & Ryan, 1985) are related to flow experience (Jackson, Kimiecik, Ford, & Marsh, 1998). However, the authors critically mentioned that their "[…] findings lend credence to the notion that something akin to autotelic personality may exist" (p. 517), but that "we have a long way to go, however, in figuring out the role of personality factors in understanding optimal experience in sport" (p. 517).

Another personal feature that can explain individual differences in flow experience is "motivational competence" (Rheinberg, 2008). It is defined as the ability to reconcile current and future situations with activity preferences enabling the individual to function efficiently, without the need for permanent volitional control" (Rheinberg, 2002). The most important component of motivational competence is an accurate sense of one's own implicit motives (Rheinberg, 2008). Knowing one's implicit motives enables to bring one's motivational self-concept (or explicit motive, see McClelland, Koestner, & Weinberger, 1989) into agreement with the implicit motives. This facilitates the setting of goals that fit to both motive systems. Goal-striving which is based on motive congruence guarantees the absence of volitional control and the presence of activity-related incentives, which are both beneficial for the experience of flow. In contrast, if the implicit and explicit motive systems are incongruent, individuals are likely to set goals that do not fit their implicit motives and thus hinder flow during goal-striving. Empirical support for the flow hypothesis of motivational competence (see Rheinberg, 2008) was provided by Clavadetscher (2003) who was interested in the flow experience of voluntary workers and found that individuals with congruent implicit and self-reported motives reported a higher amount of flow experience than individuals with incongruent motives. Engeser et al. (2005) showed that students of a statistics course whose implicit achievement motive was high and congruent with a high self-attributed achievement motive could better self-regulate their behavior. They could better identify themselves with their actions

and were more likely to feel absorbed by the action. Thus, individual differences in motivational competence revealed to be an important determinant of flow experience.

Jackson et al. (2001) investigated flow experience in sports. They focused on the athletic self-concept and self-regulation skills as personal determinants of flow experience. A positive athletic self-concept (e.g., regarding mental competence, overall performance and skills) was expected to be a flow predictor, due to the enhanced confidence in one's actions. In an earlier study the related construct of perceived ability was shown to be positively associated with flow experience (e.g., Jackson & Roberts, 1992). Self-regulation skills (e.g., emotional control, relaxation, self talk) should also be connected to flow experience, because their effective use means a greater control over one's thoughts and emotions. Hence, concentration on the sport activity itself should be facilitated. Jackson et al. (2001) studied athletes of different competitive sports and found that the athletic self-concept as well as the self-regulation skills was associated with flow experience.

3.1.3. The consideration of global and local perspectives on flow antecedents

The previous paragraphs showed two perspectives that can be taken to analyze antecedents of flow experience. On the one hand, there is the perspective of global (i.e., universally valid) antecedents, as for example, unambiguous feedback or the clarity of goals. On the other hand, flow experience is to some extent determined by individual differences in the preference for situations that can bring about flow experience, such as personality characteristics and motivational competences. This paragraph simultaneously considers a local and a global perspective.

As mentioned above, Csikszentmihalyi (1975, 1999; Csikszentmihalyi et al., 2005) postulated that the challenge-skill balance is an important determinant of flow experience. The balance of challenges and skills is associated with flow experience, whereas the imbalance leads to negative experience (anxiety, boredom). This relationship between challenge-skill balance, on the one hand, and flow experience, on the other, was formulated as global regularity that was assumed to be valid for all individuals. Empirical evidence, however, showed that this regularity does not always hold. Studies investigating the relationship between challenge-skill balance and flow experience yield inconsistent results (Ellis, Voelkl, & Morris, 1994; Engeser & Rheinberg, **2008**; Schüler, 2007; Stoll & Lau, 2005). Rheinberg (2008; see also Stoll & Lau, 2005) suggested that these inconsistencies might be explained by moderator variables.

A moderator that might explain why some individuals experience flow when there is a challenge-skill balance, whereas others do not, is the achievement motive (Engeser & Rheinberg, 2008; Rheinberg, Vollmeyer, & Engeser, 2003; Schüler, 2007). With Atkinson's (1957) Risk Taking Model we already introduced a theoretical framework linking the achievement motive to the challenge-skill balance and its consequences. The Risk Taking Model assumes that individuals with hope of success and fear of failure both have the desire «to overcome obstacles, to exercise power, to strive to do something difficult as well and as quickly as possible» (Murray, 1938, pp. 80-81) and want to surpass personal standards of excellence (McClelland et al., 1953). The main difference between individuals motivated by hope of success and fear of failure is that the former prefer moderately difficult tasks whereas individuals with fear of failure feel more comfortable with tasks that are either too easy or too difficult. The link between Atkinson's conceptualization of task difficulty and Csikszentmihalyi's challenge-skill balance follows a clear rationale. A moderately

difficult task which is preferred by individuals motivated by hope of success can be interpreted as a task where the challenges of the situation can be faced with adequate personal skills. Analogously, tasks that are either too difficult or too easy (preferred by individuals motivated by fear of failure) are characterized by an imbalance of challenge and skill. Integrating both theories, a challenge-skill balance should lead to higher motivation only for individuals who are high in hope of success, whereas it does not arouse higher motivation for individuals with fear of failure. For the latter, being in a challenge-skill balance arouses anxiety that is known to hinder flow experience (Csikszentmihalyi, 1990; Jackson, 1995). Thus, only individuals with hope of success are assumed to experience flow when a perceived challenge-skill balance is given; individuals motivated by fear of failure are expected to report the absence of flow experience when they are in a challenge-skill balance situation.

Eisenberger et al. (2005) applied Csikszentmihalyi's (1990) flow theory to the workplace and found support for the moderating role of the achievement motive. They found that among employees with a high need for achievement the experience of high skills and challenges of a job task was related to a better mood, task interest, and organizational spontaneity. Employees with a low need for achievement, however, showed no such correlation. Although it could be criticized that flow experience was only measured indirectly by assessing task interest, the findings are generally consistent with the assumption of the achievement motive as a moderator of the challenge-skill balance and a motivational state comparable to flow experience.

Schüler (2007) found evidence for the moderating function of the achievement motive in an academic learning setting. In two studies the hope-of-success motive and the fear-of-failure motive were measured among undergraduate students using the Multi-Motive-Grid (MMG; Sokolowski, Schmalt, Langens, & Puca, 2000) which was proven to be a highly economic, reliable and valid measurement of motives (Gable, Reis, & Elliot, 2003; Sokolowski et al., 2000). In an elementary course in psychology the students were asked whether the challenge of course contents was either too low for their skills, too high for their skills, or whether it fitted their skills. Then, participants' experience of flow during the course lectures was registered by administering the Flow Short Scale (Flow Kurz Skala, FKS; Rheinberg et al., 2003), which showed high reliability and validity in several studies (see Rheinberg et al., 2003). Items included "My thoughts run fluidly and smoothly", "I am totally absorbed in what I am doing" and "I am completely lost in thought" and were rated using a 7-point scale (from "not at all" to "very much"). As expected, participants whose challenges and skills were in a balance and who additionally had a high score in hope of success reported high amount of flow experience. Students with high scores in fear of failure experienced the lowest amount of flow experience when a challenge-skill balance was given.

Engeser and Rheinberg (2008) extended previous research by using a direct measurement of flow in longitudinal studies. Assuming that flow is a transient state occurring during the activity itself, the authors measured students' flow experience directly while the learning activity was performed. The flow measurement at the end of the semester was expected to be predicted by the hope-of-success measure (Picture Story Exercise; Pang & Schultheiss, 2005) and the fear-of-failure measure (German Version of the Achievement Motives Scale; Dahme, Jungnickel, & Rathje 1993), which were administered at the beginning of the semester. As expected, when the challenge of the task was rated "just right" — an example item is "I think that my competence in this area is 1 (too low) / 5 (just right) / 9 (too high) — flow experience

was high for highly in hope-of-success motivated individuals. In contrast students with fear of failure reported low scores of flow experience in a situation with challenge-skill balance. Again, the relationship between the challenge-skill balance and flow experience was moderated by individual differences in the achievement motive.

The results of the cited studies strongly recommend considering a local perspective on motivation (individual differences in interaction with special situations) when analyzing the relationship between a global predictor (challenge-skill balance) and flow experience. Further research that considers a global as well as a local perspective on flow-experience antecedents will be needed to enhance the understanding of the interplay of global and specific conditions.

4. Summary and practical implications

In this chapter, we elaborated the concept of incentives by introducing the distinction into activity-related and purpose-related incentives (Rheinberg, 1989, 2008). We then focused on flow experience which constitutes a prominent representative of an activity-related incentive and examined its antecedents and consequences.

The theoretical separation into activity-related and purpose-related incentives as well as a detailed knowledge of flow conditions has important practical implications for educational settings. Assuming that alongside purpose-related learning incentives (e.g., compliments and grades) a second source of incentives exists provides the opportunity to enhance the incentive intensity of a learning context. Because activities with only purpose-related incentives are much easier to disrupt than activities done for their own sake, it is helpful to enrich learning settings with activity-related incentives. It is crucial to note that this does not mean that purpose-related incentives are unimportant. Even if activity-related incentives yield a more robust form of motivation the most robust form is when activity- and purpose-related incentives are both given simultaneously. An example is a high enjoyment while preparing for an exam and additionally being proud after achieving a good grade.

In what follows we speculate about some starting points and general advices for the enhancement of the activity-related incentive of flow experience. With flow, a robust form of motivation is created, which remains present even if the control by external demands or rewards (e.g., exam grades, controlling teachers) is missing and even if the persons' expectancies to achieve a goal state are low (see above: activity-related incentives do not need any outcome expectancies!).

Csikszentmihalyi (1990) proposed that the clarity of the goal, clear immediate feedback, and challenge-and-skill balance are critical preconditions for flow experience. The new conceptualization provided by our research is that the relationship between the challenge-skill balance and flow experience is moderated by a personal variable (the achievement motive) and by a more situation-specific variable, that is, the instrumentality of an activity. Herewith we differentiated between a global perspective on flow antecedents (e.g., clear goals and feedback) and a local perspective (e.g., achievement motive, instrumentality).

Our results showed that individuals with hope of success, but not with fear of failure, experienced flow when they were in an achievement situation characterized by challenge-skill balance. In contrast, individuals with fear of failure experienced flow when the task was either too difficult or too easy for their skills. For educational

settings these results mean that in order to evoke flow experience in students, either the challenge-skill balance can be adapted to students motive or the motives can be changed in that way that they fit with the challenge-skill balance condition. It is important to note that both ways are just theoretical speculations unless empirical evidence for their efficacy is supplied, but nevertheless they might inspire a new view on educational settings.

Adapting the challenge-skill balance condition to a person's motive would be a new strategy that has not been used so far within the achievement motivation research. With this strategy it would be possible to motivate students. Facilitating flow experience in students with fear of failure is a desirable pedagogical aim but, on the other hand, providing a student with too easy or too difficult tasks (which are optimally flow-arising for students with fear of failure) is in conflict with the increase of competences and knowledge. The increase of competence and knowledge depends on realistic demands that are not given for individuals in a challenge-skill imbalance situation. Therefore, in the long run, it makes much more sense to make a student feel comfortable with challenge-skill balanced tasks. This second implication requires modifying a students' motive in a way that it interacts optimally with challenge-skill balance.

Changing motives is a complex procedure, because motives are conceptualized as characteristics, which, once they are developed, are relatively stable across the life span and that are difficult to influence by the social environment (McClelland, 1985). Nevertheless, sophisticated intervention programs showed that it is still possible to change motives to some degree. Intervention programs that have been proven to be highly effective mostly reduce fear of failure (rather than enhance hope of success); for example by training realistic goal setting and teaching beneficial attributions for success and failure (Krug & Hanel, 1976; for an overview see Rheinberg & Engeser, in press; Rheinberg & Krug, 2005). With effective motive modification programs, fear of failure with its negative consequences (e.g., the negative consequences on flow experience in case of a challenge-skill balance situation) can be reduced so that again the development of students' skills and well-being are enhanced.

Considering the instrumentality of a task as a moderator within the challenge-skill balance and flow relationship could also have interesting practical implications. Regarding Engeser and Rheinberg's (2008) results, challenge-skill balance is optimal to experience flow in activities of low instrumentality, whereas for high instrumentality tasks the skill should be higher than the challenge of the task. Transferred to teaching practice, it would be best to challenge students with skill-fitting tasks that are not evaluated by the teacher, do not influence a grade and do not have other important consequences (= low instrumentality). For example, such a task could be learning a new topic without being directed towards an important purpose such as an examination or solving complex math problems that are not evaluated. This can evoke flow experience and thus learning motivation and performance can be enhanced and will help to improve students' competences. To deal with the fact that grades and evaluations are part of most pedagogical school systems, teachers could lower the task challenges when tasks have a high instrumentality such as a statistics test or other kinds of examinations. This could be done, for example, by letting students practice already well handled operations (e.g., routine tasks) during the preparation for an examination. With this procedure, flow can be maintained even in necessary exam preparation periods. Additionally, the students can perform on a high level due to high competences they achieved by low instrumentality tasks they

performed before. Teachers may decide whether adapting task challenges to different periods of learning (learning new things without being evaluated vs. preparing for an examination) is practical in their teaching work.

References

Atkinson, J. W. (1957). Motivational determinants of risk taking behavior. Psychological Review, 64, 359-372.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

Beckman, J., & Heckhausen, H. (2008). Motivation as a function of expectancy and incentives. In H. Heckhausen & J. Heckhausen (Eds.), Motivation and action (pp. 99-136). Cambridge, UK: Cambridge University Press.

Brunstein, J. C., & Heckhausen, H. (2008). In H. Heckhausen & J. Heckhausen (Eds.), Motivation and action (pp. 137-183). Cambridge, UK: Cambridge University Press.

Brunstein, J. C., Schultheiss, O. C., & Grässmann, R. (1998). Personal goals and emotional well-being: The moderating role of motive dispositions. Journal of Personality and Social Psychology, 75, 494-508.

Bühler, K. (1922). Die geistige Entwicklung des Kindes [The mental development of the child]. Jena, Germany: Fischer.

Clavadetscher, C. (2003). Motivation ehrenamtlicher Arbeit im Verein Mahogany Hall, Bern [Motivation for voluntary work in the association Mahogany Hall, Bern]. Bern: Abschlussarbeit NDS BWL/UF, Hochschule für Technik und Architektur.

Csikszentmihalyi, M. (1975). Beyond boredom and anxiety. San Francisco: Jossey-Bass.

Csikszentmihalyi, M. (1990). Flow: The psychology of optimal experience. New York: Harper & Row.

Csikszentmihalyi, M. (1999). Das Flow-Erlebnis: Jenseits von Angst und Langeweile. [Flow experience: Beyond Anxiety and Boredom]. Stuttgart, Germany: Klett-Cotta.

Csikszentmihalyi, M., Abuhamdeh, S., & Nakamura, J. (2005). Flow. In A. J. Elliot & C. S. Dweck (Eds.), Handbook of competence and motivation (pp. 598-608). New York: Guilford.

Csikszentmihalyi, M., & Csikszentmihalyi, I. (1988). Optimal experience: Psychological studies of flow in consciousness. Cambridge, UK: Cambridge University Press.

Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (1991). Die aussergewöhnliche Erfahrung im Alltag: Die Psychologie des Flow-Erlebens [Extraordinary experience in everyday life: Psychology of flow experience]. Stuttgart, Germany: Klett-Cotta.

Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. Journal of Personality and Social Psychology, 56, 815-822.

Csikszentmihalyi, M., & Rathunde, K. (1992). The measurement of flow in everyday life: Toward a theory of emergent motivation. In R. Dienstbier & J. E. Jacobs (Eds.), Nebraska Symposium on motivation (pp. 57-97). Lincoln, NE: University of Nebraska Press.

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). Talented teenagers: A longitudinal study of their development. New York: Cambridge University Press.

Dahme, G., Jungnickel, D., & Rathje, H. (1993). Güteeigenschaften der Achievement Motives Scale (AMS) von Gjesme und Nygard (1970) in der deutschen Übersetzung von Göttert und Kuhl: Vergleich der Kennwerte norwegischer und deutscher Stichproben [Psychometric indices of the Achievement Motives Scale by Gjesme and Nygard (1970) in the German version by Goettert and Kuhl: A comparison of Norwegian and German samples]. Diagnostica, 39, 257-270.

DeCharms, R. (1968). Personal causation. New York: Academic.

Deci, E. L., & Ryan, R. M. (1980). The empirical exploration of intrinsic motivational processes. In L. Berkowitz (Ed.), Advances in experimental social psychology (pp. 39- 80). New York: Academic.

Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. New York: Plenum.

Dweck, C. (1996). Capturing the dynamic nature of personality. Journal of Research in Personality, 30, 348-362.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. Annual Review of Psychology, 53, 109-132.

Eisenberger, R., Jones, J. R., Stinglhamber, F., Shanock, L., & Randall, A. T. (2005). Flow experiences at work: For high need achievers alone? Journal of Organizational Behavior, 26, 755-775.

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck (Eds.), Handbook of competence and motivation (pp. 52-72). New York: Guilford.

Elliot, A. J., & Harackiewicz, J.M. (1996). Approach and avoidance achievement goals and intrinsic motivation. A mediational analysis. Journal of Personality and Social Psychology, 70, 461-475.

Elliot, A. J., & Thrash, T. M. (2001). Achievement goals and the hierarchical model of achievement motivation. Educational Psychology Review, 13(2), 139-156.

Ellis, G. D., Voelkl, J. E., & Morris, C. (1994). Measurements and analysis issues with explanation of variance in daily expierience using the flow model. Journal of Leisure Research, 26, 337-356.

Emmons, R.A. (1989). The personal striving approach to personality and subjective well-being. In L. A. Pervin (Ed.), Goal concepts in personality and social psychology (pp. 87-126). Hillsdale, NJ: Erlbaum.

Engeser, S., & Rheinberg, F. (2008). Flow, performance, and moderators of challenge-skill balance. Manuscript submitted for publication.

Engeser, S., Rheinberg, F., Vollmeyer, R., & Bischoff, J. (2005). Motivation, Flow-Erleben und Lernleistung in universitären Lernsettings [Motivation, flow experience and performance in learning settings at university]. Zeitschrift für Pädagogische Psychologie, 19, 159-172.

Gable, S. L., Reis, H. T., & Elliot, A. J. (2003). Evidence for bivariate systems: An empirical test of appetition and aversion across domains. Journal of Research in Personality, 37, 349-372.

Groos, K. (1899). Die Spiele des Menschen [Human games]. Jena, Germany: Fischer.

Harackiewicz, J. M., & Sansone, C. (1991). Goals and intrinsic motivation: You can get there from here. In M. L. Maehr & P. R. Pintrich (Eds.), Advances in motivation and achievement (Vol. 7, pp. 21-49). Greenwich, CT: JAI Press.

Heckhausen, H. (1989). Motivation und Handeln (2. Auflage) [Motivation and Action (2nd ed.)]. Berlin: Springer.

Heckhausen, H., & Rheinberg, F. (1980). Lernmotivation im Unterricht, erneut betrachtet [Learning motivation in the classroom reconsidered]. Unterrichtswissenschaft, 8, 7-47.

Heckhausen, J., & Heckhausen, H. (2008). Motivation and action: Introduction and overview. In J. Heckhausen & H. Heckhausen (Eds.), Motivation and action (pp. 1-9). Cambridge, UK: Cambridge University Press.

Hull, C. L. (1943). Principles of behavior. New York: Appleton-Century-Crofts.

Jackson, S. A. (1995). Factors influencing the occurrence of flow state in elite athletes. Journal of Applied Sport Psychology, 7, 138-166.

Jackson, S. A., Kimiecik, J., Ford, S., & Marsh, H. W. (1998). Psychological correlates of flow in sport. Journal of Sport & Exercise Psychology, 20, 358-378.

Jackson, S. A., & Roberts, G. C. (1992). Positive performance states of athletes: Toward a conceptual understanding of peak performance. The Sport Psychologist, 6, 156-171.

Jackson, S. A., Thomas, P. R., Marsh, H. W., & Smethurst, C. J. (2001). Relationships between flow, self-concept, psychological skills, and performance. Journal of Applied Sport Psychology, 13, 129-153.

Kimiecik, J. C., & Jackson, S. A. (2002). Optimal experience in sport: A flow perspective. In T. S. Horn (Ed.), Advances in sport psychology (Vol. 2, pp. 501-527). Champaign, IL: Human Kinetics.

Krapp, A. (1999). Intrinsische Lernmotivation und Interesse [Intrinsic learning motivation and interest]. Zeitschrift für Pädagogik, 45, 387-406.

Krug, S., & Hanel, J. (1976). Motivänderung: Erprobung eines theoriegeleiteten Trainingsprogramms [Motive modification: Testing a theory-based training program]. Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie, 8, 274-287.

Lee, E. (2005). The relationship of motivation and flow experience to academic procrastination in university students. The Journal of Genetic Psychology, 166, 5-14.

McAdams, D. P., Healy, S., & Krause, S. (1984). Social motives and patterns of friendship. Journal of Personality and Social Psychology, 47, 828-838.

McClelland, D. C. (1975). Power: The inner experience. New York: Irvington.

McClelland, D. C. (1985). Human motivation. Glenview, Ill.: Scott and Foresman.

McClelland, D. C., Koestner, R., & Weinberger, J. (1989). How do self-attributed and implicit motives differ? Psychological Review, 96, 690-702.

McClelland, D. C., Atkinson, J. W., Clark, R. A., & Lowell, E. L. (1953). The achievement motive. New York: Appleton-Century-Crofts.

Moneta, G. B., & Csikszentmihalyi, M. (1996). The effect of perceived challenges and skills on the quality of subjective experience. Journal of Personality, 64, 274-310.

Murray, H. A. (1938). Explorations in personality. New York: Oxford University Press.

Pang, J. S., & Schultheiss, O. (2005). Assessing implicit motives in U.S. college students: Effects of picture type and position, gender and ethnicity, and crosss-cultural comparisons. Journal of Personality Assessment, 85, 280-294.

Pates, J., Karageorghis, C. I., Fryer, R., & Maynard, I. (2003). Effects of asynchronous music on flow states and shooting performance among netball players. Psychology of Sport and Exercise, 4, 415-427.

Pekrun, R. (2000). A social cognitive, control-value theory of achievement emotions. In J. Heckhausen (Ed.), Motivational psychology of human development (pp. 143-163). Oxford, England: Elsevier.

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. Educational Psychology Review, 18(4), 315-341.

Perry, S. K. (1999). Writing in flow. Cincinnati, OH: Writer's Digest Books.

Rheinberg, F. (1989). Zweck und Tätigkeit. Motivationspsychologische Analysen zur Handlungsveranlassung. [Goal and activity. Motivational psychology analyses of action initiation]. Göttingen, Germany: Hogrefe.

Rheinberg, F. (1993). Anreize engagiert betriebener Freizeitaktivitäten. Ein Systematisierungsversuch [Incentives of dedicated leisure activities: A suggestion for systematization]. Unveröffentlichtes Manuskript, Psychologisches Institut der Universität Potsdam.

Rheinberg, F. (2008). Intrinsic motivation and flow-experience. In H. Heckhausen & J. Heckhausen (Eds.), Motivation and action (pp. 323-348). Cambridge, UK: Cambridge University Press.

Rheinberg, F., & Engeser, S. (in press). Motive training and motivational competence. In O. C. Schultheiss & J. C. Brunstein (Eds.), Implicit motives. New York: Oxford University Press.

Rheinberg, F., & Krug, S. (2005). Motivationsförderung im Schulalltag [Motivation promotion in everyday school life]. Göttingen, Germany: Hogrefe.

Rheinberg, F., Manig, Y., Kliegl, R., Engeser, S., & Vollmeyer, R. (2007). Flow bei der Arbeit, doch Glück in der Freizeit: Zielausrichtung, Flow und Glücksgefühle [Flow during work but happiness during leisure time: goals, flow-experience, and happiness]. Zeitschrift für Organisationspsychologie, 51, 105-115.

Rheinberg, F., & Vollmeyer, R. (2003). Flow-Erleben in einem Computerspiel unter experimentell variierten Bedingungen [Flow experience in a computer game under experimentally controlled conditions]. Zeitschrift für Psychologie, 211, 161-170.

Rheinberg, F., Vollmeyer, R., & Engeser, S. (2003). Die Erfassung des Flow-Erlebens [The assessment of flow experience]. In J. Stiensmeier-Pelster & F. Rheinberg (Eds.), Diagnostik von Selbstkonzept, Lernmotivation und Selbstregulation (pp. 261-279). Göttingen, Germany: Hogrefe.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55(1), 68-78.

Sansone, C., & Smith, J. L. (2000). Interest and self-regulation: The relation between having to and wanting to. In C. Sansone & J. M. Harackiewicz (Eds.), Intrinsic and extrinsic motivation (pp. 343-372). San Diego: Academic.

Sawyer, K. (1992). Improvisational creativity: An analysis of jazz performance. Creativity Research Journal, 5, 253-263.

Schmalt, H. D. (1996). Zur Kohärenz von Motivation und Kognition [The coherence of motivation and cognition]. In J. Kuhl & H. Heckhausen (Eds.), Enzyklopädie der Psychologie. Motivation, Volition und Handeln (pp. 241-273). Göttingen, Germany: Hogrefe.

Schneider, K., & Schmalt, H. D. (2000). Motivation [Motivation]. Stuttgart, Germany: Kohlhammer.

Schüler, J. (2007). Arousal of flow-experience in a learning setting and its effects on exam-performance and affect. Zeitschrift für Pädagogische Psychologie, 21, 217-22.

Schultheiss, O. C. (in press). A biobehavioral model of implicit power motivation. In E. Harmon-Jones & P. Winkielman (Eds.), Fundamentals of social neuroscience. New York: Guilford.

Shah, J. Y., & Kruglanski, A. W. (2000). The structure and substance of intrinsic motivation. In C. Sansone & J. M. Harackiewicz (Eds.), Intrinsic and extrinsic motivation (pp. 105 – 127). San Diego: Academic.

Sokolowski, K., & Heckhausen, H. (2008). Social bonding: Affiliation motivation and intimacy motivation. In H. Heckhausen & J. Heckhausen (Eds.), Motivation and action (pp. 184 - 201). Cambridge, UK: Cambridge University Press.

Sokolowski, K., Schmalt, H.-D., Langens, T. A., & Puca, R. M. (2000). Assessing achievement, affiliation, and power motives all at once – The Multi-Motive Grid (MMG). Journal of Personality Assessment, 74, 126-145.

Stein, G. L., Kimiecik, J. C., Daniels, J., & Jackson, S. A. (1995). Psychological antecedents of flow in recreational sport. Personality and Social Psychology Bulletin, 21, 125-135.

Stoll, O., & Lau, A. (2005). Flow-Erleben beim Marathonlauf – Zusammenhänge mit Anforderungspassung und Leistung. [Experiencing „flow“ during a marathon − Association with the fit between demand and ability]. Zeitschrift für Sportpsychologie, 12, 75-82.

Vroom, V. H. (1964). Work and motivation. New York: Wiley.

White, R. W. (1959). Motivation reconsidered: The concept of competence. Psychological Review, 66, 297-333.

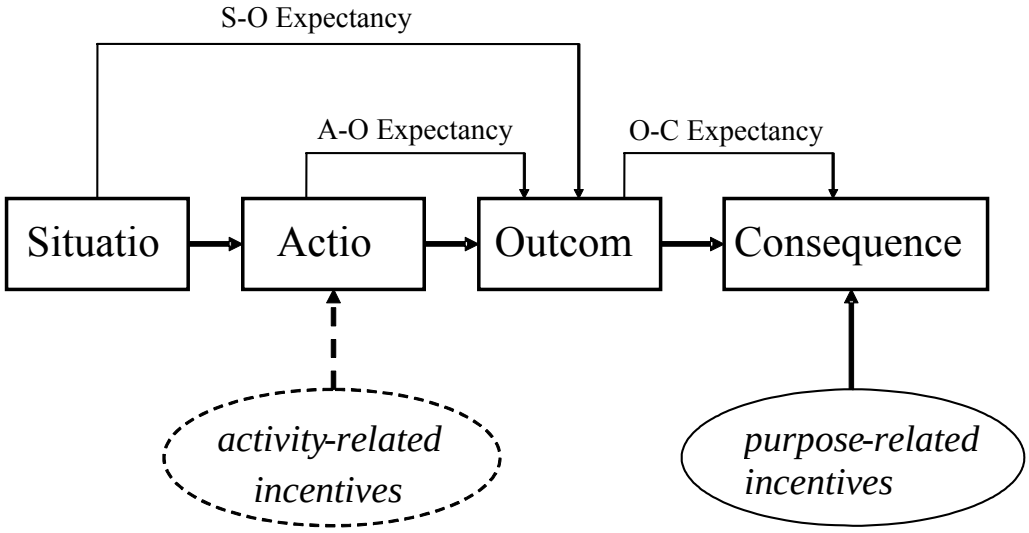

Figure 1. The Extended Cognitive Model (see solid lines, adapted from Heckhausen & Rheinberg, 1980) and its revision by Rheinberg (see below; dotted lines, adapted from Rheinberg, 1989), S-O = situation-outcome; A-O = action-outcome; O-C = outcome-consequence.