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In the Power of Flow:

The Impact of Implicit and Explicit Motives on Flow Experience with a Special Focus on the Power Domain

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DEDICATION

To Nina TS and her gushing spring

and

To my family and friends for their loving support and encouragement to keep walking to the finish line

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ap	Affective preferences
cp	Cognitive preferences
ESM	Experience Sampling Method
FKS	Flow Short Scale
IAT	Implicit Association Test
IPM	Inhibited power motive
AI	Activity inhibition
MMG	Multi-Motive Grid
nAgent	Need for agency
nPow	Need for power
pa	Perceived abilities
PDA	Personal digital assistant
PRF	Personality Research Form
PSE	Picture Story Exercise
sanPow	Self-attributed need for power
SRT	Serial response task
t	Time of measurement
UPM	Uninhibited power motive

1 Abstract

Flow is a state in which people are completely immersed in an activity without reflective self-consciousness but with a deep sense of control (Engeser & Schiepe-Tiska, 2012; Rheinberg, 2008). Recent research has challenged Csikszentmihalyi's (1975) assumption that the balance between challenge and skills promotes flow experience by revealing that an individual's achievement motive moderates this relation (Eisenberger, Jones, Stinglhamber, Shanock, & Randall, 2005; Engeser & Rheinberg, 2008; Schattke, 2011; Schüler, 2007, 2010).

The compensatory model of motivation and volition (Kehr, 2000, 2004b) provides a more general explanation of how flow occurs and integrates motives and skills in a joint model. The model proposes that flow emerges when (1) implicit motives are aroused by task-intrinsic incentives leading to affective preferences for a task, (2) no competing explicit motives are activated that could lead to thematically different cognitive preferences (partial congruence), or the congruent explicit motive is elicited, which would lead to high cognitive preferences for the task (complete congruence), and (3) the ability to accomplish a task is perceived as sufficient. Derived from these propositions, it may also be possible to reach flow when other motives, such as the implicit and explicit power motives, are aroused.

Study 1 tested whether the effect of implicit motives on flow would be mediated by affective preferences, and whether the components, affective preferences, cognitive preferences, and perceived abilities would interact with each other in order to promote flow. Studies 2 and 3 examined whether flow could also be attained by people high in power-motive congruence.

The findings supported my hypotheses in most cases. Study 1 revealed that affective preferences mediated the effect of the agentic motive on flow. Moreover, a hierarchical regression analysis indicated that high affective preferences, high cognitive preferences, and high perceived abilities interacted with each other in order to foster high levels of flow. Studies 2 and 3 confirmed that people high in power-motive congruence also achieved high levels of flow experience. Study 3 additionally revealed that the combination of a strong implicit and weak explicit power motive is more important for the emergence of flow than a weak implicit and strong explicit power motive.

The findings complement previous research on the achievement motive (Rheinberg, Manig, & Vollmeyer, 2005; Schüler, 2007; 2010; Schattke, 2011; Steiner, 2006). They provide some new and essential ingredients to Csikszentmihalyi's (1975) conception of flow by confirming important assumptions of the compensatory model (Kehr 2000, 2004b). Moreover, the results broaden the scope of the application of flow research beyond the achievement domain. Implications for practice are that people can attain flow when they realistically evaluate their implicit motives and bring them in line with their explicit motives.

2 Introduction

When successful athletes are asked about what they experience during competitions, they often refer to a feeling of “being in the zone”. For example, Katie Taylor, four-time World Champion and Olympic Champion in women’s boxing, after winning the World Championship in 2012, stated: “I am so focused during competition time that I often do not realize where I am. For me it was just another place and another competition. When I am in the zone, nothing else matters, I am purely concentrated on the job at hand.” (International Boxing Association, 2012).

Within the research literature, the state of being in the zone is also known as flow experience (Marr, 2001). Flow is a state “in which people are so intensely involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it” (Csikszentmihalyi, 1990, p. 4). It has been shown that flow is related to improved performance (Engeser & Rheinberg, 2008; Schüler, 2007), increased creativity (Csikszentmihalyi, 1997), and higher well-being (Clark & Haworth, 1994; Csikszentmihalyi & LeFevre, 1989; Massimi & Carli, 1988; Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003; Schüler, 2007). These positive associations of flow raise the question of what conditions need to be fulfilled so that people will get involved in an activity for the sake of doing it. Are there factors in the situation or within a person that facilitate flow experience? Or as Dharmesh Shah, a Massachusetts Institute of Technology (MIT) graduate who founded his own software company expressed it: “Sometimes, I wish getting into ‘the zone’ wasn’t so hard. Once I’m there, it’s like magic—but it’s so hard to get there” (2012).

The traditional flow channel model (Csikszentmihalyi, 1975) proposes that flow occurs when people perceive a balance between their skills and the challenge of an activity. More recent research challenges Csikszentmihalyi’s conception of flow by revealing that a person's need for achievement may moderate the relation between challenge-skill balance and flow experience (Eisenberger et al., 2005; Engeser & Rheinberg, 2008; Schattke, 2011; Schüler, 2007, 2010).

The compensatory model of motivation and volition (Kehr, 2000, 2004b) reconciles these views by combining traditional (i.e., based on the demand-skill balance) and more recent research (i.e., based on the need for achievement) in order to explain how flow emerges. In general, the compensatory model proposes that the congruence of three distal structural components enables flow: implicit motives, explicit motives, and perceived abilities. In addition to these distal components, the model describes three proximal components that mediate the relation of distal components and flow within a particular situation: affective preferences, cognitive preferences, and scripted behavior (Kehr, 2000, 2004b). The model proposes that flow emerges when (1) implicit motives are aroused by task-intrinsic incentives (e.g., a demand-skill balance is an incentive that elicits the achievement motive in particular), leading to affective preferences for a task, (2) no competing explicit motives are activated that could lead to thematically different cognitive preferences (partial congruence), or the congruent explicit motive is elicited, which would lead to high cognitive preferences for the task (complete congruence), and (3) the ability to accomplish a task, thus reflecting an individual's scripted response pattern, is perceived as sufficient.

Previous research has confirmed parts of these propositions by examining the joint effect of distal components on flow in the achievement domain (Schattke, 2011) or by studying the effect of a single proximal component (Engeser & Rheinberg, 2008). However, a comprehensive consideration of all proximal components is still missing. Moreover, the assumption that proximal components may mediate the relation between distal components and flow has not yet been confirmed.

Another research gap that has been unexplored to date is whether flow can occur in contexts other than the achievement domain and whether motives other than the achievement motive promote flow. Both, studies in the early years of flow research (e.g., Csikszentmihalyi, 1975) and recent studies have primarily focused on flow in achievement situations such as sports (e.g., Schüler, 2010), academic learning (e.g., Bassi, Steca, Delle Fave, & Caprara, 2007), and innovations in work settings (Steiner, Diehl, Engeser, & Kehr, 2011) as well as on the achievement motive (Eisenberger et al., 2005; Engeser & Rheinberg, 2008; Schattke, 2011; Schüler, 2007, 2010). However, this research has left unanswered the questions of what happens in situations without a clear achievement focus or when people have a low need for achievement but a high need for affiliation or power. Are these people incapable of experiencing flow in their lives? Can only people high in the need for achievement experience flow?

In sum, the present research has pursued two main goals. First, it tested the basic assumptions of the compensatory model of motivation and volition (Kehr, 2000, 2004b) as related to the emergence of flow (Study 1). It examined whether the effect of implicit motives on flow would be mediated by affective preferences. Further, the interaction of proximal components, affective preferences, cognitive preferences, and perceived abilities on flow was tested. Second, it focused in particular on the power domain and examined whether people high in power motivation could also experience flow (Studies 2 and 3). In this context, the relation between the power motive and implicit learning was also studied (Study 3).

In the following section, I begin by briefly presenting the concept of flow and illustrating traditional models that explain how flow emerges. Next, the compensatory model of motivation and volition (Kehr, 2000, 2004b) and the propositions referring to flow are introduced. Subsequently, the need for power is outlined together with theoretical assumptions of why flow may also occur in the power domain. Finally, these lines of research are integrated and hypotheses for the following three studies are derived.

2.1 Flow Experience and its Components

The flow state was first described by Csikszentmihalyi (1975). It is characterized by six components: (a) merging of action and awareness, (b) centering of attention on a limited stimulus field and a high level of concentration, (c) loss of reflective self-consciousness, (d) high sense of control of one's actions and the demands of the environment, (e) distortion of temporal experience, and (f) autotelic nature in the sense that there is no need for external goals or rewards (Nakamura & Csikszentmihalyi, 2009). All components are linked together and depend on each other. Therefore, flow reflects a distinct combination of different experiential states (see also Beard & Hoy, 2010, for testing model fits with different combinations of components). Each state itself could also be experienced by individuals who are not in the flow state. Only the combination of these states can reveal the experience of flow (cf. Keller & Landhäußer, 2012).

Furthermore, there are three preconditions that foster the emergence of flow: A balance between challenge and skills, clear goals in the sense that the structure of the task is clearly understood (often based on clear task instructions), and immediate and unambiguous feedback about one's actions and the progress made when executing a task (Keller & Landhäußer, 2012; Nakamura & Csikszentmihalyi, 2009).

For example, when individuals experience a balance between the challenges in their environment and their own skills and the structure of the task is clear, they are able to limit their stimulus field in order to concentrate completely on their actions and to ignore distractions. As a consequence, they feel that they are in complete control of their actions and the environment. Given clear noncontradictory goals and immediate feedback, individuals can temporarily lose their self-consciousness and their sense of time, and flow can emerge.

Flow and positive affect

Flow is also associated with positive affect, but positive affect is not a component of flow itself (Clarke & Haworth, 1994; Csikszentmihalyi & LeFevre, 1989; Massimi & Carli, 1988; Schallberger & Pfister, 2001; Shernoff et al., 2003). Csikszentmihalyi and LeFevre (1989) called flow an optimal experience that promotes happiness because of its rewarding nature. Therefore, happiness should be a consequence rather than a component of flow. "When we are in flow, we are not happy … if a rock climber takes time out to feel happy while negotiating a difficult move, he might fall to the bottom of the mountain" (Csikszentmihalyi, 1997, p. 32). Therefore, happiness and satisfaction should follow *after* the experience of flow (Csikszentmihalyi, 1999).

Aellig (2004) analyzed the relation between flow, positive affect, and happiness in more detail. He distinguished between the affective dimensions valence (i.e., pleasantness vs. unpleasantness, hedonic tone) and arousal or activation, which can be further differentiated into positive activation (i.e., energetic arousal) and negative activation (i.e., tense arousal; see also Matthews, Jones, & Chamberlain, 1990; Schallberger, 2005; Sjöberg, Svensson, & Persson, 1979; Thayer, 1978, 1986; Watson & Tellegen, 1985; Wundt, 1874; Zevon & Tellegen, 1982, for similar conceptualizations of affect). He examined rock climbers before climbing, while climbing, and afterwards (when they rappelled, during breaks, and even when they went home). Participants carried an electronic beeper and a questionnaire to assess flow (Engeser & Rheinberg, 2008; Rheinberg, Vollmeyer, & Engeser, 2003), positive emotional activation (feeling excited, enthusiastic, alert, highly motivated), negative emotional activation (feeling stressed, upset, jittery, afraid), and valence (feeling satisfied, happy; the affect items are part of the PANAVA Short Scale; Schallberger, 2005). Whenever climbers heard an electronic signal from the beeper, they completed the questionnaires. When they were indeed climbing at this time, they tried to find a stable and safe position and then completed the questionnaires. Results showed that, while climbing, participants experienced high levels of flow and positive activation, medium levels of negative activation, and low levels of valence. A medium level of negative activation (i.e., tense arousal) seemed to indicate that the person had the thought that what he or she was currently doing could go wrong. However, when climbers rappelled, took breaks, or went home, they reported high levels of valence but low levels of positive and negative activation and flow. In sum, climbers experienced flow and positive activation *while* they were climbing and happiness and satisfaction *after* they were done climbing. Aellig explained the difference by referring to Watson's (2002) proposition that positive affect can be hierarchically structured with the overall valence at the upper level and the distinctive qualities of each specific type of affect at the lower level. Therefore, valence is the result of an individual's inner comparison between anticipated happiness and actual happiness.

A similar pattern of results was found in a study that examined flow at work and during leisure time (Rheinberg, Manig, Kliegl, Engeser, & Vollmeyer, 2007). At work, people experienced high levels of flow but only medium levels of valence, whereas during leisure time, the pattern was the other way around. In addition, Schallberger and Pfister (2001) showed that, at work and during leisure time, people reported high levels of positive activation, but at work, they experienced higher levels of negative activation as compared to their leisure time.

In line with these studies, an experimental study that induced flow revealed that levels of valence did not differ between a flow condition, a boredom condition, and an overload condition (Keller, Bless, Bloman, & Kleinböhl, 2011; see Chapter 2.2 for a more detailed description of the experimental procedure). However, in the flow condition, individuals experienced higher levels of task enjoyment as compared to the boredom and overload conditions. Hence, the authors concluded that a global state of happiness is not the same as task-specific enjoyment. In fact they suggested that task-specific enjoyment would cause happiness. However, this assumption has not yet been empirically tested.

Another research group tried to do the reverse and experimentally induced positive and negative moods in order to examine their relations with flow (Cabo, Kleinman, McCauley, & Parks, 2004; Parks & Victor, 2006; both studies are cited in Moller, Meier, & Wall, 2010). Their results revealed that positive mood did not significantly affected flow, but negative mood inhibited flow.

In sum, correlational and experimental studies have confirmed that flow is associated with high levels of positive activation (i.e., energetic arousal) and medium levels of negative activation (i.e., tense arousal) *during* a task. However, these findings have additionally reinforced a distinction between flow and valence (i.e., happiness) by showing that flow during a task is followed by high levels of valence *after* a task.

2.2 Traditional Flow Models

The first flow model—the flow channel model—proposes an *environment x person* interaction in order to explain the emergence of flow (Csikszentmihalyi, 1975). According to this model, flow occurs when individuals perceive a balance between the challenge of an activity and their skills. In this model, challenge indicates that individuals are always aware of a limited number of action opportunities, which structure the demands of the environment and challenge them to act. At the same time, individuals are aware of their skills; that is, their perceived action capabilities to cope with the demands of the environment (Csikszentmihalyi, 1975). However, challenge level and skills do not depend on objective criteria but rather on the individual's perception of what the challenge is and how skilled people think they are.

A situation may provide different action opportunities, but people cannot act upon all of them (Csikszentmihalyi & Bennett, 1971). Therefore, they have to choose which of these possible actions they will attempt to turn into action. This selection process is mainly directed by attention processes that are important for entering the state of flow and staying in it (Csikszentmihalyi & Csikszentmihalyi, 1988). Interest developed in the past directs a person's attention to specific action opportunities and thus limits the complex structure of the situation to a finite number of action opportunities. Subsequently, this finite set of action opportunities can be graded according to different criteria such as the perceived difficulty of each action opportunity. For example, for climbing, there are different scales that allow an objectively grading of how difficult a route is (e.g., UIAA-Scale of the International Mountaineering and Climbing Federation, 2012). However, when climbers climb a route of medium difficulty on that scale, the route may still exceed their climbing skills and prevent flow. Thus, only the balance of the perceived difficulty of the route and their skills will facilitate flow.

In sum, the flow channel model proposes that flow occurs when challenge level and skills are both low, when both are medium, or when both are high (Csikszentmihalyi, 1975; see Figure 1). Staying in flow would require that attention stays focused on the limited stimulus field defined by the activity. When perceived skills exceed the challenge, attention may shift, and boredom will be experienced. When the ratio between challenge and perceived skills becomes too large, people may become even more distracted from the task and will be more likely to make mistakes. As a consequence, people may experience anxiety. For example, surgeons who perform only very routine surgeries may experience anxiety during a surgery because they are aware that every mistake may be dangerous to their patient's life. On the other hand, when the challenge exceeds perceived skills, people may experience worry because attention is directed to the self and its shortcomings (Nakamura & Csikszentmihalyi, 2002). When the ratio between challenge level and perceived skills becomes too large, people may again experience anxiety. Climbers who climb much too difficult routes may be distracted by their painful hands and their own exhaustion. As a consequence, they may get scared because they don't feel able to succeed in the climbing activity. However, people are able to restructure their environment in order to reach the flow state again (Csikszentmihalyi, 1975). When climbers get bored because the route is too easy, they can return to flow by either climbing a more difficult route or by handicapping themselves by using only one hand for climbing. When they start to worry during climbing, they can return to flow by either climbing an easier route or by practicing and improving their skills. Likewise, surgeons can return to flow by adjusting the challenge or their skills.

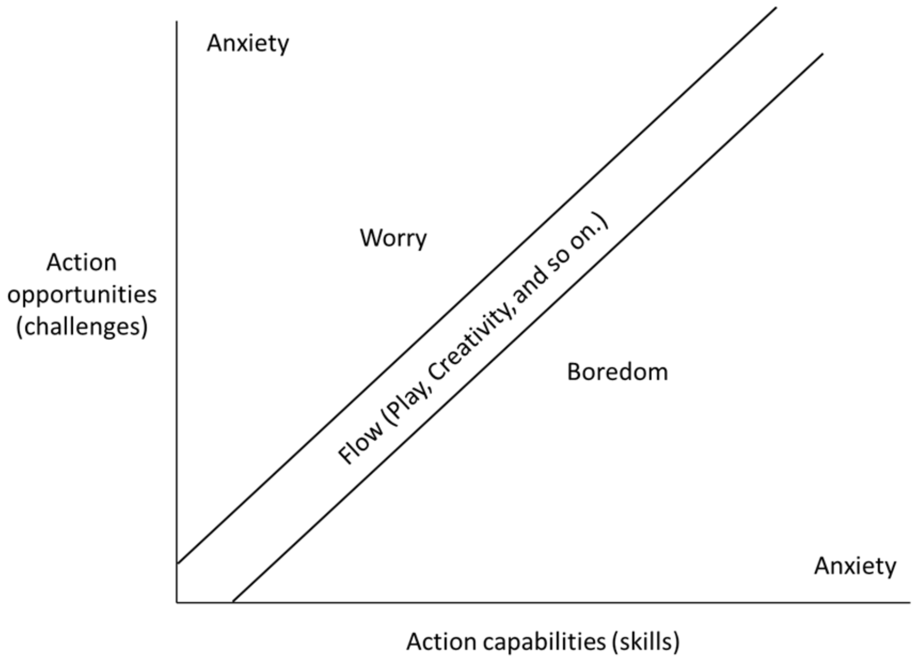

Figure 1. The flow channel model (adapted from Csikszentmihalyi, 1975).

In order to test this model empirically, the Experience Sampling Method (ESM; Csikszentmihalyi & Csikszentmihalyi, 1988) was used, which is one of the methods most commonly used to assess flow (cf. Moneta, 2012). The ESM is designed to infer the sequences and times during which people are in specific states. The ESM seeks a random sampling of the population of experiences. The goal of the method is to examine subjective experiences while individuals are acting in their natural environments. With this method, people carry an electronic device such as a personal digital assistant (PDA) or a mobile phone with them. The device randomly generates electronic signals that invite participants to answer a set of short questions. People usually get beeped seven times a day over 1 week during their daily lives. When they get beeped, participants report where they are and what they are doing. They also indicate whether they have to do a particular activity, want to do it, or have nothing else to do. Moreover, they rate the perceived challenges during this activity, and their skills with regard to this activity on a 10-point scale from 0 (*none*) to 9 (*very high*). Csikszentmihalyi (1975) stated that flow would occur whenever both questions are rated with the same numerical value. Therefore, he used the balance between challenge and skills as an indicator of the experience of flow. Furthermore, participants report their level of concentration as well as whether they wish they are doing something else. Csikszentmihalyi expected that when the levels of challenge and skills were in balance, people would experience a positive state of consciousness as indicated through a high level of concentration, excitement, and strength.

However, researchers have tested the model but have found theoretically inconsistent results (cf. Csikszentmihalyi & Csikszentmihalyi, 1988). Individuals did not experience high levels of concentration and excitement when they experienced a balance between challenge and skills. The only dimension that matched the theory was that people did not want to do something else.

One possible explanation for these theoretically inconsistent results was provided by Rheinberg (2008). He noted that the terms demand and challenge might be conflated. In theory, Csikszentmihalyi (1975) referred to demands. A balance between demands and skills would, as a consequence, be experienced as challenging (Rheinberg, 2008). However, in empirical studies, individuals were asked to indicate the perceived challenge and their perceived skills while performing an activity (e.g., Csikszentmihalyi & LeFevre, 1989;

Moneta & Csikszentmihalyi, 1996). Imprecisely, the term challenge was used instead of demand[1]. This may have led to results suggesting that when demands are low, flow can never occur.

As a consequence of the inconsistent results, Massimi and Carli (1986; as cited in Csikszentmihalyi & Csikszentmihalyi, 1988) reformulated the model and introduced the quadrant model (Figure 2). This revised model specifies that flow occurs only when skills and demands are perceived as above the average level in contrast to below the average level. Indeed, the empirical data supported this theoretical assumption. Also the results of further studies have supported the quadrant model such that affect, concentration, and the wish to repeat the activity were high in the flow quadrant (i.e., Csikszentmihalyi & LeFevre, 1989; Schallberger & Pfister, 2001).

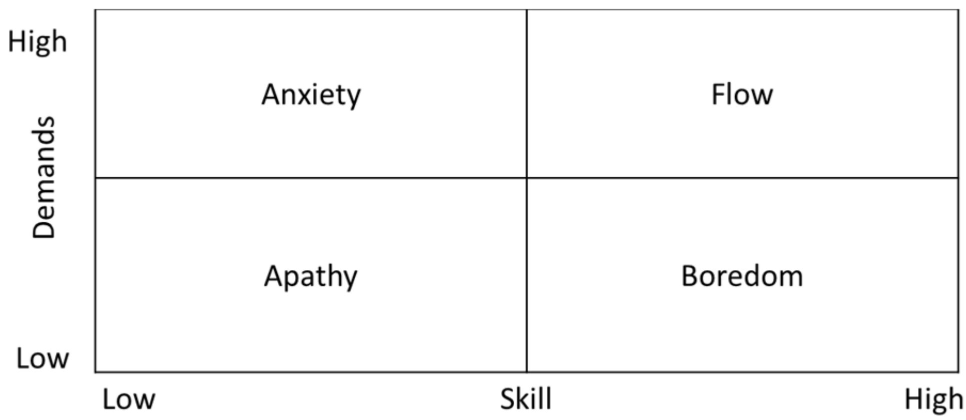

Figure 2. The flow quadrant model (adapted from Csikszentmihalyi & Csikszentmihalyi, 1998).

However, in other studies, some people experienced flow in the boredom quadrant too, when perceived skills were high but perceived demands were low (i.e., Clarke & Haworth, 1994; Ellis, Voelkl, & Morris, 1994; Pfister, 2002). Therefore, Csikszentmihalyi (1997)

[1] Henceforth, I will use the term "demand" instead of "challenge" because it is more accurate.

renamed the boredom quadrant the relaxation quadrant (see Figure 2). Massimi and Carli (1988) went even one step further and proposed an octant model that divides the world of experience into the following states: apathy, worry, boredom, anxiety, relaxation, arousal, control, and flow.

Nevertheless, a problem of many studies on flow is that the demands-skill balance has been placed on the same level as flow itself (e.g., Csikszentmihalyi & LeFevre, 1989; Eisenberger, et al., 2005; Heo, Lee, Pedersen, & McCormick, 2010; Nakamura, 1988; Wells, 1988). Csikszentmihalyi's (1975) underlying assumption was that individuals who experience a demand-skill balance also experience high levels of flow (see also Csikszentmihalyi & Csikszentmihalyi, 1988). This assumption was based on findings from interview studies revealing that people who described their flow experiences also reported that they perceived the demands of the environment as neither too easy nor too difficult (Csikszentmihalyi, 1975). However, when people indicate that when they experience flow, they also experience a demand-skill balance this does not mean that the reverse is true as well. Indeed, Moneta and Csikszentmihalyi (1996) showed that people who reported a demand-skill balance did not always experience flow. Therefore, flow is conflated with the demand-skill balance, which rather is a precondition of flow (Nakamura & Csikszentmihalyi, 2009; Landhäußer & Keller, 2012).

A second problem that also results from equating flow with the demand-skill balance is that flow has not been assessed with all of its components. This incomplete assessment of flow contradicts the assumption that flow is a combination of different experiential states. As a consequence, researchers have developed new questionnaires in order to assess all components of flow such as the Flow Short Scale (FKS; Engeser & Rheinberg, 2008; Rheinberg et al., 2003). Moreover, the FKS prevents the confounding of preconditions of flow and its phenomenological components. The scale consists of only 10 items, and thus it can also be easily combined with the ESM.

The third problem is that empirical data that confirm these models have primarily been collected in interview studies and cross-sectional correlational studies (e.g., Csikszentmihalyi & LeFevre, 1989; Di Bianca, 2000; Rodríguez-Sánchez, Schaufeli, Salanova, Cifre, & Sonnenschein, 2011). However, in order to understand how flow arises and which preconditions promote flow, experimental studies are needed. To date, experimental procedures for inducing flow are still in the early stages of development and focus exclusively on the achievement domain (cf. Moller et al., 2010). There are two approaches for experimentally inducing flow: manipulating the demand-skill balance by varying the level of difficulty and manipulating the structure of a task by varying the clarity of goals.

The first experiments that manipulated the demand-skill balance used simple videogames such as Roboguard (Rheinberg & Vollmeyer, 2003) or Pac-Man (Engeser & Rheinberg, 2008; Rheinberg & Vollmeyer, 2003). These studies applied a within-subjects design such that each participant played games across different levels of difficulty (from *very easy* to *optimal* to *very difficult*). The difficulty was manipulated by the number of obstacles in the game (meteors in Roboguard, ghosts in Pac-Man) and how quickly these obstacles moved. Results revealed that players experienced more flow in the optimal condition compared to the easy and difficult conditions. Hence, flow could be successfully induced by an experimental manipulation. Other researchers used the computer game Tetris, in which the speed of objects falling vertically from the top of the computer screen was varied (Keller & Bless, 2008; Keller & Blomann, 2008; Keller, et al., 2011; Moller, Csikszentmihalyi, Nakamura, & Deci, 2007). The goal of the game was to arrange these falling objects in such a way that these objects created completely filled lines. The demand-skill balance was manipulated by varying the speed of the falling objects from very slow (no demand-skill balance, boredom condition), to adaptive to the players' performance (demand-skill balance, fit condition), to very fast (no demand-skill balance, overload condition). Results showed that people in the fit condition reported a higher demand-skill balance compared to the boredom and overload conditions. Moreover, they also experienced higher levels of flow.

Mannell and Bradley (1986) chose a different way to cause flow by manipulating the structure of a task. In their experiment, participants were asked to manipulate blocks in order to replicate geometric patterns from memory. After a brief demonstration of how to replicate an example geometric pattern, people in the low-structure condition were told to take several cards with geometric patterns printed on them. Further, they were told to replicate these patterns until the time was called. People in the high-structure condition were given a set number of cards and were additionally given a set of scoring guidelines for how their patterns could be evaluated afterwards. However, participants in both groups were told that their scores would not be recorded. Results showed that people in the high-structure condition reported higher levels of flow than people in the low-structure condition.

2.3 Moderators of the Relation between Demand-Skill Balance and Flow

Another reason for why flow models may not have been empirically supported has been discussed since the beginning of flow research: People seem to differ in their likelihood to experience flow. In order to explain these differences, Csikszentmihalyi (1975) introduced the concept of an autotelic personality that refers to the tendency to experience challenging situations as rewarding (Csikszentmihalyi & LeFevre, 1989). Autotelic personalities have the ability to manage a rewarding balance between challenge finding and skill building (Csikszentmihalyi, Rathunde, & Whalen, 1993). They are characterized as curious, persistent, not self-centered, open to novelty, and with a high need to achieve (Csikszentmihalyi et al., 1993; Nakamura & Csikszentmihalyi, 2002). Abuhamdeh (2000) compared nonautotelic and autotelic people who are characterized by reporting a preference for high-action-opportunity-high-skill balance situations. He found that autotelic people experienced less stress and strain in the flow quadrant than outside the quadrant, whereas for nonautotelic people, the reverse was true.

Although the existence of an autotelic personality was acknowledged early in flow theory, researchers have only recently started to empirically examine the relation between personality facets and flow by considering possible moderators of the effect of the demand-skill balance. For example, Keller and his colleagues focused on individual differences in self-regulation competencies such as action orientation (Keller & Bless, 2008) and locus of control (Keller & Blomann, 2008). They assumed that flow may depend on the fit between a persons' personality and the structural requirements of the given task. In their experiments, participants played the computer game Tetris (see Chapter 2.2 for a description of the procedure). The results showed that action-oriented persons who stay immersed in an ongoing task with high concentration experienced more flow when the demands of the game were adapted to their abilities than state-oriented persons who become easily distracted from a task and work on other things in between (Keller & Bless, 2008). Moreover, only action-oriented people experienced more flow in the demand-skill balance condition compared to the no-balance conditions. Similar findings were found for a strong internal locus of control (Keller & Blomann, 2008) which refers to the belief that outcomes depend on the work and effort a person puts into a task (Rotter, 1966). People with a strong rather than a weak internal locus of control were more likely to enter the flow state in the demand-skill balance condition compared to the no balance conditions.

Other researchers have focused on the achievement motive as a possible moderator of the demand-skill balance. The achievement motive is the desire to surpass personal standards of excellence (McClelland, Atkinson, Clark, & Lowell, 1953). The situational cue that elicits the achievement motive is dealing with tasks of perceived moderate difficulty. For individuals high in achievement motivation, mastering tasks at a moderate level of difficulty is an opportunity to obtain reward. In line with this, Schüler (2007) as well as Engeser and Rheinberg (2008) showed that the achievement motive moderated the relation between demand-skill balance and flow. The demand-skill balance was positively associated with flow only when the achievement motive was also high. For individuals low in achievement motivation, no relation was found.

Baumann and Scheffer (2010) even postulated an achievement flow motive behind the experience of flow as a stable motive disposition. The achievement flow motive is characterized as the mastery-approach-oriented satisfaction of the aroused need to master challenging tasks. It is defined as the intrinsic component of the achievement motive (Baumann & Scheffer, 2011; see also Baumann, 2012). Research has shown that the achievement flow motive enables people to create more self-determination, work efficiency, and experiences of being completely immersed across different tasks and situations (Baumann & Scheffer, 2011).

In sum, possible moderators of the relation between the demand-skill balance and flow have already been found. Moreover, there are some theoretical considerations that link flow to the achievement motive literature. However, thus far, all studies have focused on the achievement domain. There are no studies that have examined flow in nonachievement situations.

One reason why most previous studies have examined flow in the achievement domain may be that Moneta and Csikszentmihalyi (1996) explicitly stated that “the flow model may be more applicable to social contexts and activities where achievement plays a dominant role” (p. 303). Another reason may be the strong theoretical focus on demand-skill balance that can be especially applied to achievement situations but seems to be less applicable to nonachievement situations. Moreover, the presented theories do not allow individual differences other than the achievement motive to be considered for the emergence of flow.

2.4 The Compensatory Model of Motivation and Volition

A theoretical model that allows other individual differences to be considered is the compensatory model of motivation and volition (Kehr, 2000, 2004b). Moreover, the compensatory model reconciles traditional research - based on the balance of demands and skills - and more recent research—based on the achievement motive—in order to explain the emergence of flow. The model is based on the assumption of distal and proximal levels of motivational processes (cf. Kanfer & Heggestad, 1997). At the distal level, the model describes three structural components: implicit motives, explicit motives, and perceived abilities (Figure 3). At the proximal level, it refers to affective preferences, cognitive preferences, and scripted behavior.

The basic idea of the model is that the congruence of the three components at the distal level in relation to those at the proximal level promotes flow experience. When the components are incongruent, functional mechanisms (i.e., volitional regulation and/or problem solving) are required to compensate for the incongruent component. In the following, the structural components and their interplay are described in more detail.

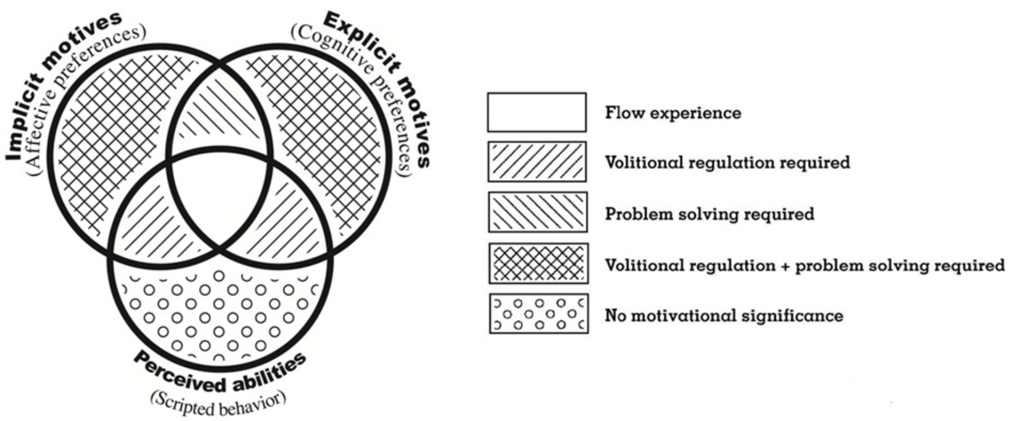

Figure 3. Schematic overview of the compensatory model of work motivation and volition (adapted from Kehr, 2004b)

2.4.1 **Congruence of implicit and explicit motives**

The first two important structural components are implicit and explicit motives. Implicit motives are unconscious motivational needs that orient attention, and select and energize behavior towards specific classes of rewarding task-intrinsic incentives (McClelland, 1987; Schultheiss & Brunstein, 2010). They are built on associative networks that link situational cues with basic affective experiences (McClelland, 1985). These situational cues are also called natural incentives (McClelland, 1987). Implicit motives are shaped by ontogenetically early, pre-linguistic, affectively toned learning experiences (McClelland, Koestner, & Weinberger, 1989).

Explicit motives are consciously accessible evaluations of a person's self-concept (McClelland, et al. 1989). They reflect the self-attributed view of a person's needs, wishes, and values (McClelland, 1995; McClelland et al., 1989) as well as the specific goals people strive toward (Brunstein, Schultheiss, & Grässmann, 1998). Explicit motives are often expressed through the reasons that individuals give for their actions (Rheinberg, 2008). They develop later in life (McClelland et al. 1989; McClelland & Pilon, 1983) and are cognitively based on the verbal learning of rules, demands, and expectations.

In order to influence people's behavior, the two motive systems need to be aroused by different incentives (McClelland et al., 1989). Incentives are situational cues provided by a situation that are inherently affectively rewarding for a person (Stanton, Hall, & Schultheiss, 2010). Implicit motives are aroused by intrinsic incentives inherent in performing an activity (McClelland et al., 1989). They preferentially respond to experiential incentives that are often perceived and represented nonverbally, such as dominance, challenge, parental care, or social bonding (Schultheiss, 2001, 2008; see Figure 4). By contrast, explicit motives are aroused by extrinsic social incentives (McClelland et al., 1989). They respond most readily to verbal stimuli that describe the expectations, values, beliefs, and norms of the sociocultural context to which a person belongs.

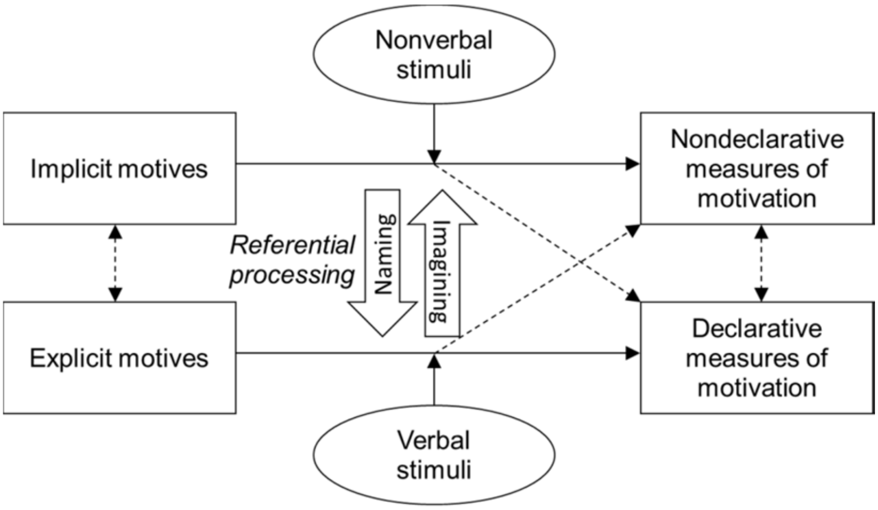

Figure 4. Information-processing model of implicit and explicit motivation. Solid lines: significant correlation/influence; dashed lines: no significant correlations (Schultheiss, 2001, 2008; Schultheiss & Strasser, 2012).

Aroused implicit motives influence processes and behaviors that are mostly not accessible to or controlled by a person's self-concept; that is, automatic incentive-driven behavior that aims to satisfy the particular motive in order to maximize pleasure (Schultheiss, 2001, 2008). Therefore, implicit motives are more likely to affect nondeclarative or operant measures of motivation, such as cardiovascular responses, hormonal changes, nonverbal communication, or response speed on performance tasks (e.g., Brunstein & Maier, 2005; McClelland, 1979; Schultheiss & Brunstein, 2002; Schultheiss, Wirth, Torges, Pang, Villacorta, & Welsh, 2005; Stanton & Schultheiss, 2009). Conversely, aroused explicit motives influence processes and behavior accessible to, and controlled by, a person's self-concept; that is, a person's attitudes, decisions, goal choices, and judgments (e.g., Brunstein & Maier, 2005). Therefore, explicit motives are more likely to affect declarative measures of motivation (Schultheiss, 2001, 2008). In other words, implicit and explicit motives affect different types of behavior. For example, in a study conducted by deCharms, Morrison, Reitman, and McClelland (1955), the implicit achievement motive predicted performance on an anagram task but not judgments of other people, whereas the explicit achievement motive predicted judgments of other people but not performance on the anagram task.

Because implicit motives are unconscious, they cannot be assessed with self-report questionnaires. Traditionally, implicit motives are assessed using the Picture Story Exercise (PSE; Pang & Schultheiss, 2005; Schultheiss & Pang, 2007; Pang, 2010). Individuals are shown different picture cues and are instructed to write imaginative stories in response to the pictures. The underlying assumption is that people project their unconscious motives onto these ambiguous pictures. The stories or statements are later coded for different motives (Winter, 1994).

Explicit motives, of which people are aware, can be measured via self-report questionnaires. Self-report questionnaires directly ask people what their motives are, what their goals are, or what they would prefer to do in a specific situation. An example for a questionnaire that is used to assess explicit motives is the Personality Research Form (PRF; Jackson, 1974). Individuals are instructed to indicate how they would behave in general, but not in response to specific situational contexts. They decide whether or not a statement applies to themselves (e.g., "I feel confident when directing the activities of others").

A measure that combines features of the PSE and self-report questionnaires is the Multi-Motive Grid (MMG; Sokolowski, Schmalt, Langens, & Puca, 2000). The MMG is a semi-projective measure that uses a grid technique (Schmalt, 1999). For the MMG, people are also shown pictures in order to arouse their motives. These pictures show ambiguous situations, but these situations were drawn specifically for this measure. In contrast to the PSE, these pictures are followed by a series of verbal statements that describe typical emotions, cognitions, goal anticipations, and instrumental actions. People indicate whether or not these descriptions describe the way they would think or feel in the situation shown in the picture.

The implicit and explicit motive systems can be classified according to motive themes. Bakan (1966) distinguished between the agentic and the communal motive. The agentic motive characterizes a need for autonomy, instrumentality, and dominance in relation to others. By contrast, the communal motive refers to the need for relationships, interdependence, and connection with others (Bakan, 1966; McAdams, 1988).

Other researchers have focused on the “big three” motives: achievement, power, and affiliation (McClelland, 1987; Heckhausen & Heckhausen, 2008; Schultheiss & Brunstein, 2010). Thereby, the communal motive (often abbreviated as *n* Communal derived from *need of*) is represented by the affiliation motive (*n* Affiliation), which is an enduring concern about establishing and maintaining or restoring positive relationships with others (Atkinson, Heyns, & Veroff, 1958). The agentic motive (*n* Agentic) is further differentiated in the achievement motive and the power motive (*n* Achievement and *n* Power; Brunstein et al., 1998; Woike, McLeod, & Goggin, 2003). The achievement motive is an enduring concern with maintaining or surpassing standards of excellence (McClelland et al., 1953), whereas the power motive is a recurrent concern for having an impact on others or the world at large (Winter, 1973; see also Chapter 2.5 for a more detailed description of the power motive).

The implicit and explicit motive systems coexist within a person but are widely independent from each other (McClelland et al., 1989; Weinberger & McClelland, 1990). As a result, they have usually be found to be uncorrelated or only weakly correlated with each other in various studies (e.g., Baumann, Kaschel, & Kuhl, 2005; Hofer, Busch, Chasiotis, & Kiessling, 2006; Job & Brandstätter, 2009; Kehr, 2004a; Koestner, Weinberger, & McClelland, 1991; Rawolle, 2010; Schattke, 2011; Schattke, Koestner, & Kehr; 2011;

Schüler, 2010; Thrash & Elliot, 2002). Their correlation has typically been found to be around the low positive range of $r \approx .10$ (Köllner & Schultheiss, 2012; Spangler, 1992).

However, although implicit and explicit motives are widely independent of each other, they should be aroused congruently (McClelland et al., 1989). Several studies have demonstrated that congruence between implicit and explicit motives has positive consequences for individuals such as enhanced life satisfaction (Hofer & Chasiotis, 2003; Hofer, Chasiotis, & Campos, 2006), increased well-being (Brunstein et al.; 1998; Hofer, Busch, Bond, Li, & Law, 2010; Schüler, Job, Fröhlich, & Brandstätter, 2008), decreased psychosomatic symptoms (Baumann et al., 2005; Schultheiss, Jones, Davis, & Kley, 2008), and mature identity development (Hofer et al., 2006). Conversely, discrepancies between implicit and explicit motives have negative consequences such as decreased well-being (Brunstein et al., 1998; Brunstein, Maier, & Schultheiss, 1999), reduced volitional strength (Kehr, 2004a), and enhanced unhealthy eating behavior (Job, Oertig, Brandstätter, & Allemand, 2010).

According to the compensatory model of motivation and volition (Kehr, 2000, 2004b), implicit and explicit motives operate at the distal level and are related to affective and cognitive preferences at the proximal level. The arousal of implicit motives at the distal level leads to implicit behavioral tendencies at the proximal level that are expressed as affective preferences. Affective preferences indicate whether or not the current task is pleasant for the person (Kehr, 2000). Likewise, McClelland et al. (1989) stated that implicit motives are built on associations with innately triggered affective experiences. Therefore, Kehr (2004b) proposed that the arousal of implicit motives by a certain task will lead to affective preferences for that task. Conversely, aroused explicit motives at the distal level will lead to explicit action tendencies at the proximal level that will generate cognitive preferences for a task. Cognitive preferences indicate whether or not the current task is important to the person

(Kehr, 2000). High cognitive preferences for a task will ensure that a person will limit his or her stimulus field in order to concentrate on the task. By doing so, no other task will be able to distract the attention of the person from the task at hand.

High affective preferences descending from aroused implicit motives may lead to intrinsic motivation (Kehr, 2004b). For example, a scientist high in the implicit achievement motive enjoys writing. Hence, she may be intrinsically motivated when she writes a new paper. However, aroused implicit motives do not necessarily lead to intrinsic motivation. It is more likely that they lead to intrinsic motivation in combination with high cognitive preferences (Kehr, 2004b). When the scientist enjoys writing and the paper is additionally important to her because the results verify some of her basic research ideas or the paper will be published in a high-ranking journal, she is more likely to be intrinsically motivated. However, when the scientist also has to correct exam papers for the next day, her intrinsic motivation will be suppressed. In sum, intrinsic motivation results when, on the one hand, implicit motives are aroused, leading to high affective preferences for the task; but on the other hand, it is also necessary that no conflicting explicit motives are activated so that there are no thematically different cognitive preferences (partial congruence), or that the congruent explicit motive is activated leading to high cognitive preferences for the task (complete congruence; Kehr, 2004b).

In flow research, Rheinberg (2002, 2008) had an idea similar to Kehr's (2000, 2004b) and introduced the flow hypothesis of motivational competence. Motivational competence is the ability to reconcile current and future situations with one's activity preferences in a way that a person can function without the need for permanent volitional control (Rheinberg & Engeser, 2010). This competence is described by five components (a) the ability to achieve congruence of implicit and explicit motives, (b) the ability to evaluate different incentives in a situation, (c) the ability to endow the situation with motive-congruent incentives when there is none of them, (d) the ability to focus on finding pleasure in an activity itself rather than focusing on the expected benefits, and (e) knowledge about internal and external conditions that can influence motivational processes (meta-motivational knowledge; Rheinberg & Engeser, 2010). In relation to flow, Rheinberg (2002, 2008) proposed that people high in motivational competence who are involved in motive-congruent activities are more likely to experience flow. However, to date only the first two components of motivational competence have been examined empirically.

Clavadetscher (2003) studied whether the motive congruence of volunteers who helped to organize different cultural events such as concerts would promote flow during the organization of these events. Volunteers were allowed to choose their preferred helping activity (e.g., inviting well-known bands, administration tasks, or running the bar during intermission). The results showed that volunteers with high motive congruence experienced more flow while performing their chosen activity than volunteers with low motive congruence.

In the achievement domain, Steiner (2006) examined badminton players who imagined that they were playing a game of badminton. Previously, their implicit and explicit achievement motives had been assessed. Results showed that players with high scores on the implicit and explicit achievement motives experienced the highest level of flow followed by players with low scores on both measures. Players with incongruent implicit and explicit achievement motives reported the lowest level of flow. Moreover, Steiner found that motive congruence was particularly relevant for flow when the implicit achievement motive was high. Only for players high in implicit achievement motivation was the contrast between high and low motive congruence significant. No significant effect was revealed for players low in implicit achievement motivation.

Rheinberg et al. (2005) conducted an Experience Sampling study in order to examine flow at work. Whenever participants got beeped, they reported their momentary flow experience, where they were, and what they were doing at that moment. Beforehand, the implicit and explicit achievement motives were assessed. Scientists/managerial staff members as well as secretaries/administrative assistants were beeped over a period of 1 week. The findings revealed that people high in motive congruence reported higher levels of flow than people low in motive congruence. Moreover, scientists/managers experienced particularly high flow when they were involved in achievement-related situations (e.g., writing papers, planning studies, running analyses). By contrast, for secretaries/administrative assistants flow was independent of whether they were engaged in an achievement-related activity or talking to colleagues or taking a break. However, their overall flow level was as high as the flow level of scientists/managers.

Schüler (2010) also explored the relation between achievement-motive congruence and flow experience and she also assumed that this relation would be moderated by present achievement-related incentives. She examined people in different sports activities either with achievement-related incentives or without achievement-related incentives. Her results showed that individuals with congruent implicit and explicit achievement motives experienced more flow in sports with achievement-related incentives compared to sports without achievement-related incentives.

In sum, Kehr's compensatory model of motivation and volition (2000, 2004b) and Rheinberg's flow hypothesis of motivational competence (2002, 2008) differ from traditional flow models (Csikszentmihalyi, 1975; Massimi & Carli, 1986, 1988) in considering the importance of implicit and explicit motives for flow. However, Rheinberg's flow hypothesis has the drawback that it does not explicitly consider perceived abilities anymore. By contrast, the compensatory model (Kehr, 2000, 2004b) goes one step further and integrates perceived abilities in a joint model with implicit and explicit motives.

2.4.2 Integration of perceived abilities

Perceived abilities are conceptualized as people's perception of the amount of control they can exert over the current situation (Kehr, 2004b). They are mostly determined by past performance (Bandura, 1977; Carver & Scheier, 1982; Kanfer & Ackermann, 1989). When individuals perform a task successfully, they feel confident about being successful again on similar tasks (Bandura, 1977). Moreover, they perceive the performance of similar tasks as easier (Ajzen, 1991). As a result of the repeated experiences, individuals develop automatic behavioral control programs. These programs are called scripts (Lord & Kernan, 1987; Schank & Abelson, 1977) and they guide routine behaviors.

Therefore, perceived abilities are associated with scripted behavior at the proximal level (Kehr, 2004b). Perceived abilities largely reflect a person's scripted response pattern. Thus, low perceived abilities are related to nonexistent, insufficient, or less developed behavioral routines and they lead to more frequent script interruptions (Kehr, 2004b).

According to the compensatory model (Kehr, 2000, 2004b) perceived abilities themselves have no relevance for motivated behavior. They need to interact with implicit and explicit motives in order to influence behavior. When implicit motives, explicit motives, and perceived abilities are congruent, flow emerges (Kehr, 2000, 2004b).

Similar to Csikszentmihalyi (1990), Kehr (2004b) assumes that low perceived abilities preclude flow. They are associated with a low degree of automation and frequent script interruptions that counteract the experience of flow. However, in contrast to Csikszentmihalyi (1990), Kehr's model proposes that when perceived abilities exceed task demands, flow is not necessarily impeded. Only when low demands prevent the arousal of flow-concordant implicit motives or activate conflicting explicit motives will flow be impeded.

Schattke (2011) conducted two studies in order to test some assumptions of the compensatory model regarding flow in the achievement domain by examining indoor wall climbers. In the first study, participants climbed routes with an increasing level of difficulty. The difficulty of the routes depended on participants' perceived abilities. Climbers' implicit achievement motive was assessed using the PSE as well as whether they perceived achievement-related incentives during climbing. After participants' had climbed each of four routes, flow was assessed using the FKS. Results showed that for climbers high in implicit achievement motive flow increased from the easy to the challenging route. For climbers low in implicit achievement motive flow did not increase. The second study followed the same procedure. However, the implicit achievement motive was assessed using the MMG. Moreover, the explicit achievement motive was additionally assessed using the achievement subscale of the PRF. Results showed that individuals high in implicit and explicit achievement-motive congruence experienced higher flow from the easy to the challenging route again, but only when they additionally experienced achievement-related incentives during climbing. However, the impact of conflicting explicit motives was not tested in these studies. Hence, Schattke (2011) confirmed parts of the propositions made by the compensatory model in the achievement domain (Kehr, 2000, 2004b). In his studies, flow occurred when the implicit motive was aroused by incentives in the situation and when people reported a congruent explicit motive in addition to their implicit motive. Moreover, he showed that, for the easy route, there was no difference between the flow experiences of climbers high in achievement motivation as compared to climbers low in achievement motivation. Only for the challenging route did climbers high in achievement motivation experience more flow than climbers low in achievement motivation. These findings are in line with Kehr's (2004b) assumption that low task demands would hinder flow if they prevented the arousal of implicit motives because an easy route does not contain achievement-related incentives and thus fails to arouse the implicit achievement motive.

However, Schattke's (2011) studies focused exclusively on distal components of the compensatory model and did not consider proximal components or the interaction of distal and proximal components in order to explain the emergence of flow. Moreover, the studies were restricted to the achievement domain only and did not take into account other motives such as the power motive.

2.5 The Power Motive

People with a high power motive are able to derive pleasure from having physical, mental, or emotional impact on other people (Winter, 1973). Furthermore, they experience the impact of others on themselves as aversive. Attaining this natural incentive arouses pleasurable affect that in turn reinforces the behavior that was instrumental in obtaining it. As a result, individuals high in power motivation experience having an impact on others as more rewarding and desirable than individuals low in power motivation.

Individuals high in power motivation show a strong concern with social ranking and prestige (McClelland, 1987). Another person's loud voice, angry face, and threatening gestures can trigger the power motive (Schultheiss, 2001). Furthermore, trying to beat the top-ranked player to ascend in a high score list provides an incentive for people high in power motivation (Schultheiss & Brunstein, 1999). Likewise, a victory over an opponent, which indicates having an impact on him or her, may elicit the implicit power motive (Schultheiss, Campbell, & McClelland, 1999; Schultheiss & Rhode, 2002; Schultheiss, Wirth, Torges et al., 2005).

Individuals high in power motivation act in a way that attracts the attention of others in order to raise their own social visibility such as placing risky bets in gambling (McClelland & Teague, 1975; McClelland & Watson, 1973) or purchasing extravagant cars and consumer goods (Winter, 1973). In particular, Politicians who actively seek office score high in power motivation (Winter, 1982, 2002, 2005, 2010, 2011). Hence, politicians are often good at calling attention to themselves, at getting their names in newspapers or on television, and at creating media events that will lead to name recognition (McClelland, 1987). In order to get recognized, politicians may also identify with a particular issue or represent politically extreme positions. For example, the prestige project of Edmund Stoiber (governor of Bavaria from 1993 until 2007) was the construction of the Transrapid, a magnetic levitation train for the city of Munich. This train was designed to transport people from the Munich airport to Munich Central Station although a commuter train for this trip already existed. However, with the Transrapid, the trip would have lasted only 10 min compared to 40 min with the commuter train. Although the cost for this project increased much more than had been expected at the beginning of planning, Stoiber fought for the Transrapid until the end of his political career in Bavaria.

Men high in power motivation have been also found to show excessive drinking behavior (McClelland et al., 1972), physical violence, and the rejection of institutional responsibility, and by frequently getting into arguments (McClelland, 1975). Women high in power motivation tend to deliberately break objects or slam doors (McClelland, 1975).

Although the aim of having an impact on others is to dominate them, the behavior that results from arousing the power motive can also follow a functionality principle (Schultheiss & Brunstein, 2002; see Chapter 6 for a possibility to distinguish between the two forms of power motivation). This means that the behavior is not necessarily perceived as dominant or aggressive, but as functional to get closer to influence others. Winter (1973) explained: “To me, power is like fire: it can do useful things; it can be fun to play with and to watch; but it must be constantly guarded and trimmed back, lest it burn and destroy” (p. xviii). Therefore, the power drive can also be socialized through providing services to others, and thus people strive for socially acceptable ways to impact others. Hence, high power motivated individuals have been found to achieve high-status positions, being top managers, and reputable presidents (McClelland & Boyatzis, 1982; McClelland & Burnham, 1976; Winter, 1987). Moreover, they care more for the well-being of others (Magee & Langner, 2008, McClelland, 1975) and are attracted to jobs that allow them to teach others (Winter, 1973). Women high in socialized forms of power motivation have been found to have a larger number of credit cards, diet more often, have more children and are more involved in parenting (McClelland, 1987; Peterson & Stewart, 1993).

2.5.1 Implicit and explicit power-motive congruence

To date, little is known about the effects of implicit and explicit power-motive congruence. Brunstein et al. (1998) were the first to examine the effects of the implicit agentic motive (as a combination of the achievement motive and the power motive) and explicit agentic goals on emotional well-being. They found that for people high in implicit agentic motivation striving for motive-congruent goals, compared with striving for motive-incongruent goals, was positively associated with a higher commitment to the goals and with enhanced well-being.

Hofer and colleagues examined the effect of power-motive congruence besides achievement- and affiliation-motive congruence on life satisfaction in three cross-cultural studies (Hofer & Chasiotis, 2003; Hofer et al., 2006; Hofer et al., 2010). Two studies found an effect only for achievement- and affiliation-motive congruence on enhanced life satisfaction, but not for power-motive congruence. However, the third study showed that power values (as a more abstract part of the explicit motive system) positively affected well-being when they were translated into power goals (as a more proximal part of the explicit motive system that is closer to actual behavior) that matched a person's implicit power motive (Hofer et al., 2010).

Kazén and Kuhl (2011) examined the effect of power-motive congruence on happiness and satisfaction among managers. Overall, power-motive congruence enhanced happiness and satisfaction of executive managers. Additionally, when comparing different combinations of the implicit and explicit power motives, managers high in the explicit but low in the implicit power motive reported reduced levels of happiness and satisfaction compared to managers high in the implicit but low in the explicit power motive. The authors concluded that striving for a goal without gaining pleasure from doing so, which is indicated by a strong explicit and a weak implicit motive, is more damaging to happiness and satisfaction than a lack of striving for a goal that would give rise to happiness and satisfaction, which is indicated by a strong implicit and a weak explicit motive.

Job et al. (2010) tested the effects of implicit and explicit power-motive incongruence on unhealthy eating behavior. They assessed women's implicit and explicit motives and created a composite index of unhealthy eating behavior. This index included two more specific indicators such as the consumption of unhealthy food and unhealthy eating such as snacking or impulsive eating behavior in the last 2 weeks as well as two more general indicators such as the experiences of hunger and appetite and binge-eating episodes. Results showed that women high in power-motive incongruence showed more unhealthy eating behavior than women low in power-motive incongruence.

2.6 Flow Experience and the Power Motive

Since the beginning of flow research, it has been proposed that people may also achieve flow in activities without obvious achievement aspects such as talking and joking with friends and family, reading books, walking, attending social events such as parties and dinners, or watching TV (Csikszentmihalyi, 1975; Csikszentmihalyi, Larson, & Prescott, 1977; Csikszentmihalyi & LeFevre, 1989). Moreover, in the same situation, for example, when playing chess, people can perceive different incentives that lead to flow. Although some chess players have reported that they achieve flow through self-imposed challenges, others achieve flow by interacting with friends. A third group of players described that they attained flow through beating strong opponents and advancing in the hierarchy of ratings (Csikszentmihalyi, 1975).

It seems that different sources of enjoyment are derived from the activity, and thus, chess provides different reward structures to different players. Some players have reported enjoying the autotelic elements of the game; that is, when the incentive for acting out the activity lies in the activity itself. Other players enjoy more exotelic elements of the game; that is , when the incentive for acting out the activity lies outside the activity, such as competing against others, gaining prestige, friendship, or camaraderie (Csikszentmihalyi, 1975).

Csikszentmihalyi (1975) wondered why players for whom the incentive of chess lies in competition and prestige discount intrinsic rewards in favor of the enjoyment of competitions. Moreover, he discovered that these players more often participated in championships and were ranked higher in the USFC Ratings by the United States Chess Federation, which ranks players on the basis of wins and losses in official competitions. Furthermore, these players subscribed to a larger number of chess magazines. Csikszentmihalyi (1975) explained this effect by assuming that the property of chess journals might satisfy a person’s desire for prestige. He concluded that the structure of playing chess has primary, autotelic characteristics such as the enjoyment of the activity itself, solving mathematical problems, discovering something new, and playing a competitive sport in order to meet one’s own standard as well as secondary, in his view, exotelic characteristics such as prestige and companionship. He summarized his considerations and stated that “In fact, from a theoretical point of view, the secondary elements are more interesting. They show that any activity—no matter what it is ostensibly about—can provide rewards that are very different from the primary ones; that is, even routine work and other necessary activities can be made to offer intrinsic rewards” (p. 63). At this point, his considerations become imprecise because he did not specify the rewards provided by secondary elements, how they differ from the primary ones, and how they can also be intrinsically rewarding. By definition, this should not be possible because they are conceptualized as exotelic. However, Csikszentmihalyi did not make any progress in examining these secondary characteristics and, henceforth, focused on the primary characteristics of autotelic activities.

From the line of research that focused on implicit motives, McClelland (1987) used the concept of autotelic activities as evidence that natural incentives exist. He considered microflow activities in particular; little things people enjoy accomplishing such as humming, whistling, playing a musical instrument, shopping or joking with others as natural incentives that may or may not be in the service of major motives.

Furthermore, a study conducted by McAdams (1982) indicated that people high in power motivation may also experience flow. The goal of the study was to examine whether people high in power motivation would recall more power themes in so-called peak experiences (Maslow, 1962) than people low in power motivation. Peak experiences are characterized as experiences of complete attention, wholeness, disorientation in time or space, and openness with the environment (McAdams, 1982). Therefore, peak experiences show some common characteristics with the experience of flow. In this study, people were asked to recall such moments or episodes they had experienced within the last 2 years. Subsequently, these episodes were coded with regard to four categories: the physical or psychological strength a person achieved, which is generally embedded in contexts of inspiration, excitement, or sudden insight; impact on others; engagement in vigorous activities; and increase in prestige. Results revealed that people high in power motivation recalled more power-specific peak experiences that contained themes of strength, impact, vigorous activity, prestige, and personal inspiration than people low in power motivation. Most central to these people was the theme of feeling personal strength through inspiration. One person high in power motivation reported the following peak power experience:

> I was at a concert in Detroit. Performing was a favorite group of mine. I really became absorbed in the music. When the band hit their first few chords I felt that I was rising toward the ceiling and that I could see in all directions at once. The next hour or so was an experience of incredible beauty. I felt tremendous personal strength and clarity, and it was then that I knew that I had to be a musician, a decision that has resulted in considerable joy and considerable frustration for me. (McAdams, 1982, p. 300)

The peak experience described above indicates that the high power-motivated person experienced flow within this nonachievement situation that had no obvious challenging character for him. The demand-skill balance did not seem to be an issue here. In line with findings from flow research (cf. Engeser & Schiepe-Tiska, 2012), McAdams (1982) also found that people did not report joy or excitement during their peak experiences. If at all, they reported that these emotions appeared after the peak experience.

In sum, power motive-specific incentives such as competing against each other, prestige, or the opportunity to feel personal strength may be inherently rewarding for people high in power motivation and thus may foster the experience of flow. More generalized implicit motives have been found to orient attention toward motive-specific stimuli in the environment (Goschke & Kuhl, 1993; McClelland & Liberman, 1949; Rösch, 2012; Schultheiss & Hale, 2007). Thus, they seem to direct attention toward action opportunities that comprise motive-specific incentives (Schiepe-Tiska & Engeser, 2012; Woike, 2010). Hence, they limit the stimulus field of a person to a finite set of action opportunities. However, which action opportunity will be executed depends on explicit motives that channel already aroused implicit motives in the direction of certain acts that are in line with conscious purposes, values, and beliefs (McClelland, 1987). According to the compensatory model of motivation and volition (Kehr, 2000, 2004b), activated explicit motives that compete with aroused implicit motives would hinder the experience of flow, whereas an absence of competing explicit motives or congruent explicit motives would promote flow. In addition, the perceived skills for executing the action still need to be sufficient. Under these circumstances, flow is very likely to emerge. For example, in the power domain, people high in implicit power motivation seek action opportunities in which they can impact others; but they do not necessarily seek influential positions. However, when people are additionally high in explicit power motivation and thus hold power and prestige in high esteem, they are more likely to aim to achieve influential positions (Kehr, 2004b). When people high in implicit and explicit power motivation hold influential positions and perceive their skills for the job as sufficient, they can attain flow at work.

Only a few studies have already examined flow in power situations to investigate transformational leaders (Boerner & Streit, 2006; Linsner, 2009) and teachers (Bakker, 2005; Froh, Menges, & Walker, 1993). However, these studies did not explicitly consider the power motive as an important variable for explaining individual differences in the experience of flow. Transformational leaders are recognized as having a vision and as inspiring their followers to perform beyond expectations (e.g., Bass, 1985). To do so, leaders stimulate and transform employees' attitudes, beliefs, values, and needs. Transformational leadership has been found to be positively associated with the power motive (De Hoogh et al., 2005; House, Spangler, & Woycke, 1991). Linsner (2009) studied the relation between the transformational leadership of managers and the work-related flow of their employees. She found that, transformational leaders who created a climate of contribution, recognition, and challenge positively influenced their employees' flow experience. Moreover, transformational leadership and flow together positively affected the work climate of the organization. Boerner and Streit (2006) examined the transformational leadership style of orchestra conductors. An interaction between the conductor's transformational leadership style with the flow of the orchestra's musicians increased the cooperative climate of the orchestra. In orchestras in which the conductors were high in transformational leadership and the players were high in flow, the cooperative climate was also high (e.g., sticking together, no tensions between the instrument groups). By contrast, in orchestras in which the conductors were high in transformational leadership but the orchestra players were low in flow, the cooperative climate was also low.

In addition, as indicated by Winter (1973), individuals high in power motivation tend to choose a teaching profession as their career. Teaching is also a form of leadership in which students are led instead of employees. In a study by Froh et al. (1993), award-winning teachers experienced the most flow when they smartly engaged their classes in classroom discussions. Furthermore, Bakker (2005) examined music teachers and their students. Playing music has been found to be a situation in which flow can be experienced (Csikszentmihalyi, 1975; Montanez, 2012; Sinnamon, Moran, & O'Connell, 2012). Bakker's results revealed that the higher the flow experience of the teacher, the higher was the flow experience of the students. He assumed that this crossover effect was due to emotional contagion (Hatfield, Cacioppo, & Rapson, 1993) or emotional transmission (Frenzel, Goetz, Lüdtke, Pekrun, & Sutton, 2009). It refers to a process by which the expression of an emotion of one person is caught by another person because people tend to mimic and synchronize the facial expressions, movements, and posture of their counterpart (Hatfield et al., 1993). This phenomenon has been found for facial expressions (e.g., Field, Woodson, Cohen, Garcia, & Greenberg, 1983; Frodi et al., 1978) as well as positive and negative emotions (Bakker & Schaufeli, 2000; Bakker, Schaufeli, Sixma, & Bosveld, 2001; Frenzel et al., 2009) and stress (Westman, 2001; Westman & Etzion, 1995; Westman & Vinokur, 1998). Research in the field of charismatic leadership has shown that the positive effect of charismatic leaders on their employees' motivation, mood, and performance can also be ascribed to emotional contagion (Bono & Ilies, 2006; Cherulnik, Donley, Wiewel, & Miller, 2001; Johnson, 2008, 2009; Sy, Côté, & Saavedra, 2005). However, Bakker's study had some methodological problems: Teachers and students did not report their flow experiences at the same time, he asked only four students whom the teachers chose by themselves, and he did not assess all components of flow. To date, no other studies have tried to overcome these limitations to examine whether teachers' flow affects students' flow.

3 The Present Research

In the following, I will briefly present the central research questions that I derived from the theoretical outline above. These research questions will be addressed in the next chapters of the thesis.

The emergence of flow has been addressed by several approaches. Research in the tradition of Csikszentmihalyi (1975) has primarily adopted a phenomenological approach. The aim of this approach is to understand the dynamics of flow and the conditions under which these dynamics are optimal (Nakamura & Csikszentmihalyi, 2002). Thereto, a person x environment interaction is assumed, and it is proposed that flow results when the perceived demands of a situation match the perceived skills of a person (Csikszentmihalyi, 1975, Csikszentmihalyi & Csikszentmihalyi, 1988; Massimi & Carli, 1986, 1988).

However, within this approach, factors other than the demand-skill balance have not been considered although it has been found that people who report a demand-skill balance do not always experience flow (Abuhamdeh & Csikszentmihalyi, 2012; Csikszentmihalyi & Moneta, 1996). Moreover, people differ in amount of flow, quality of flow, and in the incentives they perceive in activities that help them to attain flow (Csikszentmihalyi, 1975; Csikszentmihalyi & Csikszentmihalyi, 1988; Csikszentmihalyi & LeFevre, 1989; Nakamura & Csikszentmihalyi, 2002).

Hence, current researchers have examined individual differences that can explain the emergence of flow. Different moderators of the relation between the demand-skill balance and flow have been found such as action orientation (Keller & Bless, 2008), locus of control (Keller & Blomann, 2008), and the implicit and explicit achievement motives (Baumann & Scheffer, 2010, 2011; Eisenberger et al., 2005; Engeser & Rheinberg, 2008; Schattke, 2011; Schüler, 2007, 2010).

The compensatory model of motivation and volition (Kehr, 2000, 2004b) proposes a more general explanation of how flow occurs by integrating implicit motives, explicit motives, and perceived skills in a joint model. According to the model, these three structural components operate at the distal level. At the proximal level, the relation between structural components and flow is mediated by affective preferences, cognitive preferences, and scripted behavior. Thus, the model proposes that flow emerges when (a) implicit motives are aroused leading to affective preferences for a task, (b) no competing explicit motives are activated leading to no thematically different cognitive preferences (partial congruence), or the congruent explicit motive is aroused leading to high cognitive preferences for the task (complete congruence), and (c) the abilities to accomplish a task, which reflect individuals scripted response patterns, are perceived as sufficient. Schattke (2011) successfully confirmed some of the assumed mechanisms at the distal level by examining the implicit and explicit achievement motives.

Furthermore, Engeser and Rheinberg (2008) showed that, at the proximal level, high cognitive preferences facilitate flow. They assumed that the perceived importance of a task might be a possible moderator for the relation between the demand-skill balance and flow. Results showed that, for highly important tasks, flow was still high when the perceived demands were low. For less important tasks, flow was high only when people perceived the demand-skill balance. Although Engeser and Rheinberg (2008) also found a moderation effect for the implicit achievement motive, the joint effect of cognitive preferences and the achievement motive was not considered in this study. Hence, an empirical verification that proximal components mediate the relation between distal components and flow has not been conducted yet.

The present research aimed to narrow this gap by examining whether the effect of implicit motives on flow would be mediated by affective preferences for a task. Further, a comprehensive consideration of all three proximal components was still missing. Consequently, their interaction was tested by hypothesizing that the congruence of high affective preferences, high cognitive preferences, and high perceived abilities would be associated with flow. These assumptions were tested in a study conducted in an open innovation environment (Study 1).

Another research gap that had existed until today was the question of whether flow could be achieved only by people high in the achievement motive. Findings from traditional flow research have indicated that people indeed perceive that there are other incentives than the demand-skill balance that promote their flow experience such as competition or prestige (Csikszentmihalyi 1975, Csikszentmihalyi & LeFevre, 1989). On the other hand, indirect evidence from research on power motivation has revealed that people high in power motivation also seem to attain flow (McAdams, 1982). Moreover, transformational leaders and teachers, both of whom have been found to be high in power motivation (De Hoogh et al., 2005; House et al., 1991; McClelland, 1987; Winter, 1973), have shown high levels of flow while working (Bakker, 2005; Boerner & Streit, 2006; Froh, et al., 1993; Linsner, 2009).

To reconcile these findings, I propose that power-motive specific incentives such as having an impact on others through leading, teaching, competition, or prestige may arouse the power motive. In line with the compensatory model of motivation and volition (Kehr, 2000, 2004b), I assume that the congruence of the implicit and explicit power motives in conjunction with sufficient perceived abilities will promote the experience of flow. In order to test this assumption, I conducted a field study examining teachers (Study 2) and a laboratory experiment using a competition paradigm (Study 3).

Further, Bakker (2005) proposed and studied the crossover effect of flow. He showed that when music teachers were high in flow, their students also experienced high levels of flow. However, this study had some methodological problems, and to date, other studies have not yet examined this effect. Therefore, the present research attempted to overcome the limitations of Bakker's original study and aimed to replicate the finding that teachers' flow affects students' flow (Study 2).

In the context of the experiment using the competition paradigm, I also examined whether high levels of implicit power motivation are related to implicit learning (as indicated through an increase in response speed and a decrease in response accuracy) that is reinforced by social victory. According to the information-processing model (Schultheiss, 2001, 2008) implicit motives, but not explicit motives, affect nondeclarative measures such as response speed and accuracy. Studies have revealed that people high in implicit power motivation, but not people low in implicit power motivation, show enhanced implicit learning when they beat an opponent (Schultheiss et al., 1999; Schultheiss & Rhode, 2002; Schultheiss, Wirth, et al., 2005). In line with previous findings, I expected that people high in implicit power motivation but not people low in implicit power motivation would show enhanced implicit learning after beating an opponent (Study 3).

In sum, the present research was guided by the following hypotheses: First, the relation between implicit motives and flow was expected to be mediated by affective preferences. Second, the interaction between high affective preferences, high cognitive preferences, and high perceived abilities was expected to be associated with flow. Third, the congruence of the implicit and explicit power motives was also expected to promote flow. Fourth, a person's flow experience was expected to be able to positively affect the experience of flow of other people. Fifth, after beating an opponent, people high in implicit power motivation were expected to show enhanced implicit learning.

4 Study 1 – Flow in an Open Innovation Environment

The first study examined the assumption made by the compensatory model (Kehr, 2000, 2004b) that proximal affective preferences may mediate the relation between distal implicit motives and flow. Furthermore, the proximal components affective preferences, cognitive preferences, and perceived abilities were comprehensively considered in order to explain how flow emerges. The study was conducted in an open innovation environment using an online platform. Open innovation is characterized as a self-organized, self-motivated, and collaborative development and creation of new and innovative ideas and products (von Hippel, 2005). Open innovation projects have attracted a lot of attention of motivation researchers (e.g., Lakhani & von Hippel, 2003; Roberts, Hann, & Slaughter, 2006; Schroer & Hertel, 2009) who intend to find answers to an obvious question: What motivates people to engage in open innovation? It has been shown that people participate in open innovation online platforms because of different incentives such as solving a certain problem, improving existing software, enhancing their reputations, or dominating other developers (e.g., Lakhani & von Hippel, 2003; Schroer & Hertel, 2009).

As deduced from these findings, it seems likely that these incentives arouse the agentic motive, which is defined as a need for autonomy, instrumentality, and dominance in relation to others (Bakan, 1966). A high agentic motive characterizes people whose behavior is primarily oriented toward self-mastery, status, achievement, and empowerment (Brunstein et al., 1998).

Building on the work of McClelland et al. (1989), who stated that implicit motives are built on associations with innately triggered affective experiences, Kehr (2004b) proposed that the arousal of implicit motives by a certain task at the distal level leads to affective preferences for that task at the proximal level. According to the compensatory model (Kehr, 2000, 2004b), affective preferences for a task stemming from aroused implicit motives will lead to the experience of flow. Therefore, it seemed likely that affective preferences would mediate the relation between the aroused agentic motive and flow (mediation hypothesis, see Figure 5).

Hypothesis 1.1: Affective preferences mediate the effect of the agentic motive on flow.

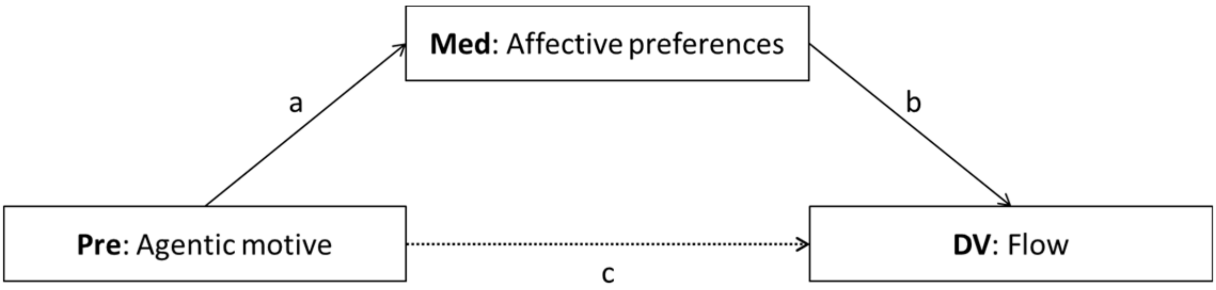

Figure 5. Mediation hypothesis. Mediation of the agentic motive (predictor) on flow (dependent variable) through affective preferences. Pre = Predictor; Med = Mediator; DV = Dependent variable.

However, affective preferences resulting from aroused implicit motives do not affect flow in isolation. According to the compensatory model (Kehr, 2004b), at the proximal level, they interact with cognitive preferences and perceived abilities to determine flow. The congruence of affective preferences, cognitive preferences, and perceived abilities should be associated with flow experiences (see Chapter 2.4 for a more detailed explanation of this assumed interaction). Therefore, high affective preferences, high cognitive preferences, and high perceived abilities should lead to high levels of flow compared to low affective preferences, low cognitive preferences, and low perceived abilities, which should lead to low levels of flow (interaction hypothesis).

Hypothesis 1.2: Affective preferences, cognitive preferences, and perceived abilities interact with each other in predicting the experience of flow.

4.1 Method

4.1.1 Participants

Sixty-three computer science students (49 men and 14 women) who were enrolled as undergraduate and graduate students at Technische Universität München participated in this study and received course credit for their participation. On average, they were 21.73 years old (*SD* = 2.44; one student did not state his or her age).

4.1.2 Design

For this study, I used a correlational design. For the mediation hypothesis, the agentic motive served as the predictor, affective preferences as the mediator, and flow as the dependent variable. For the interaction hypothesis, affective preferences, cognitive preferences, and perceived abilities served as predictors, and again flow was the dependent variable.

4.1.3 Procedure

Before coming to the lab, the agentic motive of the participants was assessed. Upon arrival at the lab, participants were seated randomly at individual computer stations. Participants saw a virtual online platform on their monitor (IdeaStream; Forster, 2010; Appendix A). This platform was designed so that participants could create new and innovative ideas in virtual teams. Groups of two to four participants worked collaboratively on the virtual online platform at a time. Group size did not affect the results of the study and was therefore disregarded in subsequent analyses.

Participants were asked to create new and innovative ideas concerning the question "What possibilities can you think of to employ student's tuition fees in a useful way?" Whenever a participant wrote an idea on the platform, other participants in the group could read the idea on their own computer. Some features of the platform were deliberately designed to arouse the agentic motive (e.g., high score list of the number of ideas, notepad to allow participants to develop their ideas first). Prior to the actual experiment, participants were introduced to the features of the platform. In the first creativity session, participants worked for 5 min to create as many ideas as possible in an online brainstorming session. Then, students' affective preferences, cognitive preferences, and perceived abilities were assessed while working on the platform. A second 5 min creativity session followed. At the end of this session, each participant's flow experience was assessed. Finally, participants were fully debriefed and thanked for their participation.

4.1.4 **Measures**

Agentic motive. The two subscales hope of control and hope of success from the MMG (Sokolowski et al.; 2000) were used to assess the agentic motive. The MMG is a semi-projective instrument that contains 14 ambiguous pictures, each followed by a series of descriptive statements (e.g., "Trying to influence other people", "Feeling confident about succeeding on this task"; Cronbach's $\alpha = .62$). Participants indicate whether or not (i.e., *yes* or *no*) the statement describes the way they would think or feel in the situation shown in the picture. Due to a technical error, one item for the power motive was missing (Picture 7, Item 8).

The implicit agentic motive was calculated by summing the z-standardized power motive score and the z-standardized achievement motive score from the MMG and dividing by 2 (e.g., Brunstein et al., 1998)[2]. This approach is also in line with findings of factor analyses computed by Sokolowski et al. (2000); these results showed that the MMG scales *hope of control* and *hope of success* formed a combined factor in addition to a factor representing *hope of affiliation* and a general fear factor.

[2] The correlation between hope of control and hope of success was $r = .39$, $p = .00$.

Affective preferences, cognitive preferences, and perceived abilities. The three components were assessed with the three-component scale (Kehr, Rosenstiel, & Bles, 1997; Appendix B), which was adapted for working with the platform. Each scale consists of four items (e.g., “Compared to other activities, I enjoy working with the platform”; “I find it important to accomplish my tasks well with the platform”; and “I have the required skills in order to accomplish my tasks with the platform”). Participants could rate each item on a 7-point scale from 1 (*not at all*) to 7 (*very much*). Cronbach’s α for affective preferences was α = .85; for cognitive preferences: α = .77; and for perceived abilities: α = .68.

Flow experience. Flow was assessed with the Flow Short Scale (FKS; Engeser & Rheinberg, 2008). This scale measures all components of flow with 10 items (e.g., “I am completely absorbed in what I am doing”; Cronbach’s α = .76) that are endorsed on a 7-point scale ranging from 1 (*not at all*) to 4 (*partly*) to 7 (*very much*).

Statistical procedures. The analyses were conducted with SYSTAT 13 and SPSS 19. They involved correlation analysis, regression analysis, and mediation analysis. The hierarchical regression analysis was conducted with SPSS 19. Likewise, SPSS 19 was applied to the mediation analysis using the macros INDIRECT (Preacher & Hayes, 2008) and PROCESS (Hayes, 2012) which compute Baron and Kenny’s (1986) regressions steps, compute the Sobel test, and apply the bootstrapping procedure. The macros test the direct, indirect, and total effects based on bias-corrected confidence intervals. The overall model fits of further analyses were determined by Mplus 6 (Muthén & Muthén, 1998-2011). Simple slope tests, simple slope differences tests, and the three-way interaction figure were conducted with an Excel macro by Meier (2008). A power analysis was performed using G*Power 3.1.3 (Faul, Erdfelder, Buchner, & Lang, 2009). Descriptive statistics are given as *M* and *SD* unless otherwise indicated. All tests were two tailed, and an alpha level of .05 was employed in all analyses.

4.2 Results

4.2.1 Preliminary analyses

Descriptive statistics and inter-correlations of all variables are presented in Table 1. All scores were z-standardized for further analyses. Further preliminary analyses indicated that neither age nor gender had significant effects on the results reported below.

Table 1

Descriptive Statistics and Correlations

Variable	(1)	(2)	(3)	(4)	*M*	*SD*	Min	Max
(1) nAgent	-				6.71	2.07	3.00	11.00
(2) Affective preferences	.32**	-			4.89	1.15	1.75	7.00
(3) Cognitive preferences	.38**	.48**	-		4.26	1.20	1.25	6.75
(4) Perceived abilities	.24	.53**	.34**	-	5.50	.84	3.50	7.00
(5) Flow	.24*	.54**	.47**	.56**	4.75	.81	2.70	6.40

Note. $N = 63$. nAgent = implicit agentic motive. * $p < .05$. ** $p < .01$.

4.2.2 Mediation analysis

In order to test whether affective preferences mediated the effect of the agentic motive on flow (Hypothesis 1.1), a series of regression models were computed (Baron & Kenny, 1986). The agentic motive was the predictor, affective preferences the proposed mediator, and flow the dependent variable. According to the causal step approach introduced by Baron and Kenny (1986), the following conditions have to be met in order to confirm a mediator effect: (a) flow has to be directly predicted by the agentic motive, (b) the experience of affective preferences also needs to be predicted by the agentic motive, (c) affective preferences must predict flow, and (d) the direct relation between agentic motive and flow must be reduced when affective preferences are introduced as the mediator. Contrary to the original steps, recent research agrees that the condition b, establishing a direct relation between predictor and mediator, is not a necessary prerequisite for the occurrence of a mediation effect (Collins, Graham, & Flaherty, 1998; Hayes, 2009, 2012; Judd & Kenny, 1981; Kenny, Kashy, & Bolger, 1998; MacKinnon, 1994, 2000; MacKinnon, Krull, & Lockwood, 2000; Preacher & Hayes, 2008; Shrout & Bolger, 2002).

The regression analyses yielded a marginally significant effect of the agentic motive (the predictor) on flow, $\beta = .24$, $t(61) = 1.98$, $p = .054$[3] and a significant effect of the agentic motive on affective preferences (the proposed mediator), $\beta = .32$, $t(61) = 2.65$, $p < .01$[4]. Likewise, the effect of affective preferences on flow was found to be significant, $\beta = .54$, $t(61) = 5.04$, $p < .01$. Next, I tested whether the agentic motive still had a significant effect on flow after controlling for affective preferences. As expected, the effect of the agentic motive on flow was reduced to $\beta = .07$, $t(60) = 0.67$, $p = .51$[5] (see Figure 6).

However, the causal step approach has been criticized because of its low power to detect mediation effects and because it does not directly test the indirect path from the predictor to the dependent variable via the mediator (cf. Hayes, 2009). "The existence of an indirect effect is inferred logically by the outcome of a set of hypothesis tests. If *a* [the effect of the predictor on the mediator] and *b* [the effect of the mediator on the dependent variable] are both different from zero by a statistical significance criterion, then so too must be the indirect effect according to the logic of this approach" (Hayes, 2009, p. 410).

[3] When I additionally controlled for hope of affiliation, the regression analysis still established a significant effect of the agentic motive on flow, $\beta = .31$, $t(61) = 2.18$, $p = .033$. The effect of hope of affiliation on flow was not significant.

[4] After controlling for hope of affiliation, the regression analysis still revealed a significant effect of the agentic motive on affective preferences, $\beta = .29$, $t(61) = 2.10$, $p = .04$. The effect of hope of affiliation was not significant.

[5] After controlling for hope of affiliation, the regression analysis still showed a significant effect of affective preferences on flow, $\beta = .53$, $t(61) = 4.66$, $p = .000$. Hope of affiliation and the agentic motive were no significant predictors.

The agentic motive and affective preferences were significantly correlated with each other, $r = .32$, $p < .01$. Thus, no multicollinearity was revealed (multicollinearity is indicated when correlations are above .80 or .90, see Field, 2009). However, in order to preclude any subtle forms of multicollinearity the variance inflation factor (VIF) was calculated. The VIF was 1.16; therefore, no collinearity was indicated (Bowerman & O'Connell, 1990; Myers, 1990).

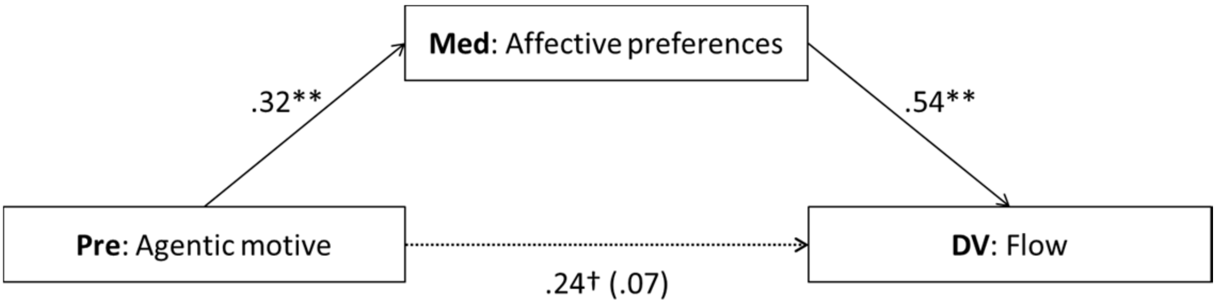

Figure 6. Mediation model of the influence of agentic motive (predictor) on Flow (dependent variable) through affective preferences (mediator). Pre = Predictor; Med = Mediator; DV = Dependent variable. The standardized regression coefficient between implicit agentic motive and flow without controlling for affective preferences is in parentheses.
† $p < .10$. * $p < .05$. ** $p < .01$.

The Sobel test (Sobel, 1982) overcomes this limitation by providing a direct test of the indirect effect. The results of the Sobel test also indicated a significant mediation effect, $z = 2.25$, $p < .05$, meaning that there was an indirect effect of the agentic motive via affective preferences on flow. The disadvantage of this approach is that it requires a normal sampling distribution of the indirect effect (Preacher & Hayes, 2008). However, the sampling distribution tends to be asymmetric (Bollen & Stine, 1990; Stone & Sobel, 1990), and the statistical power to detect a mediation effect is admittedly higher than the power of the causal step approach but still only moderate (Hayes, 2009).

Therefore, bootstrapping procedures have been introduced as the method of choice for analyzing mediation effects (Hayes, 2009; Preacher & Hayes, 2008). For this analysis no assumptions about the distribution of the variables are required and it can be applied more confidently to smaller samples. Moreover, this procedure has the highest power to detect indirect effects and the best Type I error control compared to the causal step approach and the Sobel test (Hayes, 2009). The procedure bootstraps the sampling distribution of the path *ab* (the indirect path from the predictor to the dependent variable via the mediator) and derives a confidence interval for the bootstrapped sampling distribution. The results of the bootstrap procedure revealed that the indirect effect of the agentic motive on flow through affective preferences was not zero by a 95% bias-corrected bootstrap confidence interval based on 5,000 bootstrap samples (.02 to .35, with a point estimate of .16). This result indicates that the indirect effect is indeed significantly different from zero at $p < .05$ because zero is not within the 95% confidence interval. The result indicates the presence of full mediation. Thus, the level of affective preferences for the task mediated the effect of the agentic motive on flow while working on the platform. The higher the agentic motive, the higher the affective preferences, and the more flow was reported.

4.2.3 **Further analysis**

The correlation analysis also revealed a significant correlation between the agentic motive and cognitive preferences, $r = .38$, $p < .05$ (see Table 1), although no relation between these variables was expected. Consequently, I examined whether the effect of the agentic motive on flow was additionally mediated by cognitive preferences. I tested a parallel mediation model examining the indirect effect of the agentic motive on flow through affective and cognitive preferences. However, the analysis of the overall fit revealed that the model fit the data poorly. The chi-square was 11.84 ($df = 6$, $p = .00$), the CFI was .78, and the RMSEA was .41. Consequently, no additional analyses were conducted.

4.2.4 **Interaction analysis**

Next, the interaction hypothesis that affective preferences, cognitive preferences, and perceived abilities interact in order to affect flow (Hypothesis 1.2) was analyzed. Therefore, a hierarchical regression analysis was computed. In the first step, flow was regressed on affective preferences, cognitive preferences, and perceived abilities. In the second step, flow was additionally regressed on all two-way interactions. In the third and final step, flow was additionally regressed on the three-way interaction. The results are presented in Table 2.

In the final step, the hierarchical regression analysis (R^2 = .54) yielded a significant three-way interaction of affective preferences, cognitive preferences, and perceived abilities on flow, β = .36, $t(55) = 2.67$, $p < .05$. The three-way interaction term produced a significant ($p < .05$) additional increase in R^2 (ΔR^2 = .06).[6] Therefore, the interaction of affective preferences, cognitive preferences, and perceived abilities significantly predicted flow for participants while they worked on the platform (Figure 7).[7]

To explore this interaction in more detail, simple slope tests at values of one standard deviation above and below the means of affective preferences and perceived abilities, depending on cognitive preferences, were applied (Aiken & West, 1991; Cohen, Cohen, Aiken, & West., 2003).

[6] Again, no multicollinearity was indicated (VIF < 1.94).

[7] In order to justify these results, which are based on only 63 participants, a post hoc power analysis (Cohen, 1988) was applied. For the three way interaction itself with the seven predictors, an alpha error probability of .05, and an effect size of f^2 = 1.16, the statistical power was 1 – β = 1.00. For the R^2 increase of the hierarchical regression analysis the effect size was f^2 = 0.09, and the statistical power was 1 – β = .45.

Table 2

Hierarchical Regression Analysis Predicting Flow From Affective Preferences, Cognitive Preferences, and Perceived Abilities

Predictor	Flow experience		
	Step 1	Step 2	Step 3
	β	β	β
Affective preferences	.24†	.24†	.22†
Cognitive preferences	.24*	.27*	.22†
Perceived abilities	.35**	.33**	.26*
Affective preferences*cognitive preferences		.16	.03
Affective preferences*perceived abilities		-.15	-.19†
Cognitive preferences*perceived abilities		-.06	-.15
Affective preferences*cognitive preferences*perceived abilities			.36*
Total R^2	.44	.48	.54
ΔR^2	.44***	.04	.06*

Note. $N = 63$. † $p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

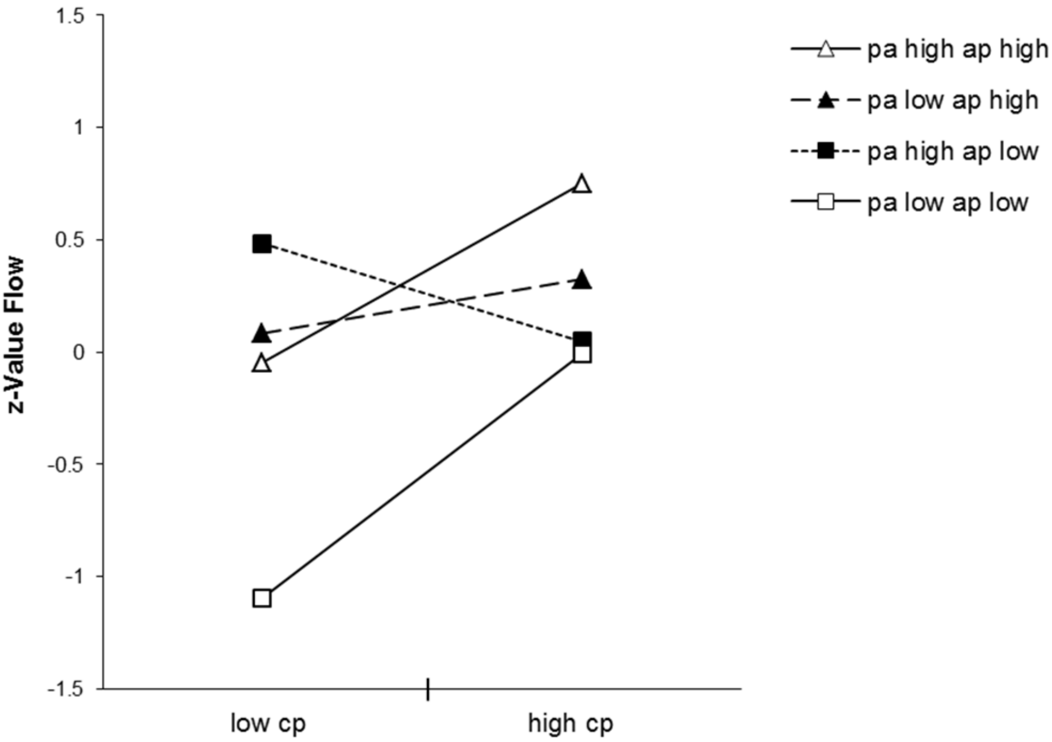

Figure 7. Predicted values for flow as a function of ap, cp, and pa. ap = affective preferences, cp = cognitive preferences, pa = perceived abilities.

Cognitive preferences positively predicted flow for participants low in affective preferences and perceived abilities, $b = .55$, $t(55) = 2.10$, $p < .05$. Participants low in affective preferences, cognitive preferences, and perceived abilities experienced less flow (low level of flow) than participants low in affective preferences and perceived abilities but high in cognitive preferences (medium level of flow). Likewise, cognitive preferences positively predicted flow for individuals high in affective preferences and perceived abilities, $b = .40$, $t(55) = 3.08$, $p < .01$. Individuals high in affective preferences, cognitive preferences, and perceived abilities experienced more flow (high level of flow) than individuals high in affective preferences and perceived abilities but low in cognitive preferences (medium level of flow). For all other combinations, no effect was found.

Next, simple slope differences following the procedure introduced by Dawson and Richter (2006) were analyzed. This procedure aims to identify whether any difference between pairs of slopes is significant. Therefore, first, simple slopes are computed (Aiken & West, 1991). Second, the difference between any two pairs of slopes is calculated. Third, the standard error of the difference of pairs of slopes is calculated. To examine, whether slopes differ from each other, the difference is computed in relation to its standard error. Thus, the final step tests whether the ratio of the difference between pairs of slopes and its standard errors differs from zero (Dawson & Richter, 2006).

Results showed that in the prediction of flow by cognitive preferences, the slope for participants low in affective preferences and perceived abilities differed significantly from the slope for participants low in affective preferences but high in perceived abilities, $t(55) = -2.41$, $p < .05$. Individuals low in cognitive and affective preferences experienced flow only when they perceived their abilities to be high compared to low perceived abilities. For individuals high in cognitive but low in affective preferences, it made no difference whether they experienced their abilities as high or low. Both groups experienced flow at a medium level.

Furthermore, the slope for participants high in affective preferences and perceived abilities differed significantly from the slope for participants low in affective preferences but high in perceived abilities, $t(55) = 2.82$, $p < .01$. Individuals low in affective and cognitive preferences but high in perceived abilities experienced more flow than individuals low in cognitive preferences but high in affective preferences and perceived abilities. Conversely, individuals high in affective preferences, cognitive preferences, and perceived abilities experienced more flow than individuals high in cognitive preferences and perceived abilities but low in affective preferences. All other slope differences were not significant.

4.3 Discussion

Study 1 was designed to test basic assumptions of the compensatory model of motivation and volition (Kehr, 2000, 2004b); that is, (a) the impact of the agentic motive on flow is mediated by affective preferences, and (b) affective preferences, cognitive preferences, and perceived abilities interact with each other in order to predict flow. First, the results confirmed the mediation hypothesis. The higher the agentic motive, the higher were the affective preferences, and the more flow was experienced (Hypothesis 1.1). As proposed by Kehr (2004b), the agentic motive at the distal level predicted affective preferences at the proximal level, which in turn elicited flow. Although, the agentic motive was also correlated with cognitive preferences, another analysis revealed no additional mediation effect by cognitive preferences.

Second, I found a significant three-way interaction effect of affective preferences, cognitive preferences, and perceived abilities on flow, which supported the interaction hypothesis (Hypothesis 1.2) that the congruence of affective preferences, cognitive preferences, and perceived abilities is associated with flow. People low in affective preferences, cognitive preferences, and perceived abilities experienced the lowest level of flow while working on the platform. By contrast, people high in affective preferences, cognitive preferences, and perceived abilities experienced the highest level of flow. People with incongruent affective and cognitive preferences reported a medium level of flow regardless of their level of perceived abilities. These results confirmed the proposed interaction effect of the distal components of the compensatory model (Kehr, 2004b) on flow.

However, unexpectedly, people high in perceived abilities but low in affective and cognitive preferences also reported levels of flow higher than the mean. This result is inconsistent with the propositions of the compensatory model. An explanation may be that these people have achieved high levels of flow because they experienced a demand-skill balance as proposed by traditional flow models (Csikszentmihalyi, 1975; Massimi & Carli, 1986; 1988). Though, I did not assess the perceived demands of the task in this study. A demand-skill balance would have been a motive-specific incentive for the achievement motive (e.g., Engeser & Rheinberg, 2008) that should have led to high affective preferences for the task for people high in achievement motivation. However, I aroused only a combination of the achievement and power motives and not the achievement motive in particular. In sum, further studies are needed to replicate and clarify these findings. To do so, experimental studies in which affective preferences, cognitive preferences, and perceived abilities are manipulated separately should be used in order to test how flow is affected by them.

Furthermore, I assessed the three components and flow only with self-report questionnaires. Future studies would benefit from using nondeclarative indicators such as cardiovascular measures (e.g., heart rate variability or facial electromyographic indicators; see Chapter 7.2 for a more detailed discussion of possible nondeclarative indicators of flow). Moreover, in order to test whether or not participants enjoy the task, they could be videotaped while they experience flow and their facial expressions could be coded using the Facial Action Coding System (Ekman & Friesen, 1978; e.g., Johnston, Miles, & Macrae, 2010). Doing so will allow for the specific examination of whether the interaction of affective preferences, cognitive preferences, and perceived abilities on flow is due to a general positivity bias or whether it goes beyond such a bias.

Another limitation of the present study can be seen in the fact that the two hypotheses were tested separately. However, although statistical power was sufficient for the separate analyses, an overall model testing the mediation and interaction effect together could not be conducted. Therefore, further studies should test these hypotheses using a larger sample.

Moreover, only the mediation effect for implicit motives on flow was examined. Individuals' explicit motives, which could have been measured with a questionnaire such as the PRF were not assessed. According to the compensatory model (Kehr, 2000, 2004b), activated explicit motives should be associated with cognitive preferences. The absence of competing cognitive preferences stemming from activated explicit motives is one precondition for the emergence of flow. Hence, implicit and explicit motives do not necessarily need to be in line with each other. This conception allows for the partial congruence of implicit and explicit motives; that is, implicit motives have to be aroused, and additionally, no competing explicit motives should be activated in order to foster flow (Kehr, 2004b). This may also explain why an effect for the implicit motive could be found without considering the congruent explicit motive.

Another limitation is that the MMG was used to assess the agentic motive. The MMG combines features of the PSE and self-report questionnaires. The measure arouses motives by using pictorial stimuli and assesses the reactions of people by asking them to evaluate a number a statements as they relate to the pictures (Sokolowski et al., 2000). A methodological problem of the MMG is that the hope scales show only low discriminant validity because they are highly correlated and thus share some amount of common variance (Sokolowski et al., 2000). An explanation for these inter-scale correlations may be that the scales assess a generalized hope factor as introduced by Snyder and colleagues; this factor reflects an overall estimation of the belief that one’s goals can be achieved (Snyder, Harris, et al., 1991; Snyder, Sympson, et al., 1996). One way to account for this problem that was applied in this study is to control for the other motives (i.e., the affiliation motive) when testing the effect of a specific motive (i.e., the agentic motive). Results revealed that the mediation effect remained significant when I additionally controlled for hope of affiliation (see Footnotes 3 to 5). Therefore, as hypothesized, the effect can be attributed to the agentic motive in particular.

A second concern with regard to the MMG is that because participants do not write stories to picture cues as they do for the PSE, the MMG may rather be a declarative measure (Brunstein & Heckhausen, 2008; Schultheiss & Pang, 2007). In line with this argumentation, motives that were assessed with the MMG predicted other declarative measures in particular such as goal choice, enjoyment, and self-descriptive memories (cf. Sokolowski et al., 2000). A study that tested the convergent validity of the MMG with the PSE did not find a correlation between the two measures (r = .10; Brunstein & Heckhausen, 2008). Studies reporting on the convergent validity of the MMG with self-report questionnaires have shown rather mixed results (Job et al., 2010; Kehr, 2004a; Schattke, 2011; Schüler, 2010; Sokolowski et al. 2000). However, to date, no systematic research has been conducted to compare the convergent and predictive validity of the MMG, PSE, and self-reported questionnaires with one another. Therefore, the results of the study presented here should be replicated and thus reinforced by using the PSE. Moreover, the effect for the power motive should be separated from the achievement motive in order to further test whether flow can occur not only in the achievement domain but also in the power domain.

5 Study 2 – Flow at School

The results of the first study confirmed two assumptions of the compensatory model (Kehr 2000, 2004b): First, an aroused agentic motive lead to affective preferences for a task that in turn promote flow. Second, the proximal components affective preferences, cognitive preferences, and perceived abilities interact with each other in affecting flow.

The second study aimed to apply the compensatory model (Kehr 2000, 2004b) to the power domain by showing that implicit and explicit power-motive congruence might also promote flow. To date, studies on flow have primarily focused on flow in achievement situations such as sports (Aellig, 2004; Csikszentmihalyi, 1975; Jackson & Eklund, 2012; Jackson & Kimiecik, 2008; Jackson, Thomas, Marsh, & Smethurst, 2001; Jackson & Wrigley, 2004; Kawabata & Mallett, 2010; Schüler, 2010; Schüler & Brunner, 2009; Seifert & Hedderson, 2010; Stoll & Lau, 2005; Swann, Keegan, Piggott, & Crust, 2012), academic learning (Bassi et al., 2007; Csikszentmihalyi & Schiefele, 1993; Engeser, Rheinberg, Vollmeyer, & Bischoff, 2005; Schüler, 2007), and innovations in work settings (Steiner, Diehl, Engeser, & Kehr, 2011). Traditional flow models propose that a balance between perceived demands and skills will result in the experience of flow (Csikszentmihalyi, 1975; Massimi & Carli, 1986; 1988). When taking into account individual differences that may explain the emergence of flow, the achievement motive has been found to moderate the relation between demand-skill balance and flow (Eisenberger et al., 2005; Engeser & Rheinberg, 2008; Schüler, 2007, 2010). The demand-skill balance seems to offer the motive-specific incentive of improving one's performance; this in turn elicits the achievement motive (Atkinson, 1957; Schiepe-Tiska & Engeser, 2012).

However, there are some hints that suggest that the arousal of the power motive—the need to have an impact on others—through power-motive specific incentives such as competition, leadership, or prestige might also promote the experience of flow (Boerner &

Streit, 2006; Csikszentmihalyi, 1975; Csikszentmihalyi & LeFevre, 1989; Linsner, 2009; McAdams, 1982). McClelland (1975) distinguished between two general forms of impact: (a) dominating others and competing, and (b) helping others. An example of a help-giving profession is teaching because it involves sharing information or imparting knowledge to students who usually know less than the teacher. Consequently, Winter (1973) found that teachers or people studying teaching are regularly higher in implicit power motivation. Therefore, individuals high in implicit power motivation seem to be attracted to teaching professions because there they have the opportunity to impact others, particularly students, and they feel influential by helping them (Krug & Kuhl, 2006). Hence, teaching seems to be an activity that especially comprises power-motive specific incentives. Other researchers have shown that teachers can indeed experience flow when teaching students (Bakker, 2005; Froh, et al., 1993). However, these studies did not consider individual differences that could explain whether or not flow was achieved while teaching.

In sum, no studies yet have tested the relation between the implicit and explicit power motives and flow. The compensatory model of motivation and volition (Kehr, 2000, 2004b) provides a general framework for examining this relation by proposing that the congruence of implicit and explicit motives promote flow. In line with this idea, I hypothesized that the implicit and explicit power-motive congruence of teachers would be positively related to their flow experience while teaching.

Hypothesis 2.1: Teachers with congruent implicit and explicit power motives experience more flow while teaching classes than teachers with incongruent implicit and explicit power motives.

Furthermore, the motivations of teachers' and students' are closely interrelated and thus should be jointly examined. It has been found that students' motivation declines from when they enter elementary school to high school (e.g., Eccles, 1994; Eccles & Wigfield, 1995; Gottfried, Marcoulides, Gottfried, & Oliver, 2009; Wigfield, Eccles, & Rodriguez, 1998; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). Therefore, flow in schools is an important issue that may help to prevent decreasing motivation. One of the first ESM studies on flow was conducted in U.S. public schools (Csikszentmihalyi & Larson, 1984). The results of this study revealed that flow is actually a rare experience for students in school. In line with traditional flow models (Csikszentmihalyi, 1975; Massimi & Carli, 1986; 1988), students experienced flow in particular when they perceived a high demand-skill balance (cf. Shernoff & Csikszentmihalyi, 2009).

Bakker (2005) examined the relation between teacher flow and student flow and showed that students' flow can be affected by their teachers' flow. He investigated music teachers by retrospectively asking them about work-related flow experiences. Additionally, teachers randomly distributed a flow questionnaire to four of their students during one of their classes. The questionnaire referred to students' flow experience when they played their musical instrument. For the assessment of flow, Bakker used the Work-Related Flow Scale (Bakker, 2008), which includes the aspects absorption, work enjoyment, and intrinsic work motivation. To analyze the data, he specified a structural equation model and found that there was a positive relation between teachers' flow and students' flow experience. I intended to replicate this finding by applying a similar procedure to a sample of teacher in a vocational school who taught diverse types of classes. Moreover, instead of examining only four students per teacher, rather, I asked all students currently enrolled in that teacher's classes to report their flow experiences. As in the previous study, I used the FKS (Engeser & Rheinberg, 2008) in order to assess flow. In comparison to the Work-Related Flow Scale (Bakker, 2008), this scale has the advantage that flow is measured with all components (Csikszentmihalyi, 1975; Engeser & Schiepe-Tiska, 2012; Keller & Landhäußer, 2012). In contrast to Bakker's (2005) study, teachers and students in the present study answered the questionnaire at the same time during classes.

Additionally, I controlled for teachers' classroom management in the present study because it has been found to be a positive predictor of students' achievement (Freiberger, Huzinec, Templeton, 2009; Helmke et al., 2010; More, 2008) as well as the development of subject-related interest, positive attitudes, and students' engagement (Kunter, Baumert, & Köller, 2007; Reeve, Nix, & Hamm, 2003; Skinner & Belmont, 1993; Weinert & Helmke, 1995). Classroom management includes all of a teacher's actions that help to establish order and structure in such a way that the use of time during classes is highly effective (Doyle, 1986; cf. Seidel, 2009). Two important components of classroom management are (a) controlling students' behavior and (b) structuring and arranging classes. Controlling behavior involves clear behavioral expectations, control of students' work, reinforcement of desirable behavior, the intervention of disruptions, and punishment of undesirable behavior (Evertson & Emmer, 2012; Kounin, 1977, 2006; Mayr, 2011). Structuring and arranging classes involves the prevention of unnecessary disruptions, classes without logical breaks, setting learning goals, showing the importance of students' future lives, providing clear instructions, providing positive expectations of students, and organizing material in a way that is interesting for students (Kounin, 1977; Mayr, 2006, 2011). To summarize, I expected that teachers' flow would be positively associated with students' flow after controlling for teachers' classroom management.

Hypothesis 2.2: After controlling for teachers' classroom management, in classes in which teachers show high levels of flow, their students also show high levels of flow.

In order to jointly examine the motivations of teachers and students, I also explored whether the power-motive congruence of teachers would have an effect on students' flow experience. Research in organizational contexts has shown that leaders high in power motivation are perceived as more charismatic (De Hoogh et al., 2005; House et al., 1991) and that charismatic leadership is associated with positive work attitudes in employees (De Hoogh et al., 2005; Fuller, Patterson, Hester, & Stringer 1996; Lowe, Kroeck, & Sivasubramaniam, 1996). Hence, there seems to be a positive impact of the power motive of a leader on the attitudes of the employees. In line with this, I assume that the power-motive congruence of teachers is positively associated with students' flow experience.

Hypothesis 2.3: The higher the power-motive congruence of the teachers, the higher the flow experience of their students.

5.1 Method

5.1.1 **Participants**

The study was conducted in a technical vocational school in Bavaria, Germany. Students had completed the theoretical part of their apprenticeship, which also includes a practical part, which is usually completed while working for a company. Thirty-three teachers (28 men and 5 women) participated. On average, teachers were 45.12 years old (*SD* = 7.88). Three teachers did not complete the PSE. Hence, they had to be excluded from the analysis of the first and last hypothesis.

Teachers had been working in their jobs between 1 and 33 years (*M* = 14.21, *SD* = 8.40). At the present school, they had been teaching the class in which the data were collected, for 1 to 3 years (*M* = 1.27, *SD* = 0.52) and gave between 1 and 12 lessons per week (*M* = 5.41, *SD* = 2.70) in that class. Teachers taught technical classes such as technical engineering, manufacturing engineering, or maintenance engineering as well as nontechnical classes such as German, social studies, or sports.

Additionally, 542 students (507 boys and 35 girls) of the same school took part in the study. Some classes were visited multiple times but had different lessons with different teachers. From the students' perspective, I assumed that having lessons with one teacher would be independently of having lessons with another teacher because flow is a situational state and not a trait. However, I used the number of participation as a control variable in the analyses at the student level reported below. Thus, in sum, there were 667 student responses. The average class size was 19.59 students. On average, students were 18.27 years old (*SD* = 1.77). Thirty-one of them completed the ninth grade, 146 the ninth grade with an additional qualification, 336 the 10th grade, 10 the 12th grade, 17 completed the Abitur, and one student already had a university degree (for one student the highest level of education was missing). At the vocational school, students were between their first and third academic year (*M* = 1.56, *SD* = 0.80). One student did not complete the FKS.

5.1.2 **Design**

For this study, I used a correlational design. In order to explain teachers' flow experience, the implicit and explicit power motives served as predictors. In order to explain students' flow experience, biographical information, and students' perceived classroom management were used as Level 1 predictors. Teachers' power-motive congruence and their flow experience were used as Level 2predictors.

5.1.3 **Procedure**

First, we obtained permission from the principal of the school, the staff council, and the Bavarian Ministry of Education and Sports. Next, teachers received a letter informing them about the goals of the study. They were told that the study would focus on the daily experiences of teachers and that their students would also be queried in order to see whether there were differences between teachers' perceptions and students' perceptions. Additionally, we announced that an experimenter would visit one of the teacher's lessons. The implicit and explicit power motives of teachers were assessed before the experimenter visited the class. For the implicit power motive, teachers could choose between an individual online assessment at home using the Inquisit 3.0 web edition (Millisecond Software, Seattle, WA) and a paper and pencil group session conducted by a female experimenter. Fifteen teachers took part in the online assessment, and 15 teachers took part in the group session. The reported results below did not differ between the two types of PSE assessment (see also Bernecker & Job, 2011 for similar results). After assessing teachers' motives, the experimenter arranged appointments for visiting the class. At this school, each lesson lasted 90 min and the experimenter arranged the appointments to visit the classes in the middle of a lesson, approximately after 45 min. In class, teachers' flow experience as well as students' flow experience and how students perceived the classroom management of their teachers were assessed. At the end, after all classes were visited, teachers and students were given short debriefings about the underlying hypotheses of the study.

5.1.4 **Measures**

Implicit power motive. The PSE was used to assess teachers' implicit power motive. The PSE instructs participants to write imaginative stories in response to the following six pictures: *boxer*, *women in laboratory*, *ship captain*, *couple by river, trapeze artists* (Pang & Schultheiss, 2005), and *Dave teaching* (Stewart, 1982). Depending on whether teachers' chose the online assessment or the classic paper and pencil assessment, they followed either the standard instructions for computer administration or the standard instructions for paper and pencil assessment described in Schultheiss and Pang (2007). For the online assessment, the PSE was programmed in Inquisit 3.0 (Millisecond Software, Seattle, WA). For each participant, picture order was randomized by the software. Each picture was shown for 10 s and then substituted by a screen with writing instructions. Participants were asked to type their stories directly into a window on the screen. After 4 min a text appeared in the lower half of the screen requesting participants to finish writing the story and to move on to the next picture. When participants were ready to continue, the instructions said they should press

"STRG+Enter" to see the next picture. Protocol length of typed stories was determined through a utility programmed in Matlab 7.0 (MathWorks, Natick, MA). For the paper and pencil assessment, a female experimenter instructed the teachers at school. Participants were shown the same pictures, each for 10 s. The time was measured using a stop watch. After 10 s, participants were instructed to turn over the page and write their stories on the next blank page. Protocol length of typed stories was determined by counting the words by hand.

All stories were blind-content-coded for the implicit power motive using Winter's (1994) *Manual for Scoring Motive Imagery in Running Text* by two trained and independent scorers. According to the manual, power imagery is scored whenever a story character shows a concern about having an impact on others through strong and forceful actions that control, influence, help, impress, or elicit strong emotions in others. Each scorer exceeded an 85% inter-scorer agreement with calibration materials pre-scored by experts. Percentage agreements (inter-rater reliability) between the two scorers were estimated by the index of concordance ([2 x number of agreements between scorers] / [Scorer A's sores + Scorer B's scores]). The inter-rater reliability for the implicit power motive was 88%. Scoring disagreements were resolved in a subsequent session by discussing the issues and finding a joint solution. The scores from these joint solutions were used as participants' final scores. Scores from the online assessment were entered directly into the text documents and were later calculated by the utility programmed in Matlab 7.0 (MathWorks, Natick, MA). The program wrote each participant's motive score automatically into a data file and averaged the score per picture and category for further analyses and aggregations. Likewise, stories written by hand were transcribed to the computer and the same procedure as for the online assessment was followed. PSE protocol length (M = 366.50, SD = 142.41) was significantly correlated with participants' overall score for implicit power motive (M = 2.80, SD = 2.31), r = .45, p = .01. Therefore, I corrected the power motive score for protocol length by regression and converted the residuals to *z* scores. The resulting power motive scores did not differ from a normal distribution ($p > .10$).

Explicit power motive. Teachers completed the 16-item dominance scale of the German version of the PRF (Jackson, 1974; German Version by Stumpf, Angleitner, Wieck, Jackson, & Beloch-Till, 1985; Cronbach's $\alpha = .76$). Consistent with typical findings (Köllner & Schultheiss, 2012; Spangler, 1992), the implicit and explicit power motives were not significantly correlated (see Table 3).

Power-motive congruence. The absolute value of the difference between the explicit and implicit power motive score was computed to express power-motive congruence[8]. The resulting difference score was not normally distributed. Thus, it was transformed using the formula log (0.3 + error score). The log-transformed score did not differ from a normal distribution ($p > .10$). Smaller difference scores indicate higher power-motive congruence.

[8] I also considered the use of polynominal regression analysis and response surface methods (Edwards, 1994, 2001, 2002; Edwards & Shipp, 2007; Shanock, Baran, Gentry, Pattison, & Heggestad, 2010) to investigate the congruence effect, which may be an alternative approach to difference scores. However, different reasons spoke against this method in the present research. First, a central precondition for this technique is that the component measures (the variables forming the congruence; i.e., the implicit and explicit power motives) need to be commensurate (Edwards, 2002; Edwards & Shipp, 2007; Shanock, et al., 2010). That means that the two variables need to be nominally equivalent; that is, they must be described in the same terms, and they need to be scale equivalent; that is, they need to be assessed on the same metric. Implicit and explicit motives do not meet these preconditions. They are not nominally equivalent because they do not express the same content dimensions (Thrash, Cassidy, Maruskin, & Elliot, 2010). Examples of commensurate measures would be actual and desired challenge or supervisor and subordinate reports on payment (Edwards, 2002). Moreover, the implicit motive was assessed using the PSE, and the explicit motive was assessed using the PRF. These measures are not scale equivalent because they do not use the same numeric scale. Edwards (2002) himself recommends assessing both components using the same scales from the beginning and then centering each variable using the midpoint of the common scale. He argues that transforming variables would not make them commensurate. Other researchers recommend transforming component measures in such a way that they can be expressed on the same scale (Harris, Anseel, & Lievens, 2008; Kazén & Kuhl, 2011; Shanock et al., 2010). However, this cannot be done by standardizing the predictors based on the sample data because "the standardized scores do not indicate the position of the component variables relative to one another" (Edwards as cited in Kazén & Kuhl, 2011, p. 323). As an alternative, Kazén and Kuhl (2011) standardized their predictors according to the norms of the population of their measures. However, even if population norms were available for the PSE, it would still remain unclear whether a score of 1.24 in the implicit measure would mean the same as a score of 1.24 in the explicit measure (see also O.C. Schultheiss, personal communication, April, 8, 2011). Subsequently, the polynominal regression technique has its own limitations. Some researchers have claimed that difference scores may represent something conceptually distinct from the component measures (Tisak & Smith, 1994). Thus, the polynominal regression analysis would not address the same construct as would analyzing the difference score. Statistically, there are two more concerns. Besides the terms for the component measures, higher order terms (two quadratic terms and an interaction term) were additionally used in the unconstrained regression equation. These additional terms have multicollinearity with the component measures (cf. Kristof, 1996). Furthermore, the polynominal regression models are highly dependent on sample size and power. This is particularly relevant to this technique because of the high number of degrees of freedom that is used in each test. In sum, these arguments highly supported the use of the difference score instead of polynominal regression analysis in the present study.

This score has been successfully used in other studies, too (e.g., Kehr, 2004a; Schüler et al., 2008).

Flow experience. As in Study 1, the FKS (Engeser & Rheinberg, 2008) was used to assess all components of flow (Cronbach's α = .92). Teachers and students rated each item on a 7-point scale ranging from 1 (*not at all*) to 4 (*partly*) to 7 (*very much*).

Classroom management. The Linzer questionnaire for classroom management (Mayr, 2011) was used to assess two components of classroom management as perceived by students: controlling behavior (e.g., "My teacher immediately intervenes when students begin to disturb classes"; Cronbach's α = .88), and structuring and arranging classes (e.g., "My teacher organizes classes in parts that build upon each other very well"; Cronbach's α = .91). Students rated each item on a 5-point scale ranging from 0 (*not at all*) to 4 (*very much*).

Statistical procedures. At the teacher level, analyses were computed with SYSTAT 13 and involved correlation analysis and regression analysis. At the students' level, students' were clustered within classrooms and thus the assumption of the independence of observations, which is central to conventional testing, was violated. Depending on the degree of systematic variation between classes, standard errors may be underestimated when this cluster effect is neglected. In order to consider the individual-level and class-level variables simultaneously and to produce correct standard errors, multilevel regression analyses using Mplus 6 were computed (Muthén & Muthén, 1998-2011). Full maximum likelihood estimation was applied to students' data. Descriptive statistics are given as *M* and *SD* unless otherwise indicated. All tests were two tailed, and an alpha level of .05 was employed in all analyses.

5.2 Results

5.2.1 **Preliminary analyses**

Descriptive statistics and inter-correlations of all variables are presented in Table 3. Zero-order correlations revealed that the classroom management components controlling behavior and structuring and arranging classes were moderately inter-correlated, indicating that they tend to occur together, but represent distinguishable constructs. Furthermore, structuring and arranging classes was positively correlated with flow. Likewise, controlling behavior was positively associated with flow. Moreover, students' flow experience was negatively related to teachers' flow experience. All scores were z-standardized for further analyses. To explain teachers' flow, further analyses indicated that age, gender, number of classes a teacher taught in the corresponding class, topic of the corresponding class, years of teaching experience in general, and years of specifically teaching in the corresponding class had no significant effects on the results reported below.

For multilevel analyses, all individual-level continuous measures were grand-mean centered (see Enders & Tofighi, 2007; Hox, 2010, for more information on centering variables in multilevel analyses). Thus, the effect of the predictors on the dependent variables was controlled for inter-individual differences in the predictors. The resulting coefficients can be interpreted like beta coefficients from conventional multiple regression models. The influence of control variables on students' flow are shown in Table 4 in the student-level section.

Table 3

Descriptive Statistics and Zero-Order Correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	*n*	*M*	*SD*	Min	Max
(1) Teachers' nPow	-							30	2.80	2.31	0	11.00
(2) Teachers' sanPow	-0.04	-						33	8.91	3.13	4.00	16.00
(3) Teachers' power-motive congruence	.19	.13	-					30	0.26	0.62	-1.07	1.17
(4) Teachers' flow	.10	.18	-.32†	-				33	5.56	0.64	3.60	7.00
(5) Students' perceived controlling behavior	.03	.01	.01	-.03	-			667	2.63	0.74	0	4.00
(6) Students' perceived structuring & arranging of classes	-.04	.05	-.01	-.06	.59**	-		667	2.77	0.87	0	4.00
(7) Students' flow	-.02	.01	.00	-.11**	.36**	.44**	-	666	4.28	1.09	1.00	7.00

Note. nPow = implicit power motive; sanPow = explicit power motive. For calculating zero-order correlations between teacher and student variables, teacher variables were replicated for each student. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

5.2.2 **Teachers' flow experience**

To examine the effect of teachers' power-motive congruence on flow (Hypothesis 2.1), a regression analysis with implicit power motive, explicit power motive, and power-motive congruence as predictors and flow as the dependent variable was computed. The regression analysis established no significant effect of the implicit power motive or the explicit power motive on flow, but a significant effect of power-motive congruence on flow, $\beta = -.37$, $t(26) = -2.13$, $p < .05$ (see Figure 8)[9]. Teachers with congruent implicit and explicit power motives experienced more flow than teachers with incongruent implicit and explicit power motives.

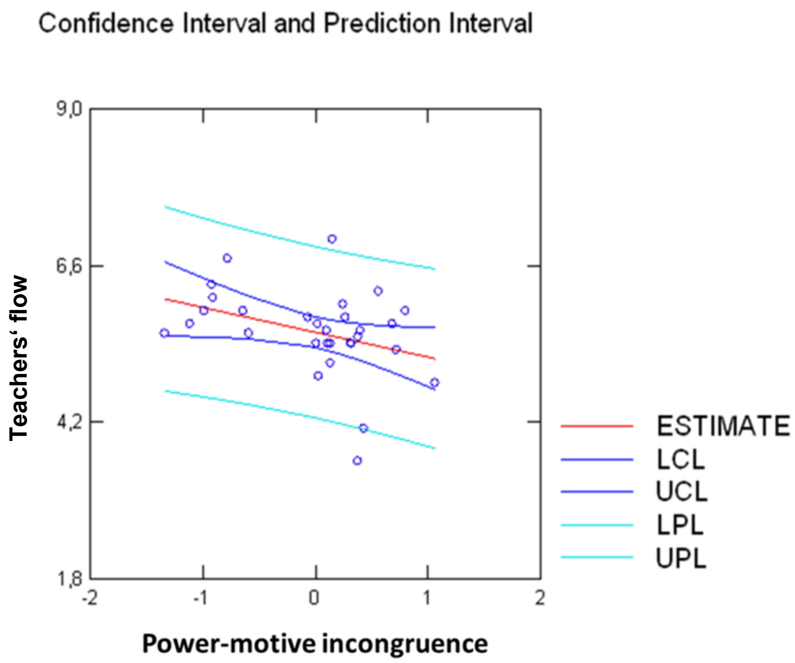

Figure 8. Predicted values for teachers' flow as a function of residualized power-motive incongruence.

5.2.3 **Students' flow experience**

In order to test whether teachers' flow affected students' flow (Hypothesis 2.2), I first ran a multilevel one-way random effects ANCOVA for students' flow with only student-level

[9] I also tested whether the interaction of implicit and explicit power motives would also predict flow. However, the interaction was not significant.

(Level 1) predictors. Students' perceived classroom management, their age, gender, how often they were asked about their flow concerning different corresponding teachers, their highest level of schooling, and their current academic year were regressed on students' flow. The results are presented in Table 4, Model 1. Teachers' structuring and arranging of classes significantly predicted students' flow (b = .48, p < .001). Moreover, teachers' controlling behavior significantly predicted students' flow (b = .20, p < .01). Hence, students who perceived high levels of classroom management experienced more flow than students who perceived low levels of classroom management. Additionally, students' highest level of schooling was a significant predictor of flow (b = -.01, p < .05) as well as students' current academic year (b = -.16, p < .01). With higher academic years and a higher level of schooling, students experienced less flow at school. The total amount of explained variance was 26%.

Second, an intercept-and-slopes-as-outcome model with teachers' flow experiences as a class-level predictor and all control variables except for the classroom management components as student-level predictors on students' flow was specified in order to test the effect of teachers' flow independently of perceived classroom management (Table 4, Model 2). At the student level (Level 1), only students' highest level of schooling (b = -.01, p < .05) and students' current academic year (b = -.19, p < .05) were significant predictors of students' flow. The amount of explained variance at the within level was 2%. At the class level (Level 2), teachers' flow experience had no significant effect on students' flow (b = -.14, p > .10), and the amount of explained variance at the between level was 6%.

Table 4

Predicting Students' Flow: Results from Multilevel Modeling.

	Model 1		Model 2		Model 3		Model 4	
Individual and classroom characteristics	*B*	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*
Level 2: Classes								
Teachers' flow			-.14	.11	-.12	.14	-.12	.15
Teachers' power motive congruence							-.03	.08
Level 1:Students								
Age	.03	.02	.03	.02	.03	.02	.03	.02
Gender	.04	.16	.07	.15	-.01	.16	.10	.15
Participation number	.09	.05	.05	.08	.09	.05	.08	.05
Highest level of schooling	-.01**	.00	-.01*	.02	-.01*	.00	-.01*	.00
Current academic year	-.16*	.07	-.19*	.09	-.16*	.07	-.15*	.07
Students' perceived controlling behavior	.20**	.08			.21**	.07	.25**	.08
Students' perceived structuring & arranging of classes	.48***	.08			.51***	.08	.51***	.08
R^2 level 2			.06		.06		.06	
R^2 level 1	.26		.02		.27		.29	
n	667		640		640		591	

Note. *B* = unstandardized regression weights. * $p < .05$. ** $p < .01$. *** $p < .001$.

Next, an intercept-and-slopes-as-outcome model with teachers' flow experiences as a class-level predictor and all control variables including the two classroom management components as student-level predictors was calculated (Table 4, Model 3). At the student level, teachers' structuring and arranging of classes (b = .51, p < .001) as well as teachers' controlling behavior (b = .21, p < .01) significantly predicted students' flow. Further, students' highest level of schooling (b = -.01, p < .05) and students' current academic year (b = -.16, p < .05) were significant predictors of students' flow. The amount of explained variance at the within level was 27%. At the between level, teachers' flow again had no significant effect on students' flow (b = -.12, p > .10) and the amount of explained variance at the between level was 6%.

Subsequently, an intercept-and-slopes-as-outcome model with teachers' power-motive congruence and teachers' flow experiences as class-level predictors and all control variables including the two classroom management components as student-level predictors was calculated (Table 4, Model 4). At the student level, teachers' structuring and arranging of classes (b = .51, p < .001) as well as teachers' controlling behavior (b = .25, p < .01) significantly predicted students' flow. Further, students' highest level of schooling (b = -.01, p < .05) and students' current academic year (b = -.15, p < .05) were significant predictors of students' flow. The amount of explained variance at the within level was 29%. At the between level, teachers' power motive congruence had no significant effect on students' flow (b = -.03, p > .10)[10]. Moreover, teachers' flow again had no significant effect on students' flow (b = -.12, p > .10) and the amount of explained variance at the between level was 6%.

5.3 Discussion

The study was designed in order to apply the assumptions of the compensatory model regarding distal components and flow (Kehr, 2000, 2004b) to the power domain. Specifically,

[10] Also the implicit and explicit power motives alone had no significant effect on students' flow.

the link between teachers' implicit-explicit power-motive congruence and flow experience was examined. Additionally, their students' flow experience, perceived classroom management, and classroom management's relation to teachers' flow was tested.

In line with the first hypothesis, teachers with congruent implicit and explicit power motives experienced more flow while teaching classes than teachers with incongruent implicit and explicit power motives (Hypothesis 2.1). The study is the first to show that the congruence of implicit and explicit power motives promotes the experience of flow. The result is in line with recurring results regarding the achievement motive revealing that achievement-motive congruence fosters the emergence of flow (Rheinberg, et al., 2005; Schüler, 2010; Schattke, 2011; Steiner, 2006). Examining these results together on a more general level, they confirm the compensatory model (Kehr, 2000, 2004b) assumption that the congruence of implicit and explicit motives leads to higher levels of flow experience.

From a practical perspective, teachers' personalities, namely, their implicit and explicit power motives, contributed to their flow while teaching classes. To date, this is also the first study to examine and provide support for the idea that teachers' personalities may influence their actual motivation while teaching. So far, teacher personality has merely been shown to be a meaningful variable when analyzing classroom processes (cf. Kunter & Pohlmann, 2009). One exception is research on teacher burnout, which has revealed that burnout is associated with high levels of neuroticism (Burke & Greenglass, 1995, 1996; Kokkinos, 2007; Maslach, Schaufeli, & Leiter, 2001; Schaufeli & Enzmann, 1998) and introversion (Fontana & Abouserie, 1993; Cano-García, Padilla-Munoz, & Carrasco-Ortiz, 2005). In line with those findings, research on motive congruence suggests that motive incongruence may be related to burnout because motive incongruence seems to be a source of intrapersonal stress in everyday life (Baumann et al., 2005; Job et al., 2010; Kehr, 2004b;

Schüler, Job, Fröhlich, & Brandstätter, 2009). However, no studies have examined the effect of motive incongruence on burnout so far and future studies could close this gap.

A limitation of Study 2 is that only the congruence between the implicit and explicit power motives was analyzed. No conclusions can be drawn regarding different combinations of implicit and explicit power motives. However, it may also be interesting to test the interaction of the two motives on flow. Steiner (2006) showed that achievement-motive congruence is particularly important for flow when the implicit achievement motive is high. However, in the present study, this analysis failed to reach significance presumably due to the small sample size of teachers. Further studies with a larger sample are needed to examine whether this effect can be replicated for the implicit power motive.

For students, contrary to my hypothesis, teachers' flow experience did not affect students' flow (Hypothesis 2.2). Although Bakker (2005) found a positive relation between music teachers' flow and their students' flow, my preliminary analyses already pointed in the opposite direction, revealing a negative correlation between teachers' and students' flow. When the hierarchical structure of the data was taken into account, the effect remained negative but was no longer significant.

A couple of reasons might possibly explain why the results did not replicate Bakker's (2005) findings. First, he conducted his study with teachers from music colleges and their students who retrospectively referred to their flow when playing their musical instruments. Playing music itself may be a more autotelic experience than attending classes in which technical and nontechnical subjects are taught theoretically. Assessing students' flow and the flow of their practical instructors during their practical training again may provide a different picture. A comparison of students doing a 4 year industrial-technical apprenticeship in a large German company revealed higher motivation during practical training compared to classes at school (Scheja, 2009). However, the difference between practical training and classes at school was smaller in the third and fourth academic years compared to the first and second academic years. Thus, there may be differential effects for students in different academic years.

Another advantage of the approach taken here as opposed to the study by Bakker (2005) is that teachers and all students reported their flow simultaneously, referring to the same situation. In Bakkers' study, teachers reported their general flow regarding their work independent of a specific situation and more importantly, without reference to the same situation as their students. Thus, the two parties may have had completely different situations in mind. Because the participants did not refer to the same situation, a shadow of doubt is thus cast upon the validity of this examination of whether flow crosses over from teachers to students.

Likewise, the random distribution of the flow questionnaire to only four of the teachers' students by the teachers themselves may be biased by the characteristics and preferences of the teacher. This also calls into question the validity of the student reports.

An additional methodological problem of Bakker's (2005) study is the measurement of flow. The Work-Related Flow Scale (Bakker, 2008) does not assess all components of flow as demanded by current flow researchers (Beard & Hoy, 2010; cf. Engeser, 2012). It assesses only absorption, which reduces the validity of the measure.

A more general explanation of why teachers' and students' flow might be negatively correlated is that when teachers are in flow, they focus exclusively on themselves and may be not aware of what is going on around them. According to the components of flow, being in flow means a loss of reflective self-consciousness (Csikszentmihalyi, 1975). Consequently, teachers may not provide flow-promoting conditions for their students such as clear goals and immediate feedback. This would be in line with results found by Di Bianca (2000) who conducted an ESM study on students' and teachers' engagement as indicated by involvement and concentration. Thus, engagement is closely related to but not the same as flow (Rodríguez-Sánchez et al., 2011). Results revealed that when teachers were engaged in math and science classes, their students were not engaged, and vice-versa. Di Bianca explained this effect with his additional finding that teacher engagement was particularly high when the instructional format was teacher-paced and not student-paced.

For students' flow, it seems more promising that teachers pay attention to providing a well-structured classroom environment that clarifies rules. Both a high level of controlling strategies and a high level of structuring and arranging classes fostered students' flow in the current study. Comparing the impact of these classroom management strategies, teachers' structuring and arranging of classes affected students' flow more than teachers' controlling strategies. These results are in line with previous findings that high levels of classroom management are positively related to subject-related interest, positive attitudes, and students' engagement (Kunter et al., 2007; Reeve et al., 2003; Skinner & Belmont, 1993; Weinert & Helmke, 1995). In sum, classroom management contributes to a well-structured learning environment and thus provides clear goals and task instructions as well as immediate and unambiguous feedback, which are important preconditions for promoting flow (Keller & Landhäußer, 2012). Additionally, results revealed that with higher academic years, students experienced less flow. This result is in line with other research that has also shown a declining intrinsic motivation during vocational school (Prenzel, Kramer, & Drechsel, 2002; Scheja, 2009).

The third hypothesis that teachers' power-motive congruence would affect their students' flow was also not supported (Hypothesis 2.3). No direct relation between teachers' power-motive congruence and students' flow was found. However, this result is in line with a study conducted by De Hoogh et al. (2005), who also did not find a direct relation between leaders' motives and their employees' work attitudes. Nevertheless, their results indicated that the relation was mediated by the charismatic leadership of the leaders. Perhaps the relation between teachers' power motive congruence and students' flow is mediated by another variable as well. Perceived classroom management does not seem to be an ideal candidate because it is not correlated with teachers' power-motive congruence. This might be due to the fact that the students were asked about their teachers' classroom management but teachers' did not report how they perceived their classroom management themselves. Therefore, future studies could additionally ask teachers about their classroom management. This would also allow researchers to examine the relation between teachers' and students' perceptions of classroom management.

Furthermore, students' implicit and explicit motives could also be assessed. Teachers with high power-motive congruence who are also able to arouse the motives of their students (i.e., having an impact on students by arousing their motives) may be able to facilitate their own flow experience and the flow experience of their students.

Another limiting factor of this study is that the sample consisted only of teachers and students from a vocational school. Thus, the results may not be valid for teachers and students in other school types or for students of different ages. However, regarding classroom management and flow, the results are in line with results by Kunter et al. (2007), who analyzed the relation between interest as another motivational construct and teachers' classroom management. They found that, across different school tracks, the development of interest was promoted by students' perceived rule clarity and monitoring and not by characteristics at the teacher level. Thus, I would expect that my results could be replicated in other school tracks as well. To be on the safe side, further studies need to be conducted in different school tracks and with students of different ages to generalize the results presented here.

Further, students' school performance was not assessed in the study. There is already some evidence showing that flow is positively linked to performance (Engeser & Rheinberg, 2008; Jackson, Thomas, Marsh, & Smethurst, 2001; Nakamura & Csikszentmihalyi, 2002; Puca & Schmalt, 1999; Schüler, 2007). Nevertheless, future studies should additionally take into account students' performance within a lesson to confirm this relation.

6 Study 3 – Flow in a Competition

The results of the previous study supported the compensatory model's assumption that flow also occurs when people are high in power-motive congruence (Kehr, 2000, 2004b). The third study examines the interaction effect of the implicit and explicit power motives in particular. Hence, I was also able to test the effects of the direction of power-motive discrepancies and high versus low power-motive congruence on flow.

The implicit power motive can be aroused by a victory over an opponent in a contest (Schultheiss et al., 1999; Schultheiss & Rhode, 2002; Schultheiss, Wirth, et al., 2005). For high power-motivated individuals, winning a contest is a rewarding experience because they have an impact on their opponent. By contrast, losing the contest is an aversive experience for them because they feel inferior to their opponent (Schultheiss & Rhode, 2002). In this study, I experimentally manipulated whether the power motive was rewarded (victory) or stressed (defeat). Hence, this study goes beyond correlational studies on flow and answers the call for experimental studies (Moller et al., 2010). It extends the few experiments that have been conducted to date that manipulated only the demand-skill balance or task structure in order to cause flow (Engeser & Rheinberg, 2008; Keller & Bless, 2008; Keller et al., 2011; Mannell & Bradley, 1986; Rheinberg & Vollmeyer, 2003).

Previous research has revealed that people show strong subjective affective responses such as happiness and satisfaction to winning or losing staged contests in the laboratory (e.g., Gladue, Boechler, & McCaul, 1989; McCaul, Gladue, & Joppa, 1992; Schultheiss, Wirth, et al., 2005) as well as in real games (e.g., Wilson & Kerr, 1999). It has been shown that flow is positively associated with happiness and satisfaction after a task (Aellig, 2004; Rheinberg et al., 2007; Schallberger & Pfister, 2001; Schüler, 2007). Hence, I expected the within-subjects manipulation itself to affect flow by showing that individuals experience more flow when they win a contest as compared to when they lose a contest.

Hypothesis 3.1: People experience more flow when they win a contest as compared to when they lose a contest.

The compensatory model (Kehr, 2000, 2004b) proposes that flow will emerge when the implicit power motive is additionally aroused and no competing explicit motives are activated (partial congruence), or the congruent explicit motive is elicited (complete congruence). A positive effect of power-motive congruence on flow was already established in Study 2. Moreover, Kazén and Kuhl (2011) found that among managers, a weak implicit but strong explicit power motive was associated more with reduced happiness than a strong implicit but weak explicit power motive. They concluded that a high implicit power motive is more important for happiness, which has been documented to be positively related to flow after a task (Aellig, 2004; Keller et al., 2011; Rheinberg et al., 2007; Schallberger & Pfister, 2001), than a high explicit power motive. In sum, I expected that the effect of contest outcome on flow would be moderated by individuals' implicit and explicit power motives.

Hypothesis 3.2: People with congruent implicit and explicit power motives experience more flow when they win a contest than people with incongruent implicit and explicit power motives. When they lose a contest, there is no difference between people with congruent and incongruent implicit and explicit power motives.

The last hypotheses tested the implicit power motive in particular and its effect on a behavioral measure, namely, implicit learning. Implicit learning is a type of nonintentional learning that occurs without explicit learning instructions and without the awareness of what is being learned. Moreover, it requires few attentional resources (cf. Nissen & Bullemer, 1987; Reber, 1989; Reed & Johnson, 1994). The learned skills cannot be consciously verbalized on request, for example, skills like juggling or riding a bike. Research has shown that implicit learning can be influenced by personality dispositions, reward, and punishment (Corr, Pickering, & Gray, 1997).

According to the information-processing model of implicit and explicit motivation (Schultheiss, 2001, 2008; Schultheiss & Strasser, 2012) a high implicit but not a high explicit power motive or power-motive congruence should be related to better learning of behavior that is instrumental for a victory. Implicit motives respond to experiential incentives and are more likely to affect nondeclarative measures such as implicit learning. Response speed and response accuracy in a reaction time task are examples of indicators of implicit learning (Schultheiss et al., 1999; Schultheiss & Rhode, 2002; Schultheiss, Wirth, et al., 2005).

High levels of power motivation have been found to be related to instrumental learning that is reinforced by having an impact on others (Schultheiss et al., 1999; Schultheiss & Rhode, 2002; Schultheiss, Wirth, et al., 2005). For the implicit learning tasks used by Schultheiss and colleagues (Schultheiss, 1998; Schultheiss & Rohde, 2002; Schultheiss, Wirth, et al., 2005), a contest was established in which two persons worked against each other on random and fixed visuomotor sequences in an alternating order before, during, and after the contest. Learning gains were assessed using response accuracy and response speed scores of the execution of the fixed visuomotor sequences compared to the random visuomotor sequences. Both the increase in response speed (i.e., response latency) and the decrease in response accuracy from the fixed to the random sequence indicated implicit learning of the fixed sequence.

Findings revealed that for American winners, higher levels of power motivation, compared to lower levels of power motivation, were related to enhanced learning of the fixed visuomotor sequence during the contest (Schultheiss, Wirth, et al., 2005). For losers, high levels of power motivation impaired implicit learning. For German winners, the learning effect occurred only when activity inhibition (AI) was additionally taken into account (Schultheiss & Rhode, 2002). Only Germans high in UPM showed more learning gains after a victory compared to Germans low in UPM.

AI indicates a stable tendency to restrain or inhibit emotional and motivational impulses (Langens, 2010; McClelland, Davis, Kalin, & Wanner, 1972). It is an effortful process that is aimed at controlling an automatic emotional or motivational tendency. AI moderates the ways in which implicit motives are expressed in behavior. People low in AI tend to directly express their motivational impulses and emotional states. By contrast, people high in AI restrain direct expressions of motivational impulses and emotional states. However, these individuals often find a delayed or refined way to pursue the goal states that satisfy their implicit motives. By doing so, they respond more emotionally to stress and are more successful at reaching long-term motivational goals (Langens, 2010).

Schultheiss, Riebel, and Jones (2009) propose that AI is involved in the activation of right-hemispheric (RH) functioning during stress in particular. According to Goldberg's (2001) model of hemispheric differences, RH is involved in developing effective strategies to handle new challenges in the environment. When these strategies are successful, they are stored in the left hemisphere (LH). However, in situations in which people high in AI have to deal with threat, punishment, or nonreward, they do not seem to rely on their established strategies but acquire new strategies in order to handle novel situations. Therefore, individuals high in AI do not try to achieve their goals through spontaneous or impulsive behavior strategies (stored in the LH) but through flexible, more sophisticated strategies.

Hence, in combination with the power motive, men high in uninhibited power motivation (UPM) have been found to achieve the goal of having impact on others by showing more physical violence, the rejection of institutional responsibility, and by more frequently getting into arguments (McClelland, 1975). Women high in UPM tend to deliberately break objects or slam doors (McClelland, 1975). By contrast, individuals high in inhibited power motivation (IPM) have been found to achieve the goal of having impact on others by teaching others (Krug & Kuhl, 2006; Winter, 2003) or achieving high-status positions such as top managers or reputable presidents (McClelland & Boyatzis, 1982; McClelland & Burnham, 1976; Winter, 1987). Schultheiss and Brunstein (2002) addressed the question of which strategies people high in IPM use in order to influence others. To do so, they invited participants to the lab and asked them to present their views to another person on the ethics of animal experiments as persuasively as possible. In doing so, the participants were filmed with two cameras: one behind them and one facing them. External observers later coded the videos for participants' persuasiveness and the behavioral strategies that they used. Results showed that high IPM people were perceived as more persuasive and more competent than low IPM, low UPM, and high UPM people. Moreover, this effect was mediated by three behavioral strategies that high IPM people used: more gesturing, raising their eyebrows to emphasize their arguments, and speaking more fluently. These results are in line with the finding that RH is more strongly involved in nonverbal expression than LH (Buck & Duffy, 1980; Dimberg & Petterson, 2000; Sackeim, Gur, & Saucy, 1978).

In sum, for the German sample used in this study, I assumed that individuals high in the implicit power motive but low in activity inhibition (UPM) would show implicit learning gains. However, in previous studies, the effect on implicit learning had been found only for response accuracy but not for response speed (Schultheiss & Rhode, 2002; Schultheiss, Wirth, et al., 2005). Hence, I also assumed that the effect of the uninhibited implicit power motive on implicit learning would be shown only for response accuracy.

Hypothesis 3.3: Men high in the uninhibited implicit power motive, but not men high in the inhibited implicit power motive show enhanced response accuracy after victory. After defeat, no difference occurs.

6.1 Method

6.1.1 Participants

Fifty-eight male students from two departments of the Technische Universität München (School of Education and School of Management) participated in the study in return for financial compensation (15€). On average, they were 24.72 years old (*SD* = 4.81). The men signed up in response to fliers that were posted on campus advertising the research as a study on "a response time game" (Appendix C). They were invited to the lab in pairs. In two dyads, the men knew each other before the contest from the university but were no friends. In one other dyad, one man knew the other one from university but not vice versa. These men did not differ from the other men and were therefore analyzed with the others.

6.1.2 Design

For this study, I used an experimental design, thereto, contest outcome was varied. One participant in each dyad won the contest whereas the other lost. Men were randomly assigned to the winner condition (*n* = 29) or the loser condition (*n* = 29). As predictors, participants' implicit and explicit power motives were assessed. The dependent variables were flow as well as response speed and response accuracy for implicit learning.

6.1.3 Procedure

Two randomly assigned men participated in pairs in one session each at one computer. All materials were presented and completed on the computer. All programming was done with Inquisit 3.0 (Millisecond Software, Seattle, WA). Each session was run by a female experimenter and consisted of a pre-contest, a contest, and a post-contest phase. In the contest phase, the men competed against each other on a serial response task described in the measures section (SRT; Schultheiss, Wirth, et al., 2005).

In the pre-contest phase, individuals' implicit and explicit power motives were assessed, and they played one pre-contest SRT. After finishing, the experimenter announced that they would then compete against each other in a contest based on SRT. Next, they listened to a computer-recorded goal imagination exercise (cf. Schultheiss, 2001, Appendix D). The exercise vividly described the procedure for the following contest from a winner's perspective by using highly concrete and detail-rich language. However, emotional or motivational responses to different aspects of the goal of beating the opponent were not specified. Rather, there were several times, when listeners were prompted to pay attention to their actual feelings and emotions. The aim was to support the arousal of the implicit power motive by enabling participants to translate the verbally assigned goal of beating the opponent into an experiential format.

During the contest phase, computers were synchronized. Participants played 12 rounds of the SRT and were instructed to be as quick and accurate as possible. Each round began with a countdown. After each round, participants saw a grey screen that said "Calculating and comparing scores…." After 2 s, either a green screen followed with the words "You have won this round" accompanied by the sound of hands clapping or a red screen followed with the words "You have lost this round" accompanied by a pitiful sighing sound. As illustrated in Figure 9, participants in the victory condition won all rounds except for the second, third, fifth, and eighth rounds. Therefore, participants in the defeat condition lost all rounds except for the second, third, fifth, and eighth rounds. After the third (t1), seventh (t2) and 12th (t3) rounds, individuals' flow experience was assessed.

In the post-contest phase, participants worked on a post-contest SRT in which the computers were not synchronized anymore. Afterwards, they provided basic biographical information about themselves and took an implicit learning awareness test. At the end, participants completed a suspicion check and were fully debriefed about the underlying hypotheses of the study and the manipulation that was used. Finally, they were paid €15 for their participation.

round	1	2	3	4	5	6	7	8	9	10	11	12
winners	V	D	D	V	D	V	V	D	V	V	V	V
losers	D	V	V	D	V	D	D	V	D	D	D	D
			Flow t1				Flow t2					Flow t3

Figure 9. Pattern of victory and defeat for winners and losers. Vertical lines represent times at which flow was measured. V = victory, D = defeat, Flow t1 = first flow measurement, Flow t2 = second flow measurement, Flow t3 = third flow measurement.

6.1.4 **Measures**

Implicit power motive. As in the previous study, the PSE was used to assess the implicit power motive. The following six pictures were used: *boxer*, *women in laboratory*, *ship captain*, *couple by river, trapeze artists*, and *nightclub scene* (Pang & Schultheiss, 2005). All participants wrote their stories at the computer using Inquisit 3.0 (Millisecond Software, Seattle, WA) and followed the standard instructions described by Schultheiss and Pang (2007). The stories were again blind-content-coded for implicit power motive using Winter's (1994) *Manual for Scoring Motive Imagery in Running Text* by two trained and independent scorer. Each scorer had exceeded 85% inter-scorer agreement with calibration materials pre-scored by experts. The inter-rater reliability for the implicit power motive was 97%. Scoring disagreements were resolved in the subsequent session by discussing the issues and finding a joint solution. The scores from these joint solutions were used as participants' final scores. Scores were entered directly into the text documents and were later calculated by the utility programmed in Matlab 7.0 (MathWorks, Natick, MA). The program wrote each participant's motive score automatically into a data file and averaged the scores per picture and category for further analyses and aggregations. PSE protocol length (M = 535.36, SD = 141.36) was significantly correlated with participants' overall implicit power motive score (M = 4.70, SD = 2.74), r = .54, p = .000. Therefore, I corrected the power motive score for protocol length by regression and converted the residuals to *z* scores. The resulting power motive scores did not differ from a normal distribution ($p > .10$).

Simultaneously, *activity inhibition* was determined by counting the frequency of the word *not* in participants' stories (Langens, 2010). The AI scores ($M = 3.71$, $SD = 2.82$) were not normally distributed. Hence, I conducted a square-root transformation with the formula square-root (1.0 + error score). These square-root-transformed AI scores did not differ from a normal distribution ($p > .10$) and thus were used in further analyses. PSE protocol length ($M = 535.36$, $SD = 141.36$) was significantly correlated with participants' overall score for activity inhibition, $r = .62$, $p = .000$. Therefore, I corrected the power motive score for protocol length by regression and converted the residuals to *z* scores. The resulting power motive scores did not differ from a normal distribution ($p > .10$).

Explicit power motive. Participants completed the dominance scale (Cronbach's α = .84) of the German version of the PRF (Jackson, 1974; German Version by Stumpf et al., 1985) to assess the explicit power motive. The scale included 16 true-false questions (e.g., "I feel confident when directing the activities of others."). As in the previous study, the implicit and explicit power motives were not significantly correlated ($r = .02$, $p > .10$).

Flow experience. As in Studies 1 and 2, the FKS (Engeser & Rheinberg, 2008) was used to assess all components of flow (t1: Cronbach's α = .84; t2: Cronbach's α = .89; t3: Cronbach's α = .84). Participants rated each item on a 7-point scale from 1 (*not at all*) to 4 (*partly*) to 7 (*very much*).

Implicit learning. For the SRTs, men were instructed to respond as quickly and accurately as possible to asterisks presented sequentially in four screen positions. They were required to press one of four response keys at the computer keyboard that were matched to these screen positions (the response keys were Y, X, N, M, Appendix E). An asterisk never appeared in the same position twice in a row (see Schultheiss, Wirth, et al., 2005 for a detailed description of the screen view). Participants worked on two types of sequences, a fixed and a random sequence. Each sequence consisted of 12 asterisks indicated as trials. For the fixed sequence, the position of the presented asterisks always had the same order of response keys (MYXMNYNXYMXN) and therefore presented a constant pattern of trial presentation. Unknown to the participants, this pattern implicitly represented a constant recurring visuomotor response pattern that could be learned. For the random sequences, asterisks were presented in a random order across all response keys. Fixed and random sequences were presented in alternating order, always beginning with a random sequence.

Response errors (i.e., incorrect key presses) were summed up per sequence as a measure of response accuracy. For response speed, individuals' response times (RT) per sequence were averaged for subsequent analyses. RT's > 1500ms and response latencies that were generated by incorrect responses were excluded (Schultheiss, Wirth, et al., 2005)[11].

In the pre-contest phase, men worked on six fixed and six random sequences by themselves as baseline measures. Response accuracy and response speed were computed separately for each sequence type. In the contest phase, men competed against each other for 12 rounds of the SRT, each with alternating random and fixed sequences. One round lasted 50 s. In the post-contest phase, men worked on 14 fixed and 14 random sequences by themselves as indicators of implicit learning gains. Again, response accuracy and response speed were formed separately for each sequence type. The resulting response accuracy scores were not normally distributed. Hence, they were log transformed with the formula log (0.2 + error score). These log-transformed accuracy scores did not differ from a normal distribution (p > .10) and thus were used in further analyses.

Implicit learning awareness test. After the pre-contest SRT, participants were told that the SRT they had worked on implied a constant pattern of trial presentation they may have

[11] This applied to 0.05% of the data.

become aware of. They were asked to identify this pattern. Thereto, they saw, the fixed sequence and a distractor sequence on the screen. Sequence order was balanced between participants. Men were not asked to respond to the asterisks as they appeared, but after each sequence presentation, they were required to report whether the sequence was the predictable fixed sequence. Men rated this question on a 5-point scale: *definitely not*, *probably not*, *not sure*, *probably*, and *definitely*.

Statistical procedures. Most analyses were computed with SYSTAT 13 and involved regression and correlation analyses and repeated-measures analysis of variance (ANOVA). Simple slope tests and the three-way interaction figure were implemented with an Excel macro by Meier (2008). When higher order effects were tested for significance, all lower order effects were controlled. Descriptive statistics are given as *M* and *SD* unless otherwise indicated. All tests were two tailed, and an alpha level of .05 was employed in all analyses.

6.2 Results

6.2.1 Preliminary analyses

Descriptive statistics of all variables separated into winners and losers are presented in Table 5. Inter-correlations of all variables are presented in Table 6. All scores were z-standardized for further analyses. Preliminary analyses found no effect of age or study subject on the results reported below.

Table 5

Descriptive Statistics Separated Into Winners and Losers

	Winners				Losers			
Variable	*M*	*SD*	Min	Max	*M*	*SD*	Min	Max
1. nPow	4.86	3.21	1.00	16.00	4.70	2.26	0	10.00
2. sanPow	7.61	4.08	1.00	15.00	8.53	3.80	2.00	15.00
3. Activity inhibition	3.68	2.80	0	11.00	3.77	2.87	0	9.00
4. Flow t1	4.23	1.02	2.40	6.30	4.84	0.81	3.30	6.90
5. Flow t2	4.51	1.17	1.40	6.50	4.31	1.01	2.50	6.10
6. Flow t3	4.71	1.03	1.90	6.30	4.09	1.04	1.80	5.90
7. Pre-contest accuracy	0.26	0.32	-0.33	1.17	0.14	0.37	-0.50	0.83
8. Post-contest accuracy	0.38	0.38	-0.29	1.21	0.28	0.30	-0.36	1.00
9. Pre-contest speed	24.08	20.33	-9.07	97.76	16.52	21.98	-30.83	91.72
10. Post-contest speed	18.82	11.55	1.60	42.64	21.62	12.23	0.98	54.36

Note. $N = 58$. nPow = implicit power motive; sanPow = explicit power motive; Flow t1 = first flow measurement; Flow t2 = second flow measurement; Flow t3 = third flow measurement; Pre-contest accuracy = pre-contest accuracy on random minus fixed sequences; Post-contest accuracy = post-contest accuracy on random minus fixed sequences; Pre-contest speed = pre-contest speed on random minus fixed sequences; Post-contest speed = post-contest speed on random minus fixed sequences. $n_{winners} = 29$, $n_{losers} = 29$.

Table 6

Correlations Separated Into Winners (Above the Diagonal) and Losers (Below the Diagonal)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) nPow	-	-.10	.28	-.13	-.44*	-.17	.08	.15	-.32†	-.23
(2) sanPow	.17	-	-.08	-.06	.24	.13	-.06	-.13	.02	.26
(3) Activity inhibition	-.08	-.16	-	.08	-.02	-.18	-.05	.12	-.08	-.06
(4) Flow t1	.06	-.09	-.15	-	.70**	.65**	-.05	-.53**	.23	.06
(5) Flow t2	-.11	-.04	-.23	.74**	-	.78**	.19	-.34†	.19	.19
(6) Flow t3	.02	-.11	-.26	.71**	.87**	-	.09	-.35†	-.05	.13
(7) Pre-contest accuracy	.11	-.01	-.11	-.25	-.07	-.01	-	.30	-.04	.18
(8) Post-contest accuracy	-.03	.07	.07	.23	-.04	.07	-.27	-	-.31	.19
(9) Pre-contest speed	.23	.24	-.21	-.26	-.05	.03	.35†	-.16	-	.45*
(10) Post-contest speed	.01	-.30	.18	.09	.02	.13	.18	-.03	.25	-

Note. N = 58. nPow = implicit power motive; sanPow = explicit power motive; Flow t1 = first flow measurement; Flow t2 = second flow measurement; Flow t3 = third flow measurement; Pre-contest accuracy = pre-contest accuracy on random minus fixed sequences; Post-contest accuracy = post-contest accuracy on random minus fixed sequences; Pre-contest speed = pre-contest speed on random minus fixed sequences; Post-contest speed = post-contest speed on random minus fixed sequences. $n_{winners} = 29$, $n_{losers} = 29$. † $p < .10$. * $p < .05$. ** $p < .01$.

6.2.2 Power-motive congruence and flow experience

First, I examined the effect of contest outcome on flow (Hypothesis 3.1). Thereto, a repeated-measure ANOVA for flow was computed with time of measurement as a within-subjects factor and contest outcome as a between-subjects factor. The analysis established no significant main effect but there was a significant interaction of Time of Measurement × Contest Outcome, $F(2, 112) = 19.49$, $MSE = 5.09$, $p < .001$. In order to break down this interaction, simple contrasts were performed. The contrasts revealed a significant interaction for the comparison of flow at t1 with flow at t2, $F(1, 56) = 14.78$, MSE = 8,50, $p < .001$, as well as the comparison of flow at t1 with flow at t3, $F(1, 56) = 33.41$, $MSE = 19.70$, $p < .001$. At t1, participants in the overall victory condition who had just lost most of the rounds reported lower levels of flow ($M = 4.27$, $SD = 1.03$) than participants in the defeat condition who had just won most of the rounds ($M = 4.79$, $SD = 0.78$). By contrast, at t2, participants in the victory condition who had actually won most of the rounds reported higher levels of flow ($M = 4.54$, $SD = 1.17$) than participants in the defeat condition who had lost most of the rounds ($M = 4.30$, $SD = 1.03$; see Figure 10). This effect was stabilized at t3 ($M_{Winners} = 4.75$, $SD = 1.03$; $M_{Losers} = 4.10$, $SD = 1.06$).

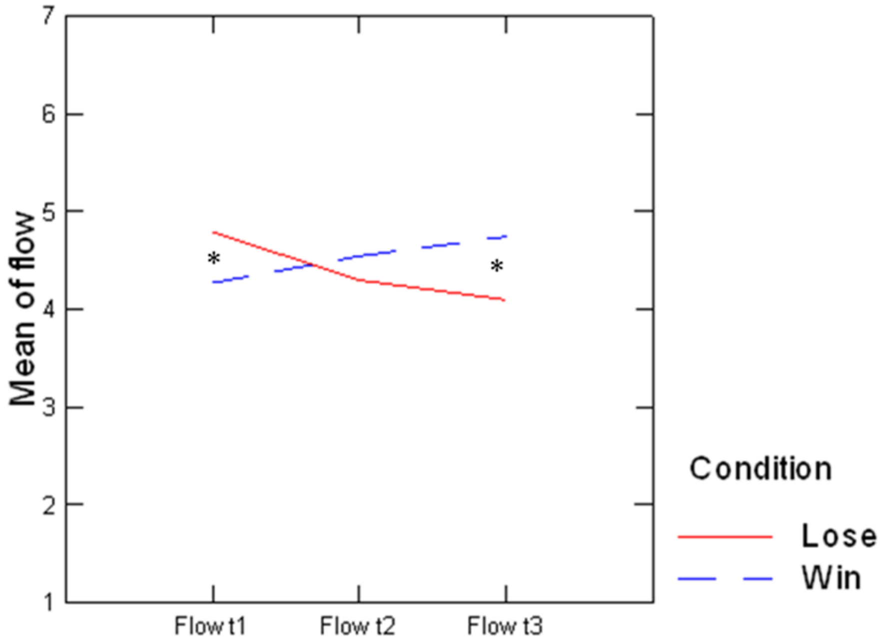

Figure 10. Means of flow at t1, t2, and t3 as a function of contest outcome. Flow t1 = first flow measurement, Flow t2 = second flow measurement, Flow t3 = third flow measurement. Blue line: winners, red line: losers. * $p < .05$ for group differences between winners and losers.

Next, I examined whether the effect of contest outcome on flow would be moderated by the implicit and explicit power motives (Hypothesis 3.2). Therefore, I computed three multiple hierarchical regression analyses for each flow measurement with contest outcome, implicit power motive, explicit power motive, all two-way interactions, and the three-way interaction as predictors. For flow at t2 and t3, I controlled for previous levels of flow. The results are presented in Table 7.

Table 7

Hierarchical Regression Analysis Predicting Flow From Contest Outcome, Implicit Power Motive, and Explicit Power Motive

Predictor	Flow t1				Flow t2				Flow t3			
	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step3	Step 4	Step 1	Step2	Step3	Step4
	β	β	β	β	β	β	β	β	β	β	β	β
Flow t1					.67***	.74***	.72***	.71***	.02	.14	.15	.19†
Flow t2									.80***	.76***	.75***	.75***
Contest outcome	-.28*	-.32*	-.31*			.34***	.32**	.32**		.24**	.24**	.25**
nPow	-.09	.01	.01			-.23**	-.11	-.11		.16*	.14	.14
sanPow	-.03	-.01	-.04			.17†	.03	.03		-.08	-.13	-.12
Contest outcome*nPow		-.23	-.33†				-.17	-.18			.05	.13
Contest outcome*sanPow		.04	.14				.18	.18			.07	.00
nPow*sanPow		-.27†	-.03				-.07	-.06			.01	-.14
Contest outcome*nPow*sanPow			-.40†					-.01				.28*
Total R^2	.09	.15	.20		.45	.62	.64	.64	.67	.76	.76	.79
ΔR^2	.09	.06	.05†		.45***	.17***	.02	.00	.67***	.09**	.00	.03*

Note. N = 58. nPow = implicit power motive; sanPow = explicit power motive; Flow t1 = first flow measurement; Flow t2 = second flow measurement; Flow t3 = third flow measurement. $n_{winners}$ = 29, n_{losers} = 29. † p < .10. * p < .05. ** p < .01.

At t3, in the final step, the hierarchical regression analysis (R^2 = .79) established a significant three-way interaction between Contest Outcome × Implicit Power Motive × Explicit Power Motive, β = .28, $t(48)$ =2.32, *SE* = .13, $p < .05$, on the dependent variable flow t3 (see also Figure 11). The three-way interaction term produced a significant ($p < .05$) additional increase in R^2 (ΔR^2 = .03).

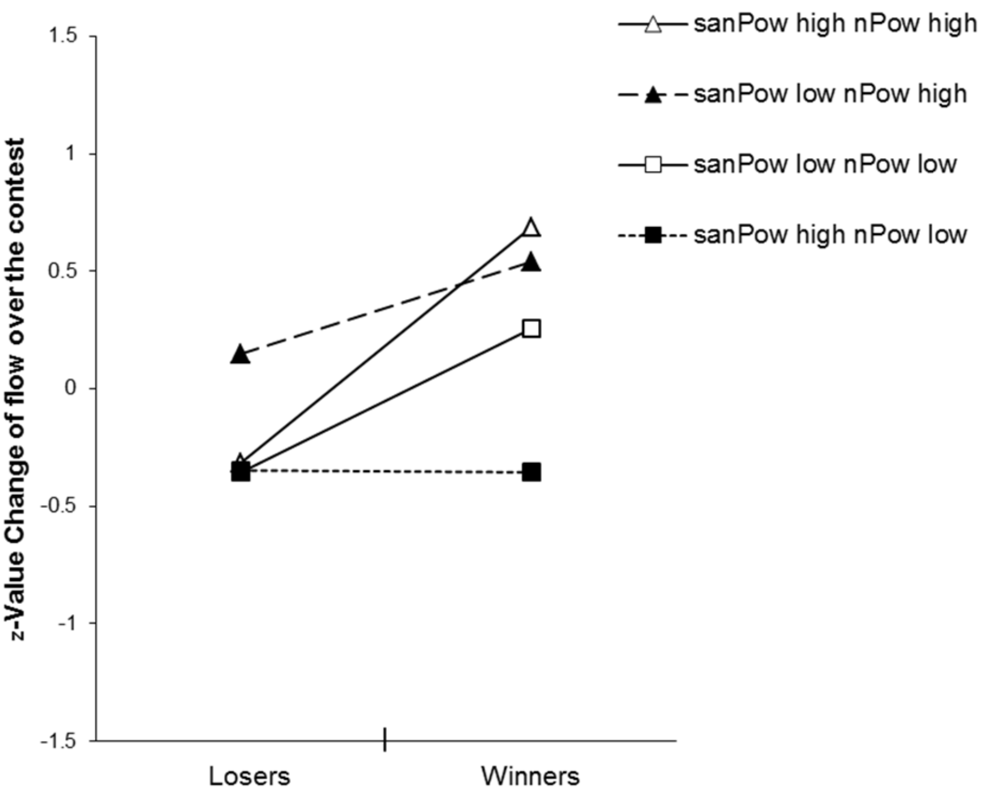

Figure 11. Predicted values of flow t3 as a function of contest outcome, nPow, and sanPow controlled for flow t1 and flow t2. nPow = implicit power motive; sanPow = explicit power motive.

To explore this interaction in more detail, simple slope tests were computed at values of one standard deviation above and below the means of the implicit and explicit power motives dependent on contest outcome (Aiken & West, 1991; Cohen et al., 2003). Winners high in implicit and explicit power motivation experienced more flow than losers high in implicit and explicit power motivation, $b = 1.00$, $t(48) = 7.23$, $p < .01$. Moreover, winners low in implicit and explicit power motivation experienced more flow than losers low in implicit and explicit power motivation, $b = .61$, $t(48) = 2.06$, $p < .05$. In addition, winners with a strong implicit but weak explicit power motive experienced marginally significantly more flow than losers with a strong implicit but weak explicit power motive, $b = .39$, $t(48) = 1.86$, $p = .07$. Only for men high in explicit but low in implicit power motivation did it make no difference whether they had won or lost.

Additionally, simple slope differences were conducted (Dawson & Richter, 2006). Results showed that for the prediction of flow by contest outcome, the slope for men high in implicit and explicit power motivation differed significantly from the slope for men high in implicit but low in explicit power motivation, $t(48) = 4.05$, $p < .001$. Winners high in implicit and explicit power motivation experienced more flow than winners high in implicit but low in explicit power motivation. For losers, the pattern was reversed. Men high in implicit but low in explicit power motivation experienced more flow than men high in implicit and explicit power motivation. Additionally, the slope for men high in implicit and explicit power motivation differed significantly from the slope for men low in implicit but high in explicit power motivation, $t(48) = 2.37$, $p < .05$. Winners high in implicit and explicit power motivation experienced more flow than winners low in implicit but high in explicit power motivation. For losers, no such difference was found. Further, the difference in slope between men high in implicit but low in explicit power motivation compared to men low in implicit but high in explicit power motivation became marginally significant, $t(48) = 1.72$, $p = .09$. Winners high in implicit but low in explicit power motivation experienced marginally more flow than winners low in implicit but high in explicit power motivation. For losers, the effect remained the same but at a lower level of flow experience. All other slopes were not significantly different from each other.

6.2.3 The implicit power motive and implicit learning

For all analyses on implicit learning one case had to be excluded ($N = 57$). In the pre-contest phase, this man correctly answered only 1 to 4 out of 12 trials ($M_{random} = 2.83$, $M_{fixed} = 2.83$) because he answered his phone during this phase. The experimenter immediately collected his phone until the end of the contest. Hence, no valid pretest data were available for this man.

Implicit learning awareness test. Men identified the fixed sequence as "fixed" ($M = 2.72$, $SD = 1.13$) slightly more often than the random sequence ($M = 2.49$, $SD = 1.09$). However, the difference was not significant ($p = .31$) and therefore it was not considered in further analyses.

Implicit learning. In order to determine whether implicit learning had occurred during the contest, a repeated-measures ANOVA for log-transformed response accuracy as well as for response speed with sequence (fixed vs. random) and time (pre- vs. post-contest) as within-subject factors was computed. The ANOVA for *response accuracy* yielded a significant effect of sequence, $F(1, 56) = 64.99$, $MSE = 36.82$, $p < .001$, an effect of time, $F(1, 56) = 303.26$, $MSE = 126.00$, $p < .001$, and a significant Sequence × Time effect, $F(1, 56) = 4.51$, $MSE = 2.44$, $p < .05$. After the contest, men made fewer errors for fixed sequences ($M = 1.64$) than for random sequences ($M = 2.24$), as compared to before the contest ($M = -0.05$ and $M = 0.96$, respectively). The ANOVA for *response speed* yielded a significant effect of sequence, $F(1, 56) = 122.21$, $MSE = 23391.65$, $p < .001$, and an effect of time, $F(1, 56) = 105.25$, $MSE = 1.35$, $p < .001$, but no significant effect of Sequence × Time occurred. In sum, men showed implicit learning gains for response accuracy but not for response speed.

Next, in order to examine whether implicit learning gains could be accounted for by the predictors contest outcome, implicit power motive, and their interaction (Hypotheses 3.3), difference scores for post-contest response accuracy and response speed (random minus fixed sequences) were created. The difference scores indicate the magnitude of each man's learning gain with higher scores representing better implicit learning (cf. Schultheiss, Wirth, et al., 2005)[12]. Response accuracy and response speed were not correlated (r = .18). These scores were regressed on contest outcome, implicit power motive, and their interaction as predictors and the baseline as covariate. Neither the analyses for response accuracy nor the analysis for response speed yielded a significant effect of any of the predictors.

Following the approach described by Schultheiss and Rhode (2002), activity inhibition was additionally subjected to the two regression analyses. The analysis for *response accuracy* (R^2 = .13) established a significant effect of Contest Outcome × Implicit Power Motive × Activity Inhibition, β = -.33, $t(48)$ =-2.12, SE = .13, p < .05 (Figure 12). The analysis for *response speed* yielded no significant effects of any of the predictors.[13]

To explore the interaction effect on response accuracy in more detail, I computed simple slope tests at values of one standard deviation above and below the means of implicit power motive and activity inhibition, depending on contest outcome (Aiken & West, 1991; Cohen et al., 2003). Winners with a high uninhibited implicit power motive had more learning gains than losers with a high uninhibited power motive, b = .56, $t(48)$ =2.48, p < .05. None of the other slopes was significant.

Additionally, simple slope differences were computed (Dawson & Richter, 2006). Results showed that the slope for men high in uninhibited implicit power motivation (UPM) differed significantly from the slope for men high in inhibited implicit power motivation (IPM), $t(48)$ = -2.39, p < .05. After victory, men high in UPM made fewer errors than men high in IPM. After defeat, there was no difference. All other slopes did not differ significantly from each other.

[12] For example, the fewer errors a man made on fixed sequences, the more positive was the difference score.
[13] Analyses were also computed for the explicit power motive alone as well as for the interaction between the implicit and explicit power motives. However, no significant effects were found.

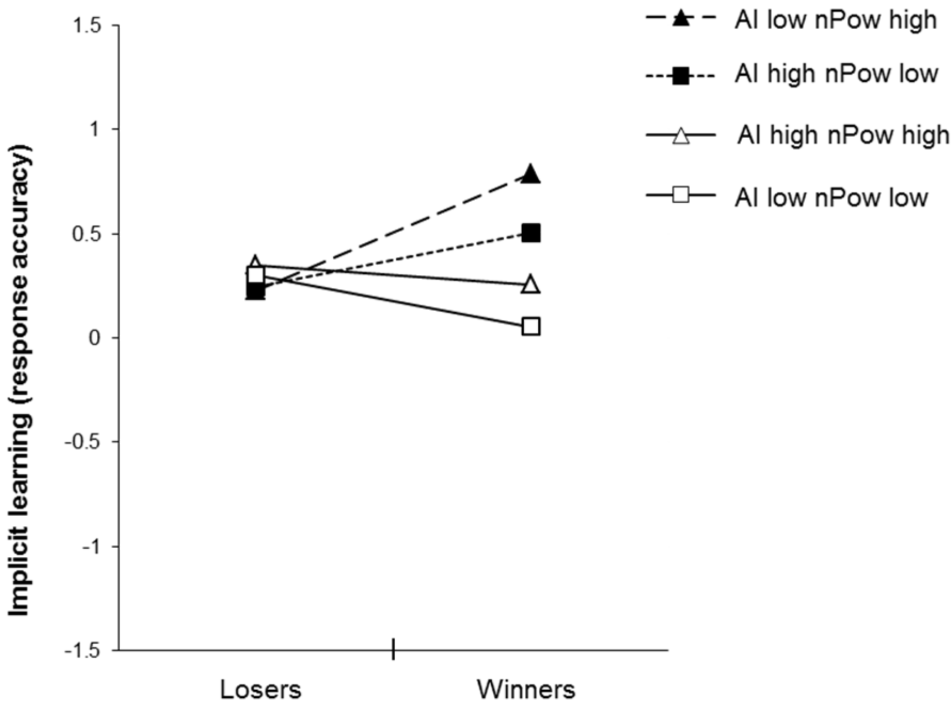

Figure 12. Predicted values of implicit learning response accuracy as a function of contest outcome, nPow, and activity inhibition, controlled for baseline accuracy. nPow = implicit power motive; AI = activity inhibition.

6.3 Discussion

The study was designed to replicate the finding that the aroused implicit-explicit power-motive congruence promotes the experience of flow. Moreover, in particular, I examined the interactive effect of the implicit and explicit power motives on flow. Furthermore, the joint effect of implicit power motive and activity inhibition on implicit learning was tested.

As hypothesized, attaining flow was directly affected by contest outcome. Individuals achieved higher levels of flow when they won the contest as compared to when they lost the contest (Hypothesis 3.1). This result is in line with studies that have shown that people experience high levels of valence after winning a contest (Gladue et al., 1989; Schultheiss, Wirth, et al., 2005; Wilson & Kerr, 1999). Flow research has also revealed that flow is related to high levels of valence after an activity (Aellig, 2004; Rheinberg et al., 2007; Schallberger & Pfister, 2001; Schüler, 2007).

Moreover, the implicit and explicit power motives moderated the effect of contest outcome on flow but only at the end of the contest (Hypothesis 3.2). As hypothesized, winners high in implicit and explicit power-motive congruence reported higher levels of flow than winners with incongruent implicit and explicit power motives regardless of the direction of discrepancies. Hence, the proposition of the compensatory model (Kehr 2000, 2004b) that the congruence of implicit and explicit power motives promotes flow was confirmed again as in Study 2.

Furthermore, winners with a strong implicit but weak explicit power motive attained marginally higher levels of flow than winners with a strong explicit power motive who lacked the support of a strong implicit power motive. Although this effect was only marginally significant, it is in line with findings by Kazén and Kuhl (2011), which showed, that a strong implicit power motive is more important for managers' well-being than a strong explicit power motive. Thus, on a more general level, it seems that performing an activity supported by aroused implicit motives has more positive effects than performing an activity that is only supported by explicit motives but lacks the support of implicit motives (see also Thrash et al., 2010). These findings also support Kehr's (2004b) assumption that partial congruence of implicit and explicit motives is also positively related to flow. The compensatory model proposes that activated explicit motives will counteract flow only when they compete with aroused implicit motives.

While losing, people with implicit-explicit power-motive congruence as well as people with a weak implicit but strong explicit power motive reported only low levels of flow, which supported part of my hypothesis. In contrast to my hypothesis, people with discrepancies in the other direction, namely with a strong implicit but weak explicit motive reported medium levels of flow. This result seems to be counterintuitive with regard to the fact that the implicit motive was threatened through a defeat. However, it may be that for these people, the victory experience from the beginning of the contest was still present. Individuals high in implicit motives tend to better remember information that matches their implicit motives (cf. Bender & Woike, 2010). Thus, individuals who lack the explicit power motive seem to focus their interpretation of the situation on the victory, whereas individuals with a high explicit power motive rather focus on the defeat.

In order to confirm and replicate the importance of these motive profiles, particularly in situations that are rewarding for the power motive, future studies should use a larger sample and apply latent profile analyses (Lanza, Flaherty, & Collins, 2003). Latent profile analyses can describe how traits are organized within people (Robins, John, & Caspi, 1998). They can be used to organize individuals into groups with homogenous trait profiles. After establishing these groups, each can be analyzed separately with regard to the outcome variable. These analyses may help to reinforce whether all of the four possible combinations of the implicit and explicit power motives are meaningful in predicting flow and how they may differ from each other.

By experimentally arousing the power motive, the present study not only shows that flow can also occur in the power domain, but it additionally provides an illustration of how an experimental design can be used to test the effects on flow in the power domain. Hence, the design of the study extends existing experimental designs with regard to how flow can be examined. However, Moller et al. (2010) have worried that a competition in particular might not provide the best opportunity to promote flow because a contest distracts individuals by enhancing reflective self-awareness that in turn prevents flow. As noted above, a loss of reflective self-consciousness is an important component of flow (Csikszentmihalyi, 1975).

However, a number of studies have shown that direct competition undermines intrinsic motivation—of which flow is a special case (Kehr, 2000, 2004b)—only when people compete for extrinsic rewards (Deci, Betley, Kahle, Abrams, & Porac, 1981; Reeve & Deci, 1996; Vansteenkiste & Deci, 2003). In line with that, the face-to-face competition used in the present study provided an intrinsic reward for the implicit power motive. Moreover, the competition offered direct feedback about an individual's actions, which is an important prerequisite for fostering flow (Csikszentmihalyi, 1975). Thus, in this case, competition facilitated flow rather than prevented it.

In light of the information-processing model (Schultheiss 2001, 2008; Schultheiss & Strasser, 2012) the finding that implicit and explicit power-motive congruence promotes flow is somewhat surprising because the flow questionnaire is more a declarative measure than a nondeclarative measure. Thus, flow should have been predicted in particular by the explicit power motive. However, flow is a state that is assessed directly within the situation. People report on their experiences regarding a concrete situation and not about their general traits. Although these experiences are evoked by a person's unconscious implicit motives, they can be consciously perceived within the situation, and therefore, items about these experiences can be answered. Thereby, referential processing may help with translating experiential, nonverbal representations such as emotional or experiential states into verbal representations and vice versa (see Figure 4; Schultheiss, 2001, 2008; Schultheiss & Strasser, 2012). In line with this, Rawolle (2010) found that the strength of implicit motives predicted self-reported affective arousal assessed with the declarative UWIST Mood Adjective Check List (Matthews et al., 1990). Further. the goal imagination exercise (cf. Schultheiss, 2001), which was presented in a verbal format, was used to translate the verbal representation of the goal *beating an opponent* into an experiential nonverbal format in order to support the arousal of the implicit power motive. However, the exercise is still represented in a verbal format and should therefore also interact with the explicit motive system. In line with this argumentation, Schultheiss and Brunstein (1999) showed that individuals high in implicit motives who had listened to a goal imagination exercise were strongly committed to goals matching their implicit motives. However, this commitment was assessed using a declarative goal commitment questionnaire (Schultheiss & Brunstein, 1999) indicating that referential processing may have translated experiential representations into verbal representations.

For implicit learning (Hypothesis 3.3), results showed that for people low in inhibition, the implicit power motive and contest outcome had strong effects on implicit learning. As hypothesized, winners with a high uninhibited implicit power motive (UPM) showed enhanced learning compared to winners with a high inhibited implicit power motive (IPM). Conversely, losers with a high IPM had slightly better learning gains than losers with a high UPM. These results replicate the findings of Schultheiss and Rhode (2002) and show that having impact by beating an opponent is indeed a rewarding experience for UPM people. Behavior leading to this reward will therefore become more energized. Being beaten by another person seems to be more aversive for UPM people and thus behavior leading to this threat will not become energized in the future. However, learning gains were observed only for response accuracy but not for response speed as had been found in previous studies (Schultheiss & Rhode, 2002; Schultheiss, Wirth, et al., 2005).

An explanation for why the implicit learning effect occurs only for response accuracy but not for response speed was offered by Hikosaka et al. (1999). They suggest that two parallel basal ganglia-cortical loops in the brain influence the learning of a visuomotor sequence using different coordinates: a visual and a motor one (Hikosaka et al., 1999; Nakahara, Doya, & Hikosaka, 2001). The two loops have in common that they reinforce learning by releasing dopamine. The visual loop includes the dorsolateral prefrontal cortex and the anterior part of the basal ganglia, whereas the motor loop includes the supplementary motor area and the posterior basal ganglia (Hikosaka et al., 1999). Each visuomotor sequence is encoded by the visual and the motor loop in visual and motor coordinates. The model of basal ganglia loops (Nakahara et al., 2001) proposes that a new visuomotor sequence can be learned more quickly with the visual loop, whereas, once the sequence had been learned sufficiently, it can be more reliably and rapidly executed with the motor loop. The two loops work in parallel, but at different speeds. They are coordinated by the pre-supplementary motor area that relies primarily on the visual loop at the beginning of implicit learning and on the motor loop at a later stage. Learning on the visual loop is indicated by response errors, whereas learning on the motor loop is indicated by response speed (Bapi, Doya, & Harner, 2000; Hikosaka, Rand, Miyachi, & Miyahita, 1995; Rand et al., 2000).

Moreover, the accuracy-speed-dual memory model (Hikosaka et al., 2002) assumes that motor skills are stored in two forms: one accountable for response accuracy and one for response speed. When researchers compared response accuracy and response speed on newly learned sequences with those on old, well-learned sequences, they found that response accuracy was higher (i.e., fewer errors) for new compared to old sequences. Conversely, response speed was higher for old compared to new sequences. The authors suggested that, on the one hand, the presupplementary motor area (Nakamura, Sakai, & Hikosaka, 1998, 1999), the dorsolateral prefrontal cortex (Sakai, Hikosaka, Miyauchi, Takino, et al., 1998; Sakai, Hikosaka, Miyauchi, Sasaki, et al., 1999), and the anterior part of the basal ganglia (Miyachi, Hikosaka, Miyashita, Karádi, & Rand, 1997; Miyachi, Hikosaka, & Lu, 2002) contribute to the learning of new sequences and thus may be more related to memory for accuracy. On the other hand, the middle part of the putamen (Miyachi et al. 1997) and the cerebellar dentate nucleus (Lu, Hikosaka, & Miyachi, 1998) contribute to the learning of old, well-learned sequences, and thus may be more related to memory for speed. Likewise, this suggestion indicates that high response accuracy can indeed be learned more quickly than high response speed, but also that response speed may be more robust in the long run compared to response accuracy.

According to this, future studies on the implicit power motive and implicit learning using a competition paradigm should extend the competition by increasing the number of playing rounds. A higher level of practice might have an effect not only on response accuracy but also on response speed. Furthermore, a follow-up test of implicit learning should be included in order to examine whether response accuracy will be higher for new compared to old learned sequences and response speed will be higher for old compared to new learned sequences.

A limitation of the study is that it consisted only of a small male sample. I did not address the question of whether the effects would also occur for women. However, Schultheiss, Wirth, et al. (2005) revealed that the power motive shapes learning in the same way for the two genders. Beating an opponent in a competition seems to be an incentive comparably attractive for women and men. Hence, I would not expect any differences when conducting the study again with a female sample. Also, with regard to flow, no gender differences have been reported to date.

7 General Discussion

The present research aimed to examine preconditions that may foster the emergence of flow. Guided by theoretical assumptions of the compensatory model of motivation and volition (Kehr, 2000, 2004b), I addressed two main research questions. First, I examined whether basic assumptions made by the compensatory model would be related to the emergence of flow, namely, whether the effect of distal implicit motives on flow would be mediated by proximal affective preferences, and whether the proximal components affective preferences, cognitive preferences, and perceived abilities would interact with each other in order to promote flow (Study 1). Second, I tested whether flow could also be attained by people high in implicit and explicit power motivation or whether the concept of flow is applicable only to the achievement domain as stated by Moneta and Csikszentmihalyi (1996) (Studies 2 and 3).

In order to test these assumptions, I used three study designs. Studies 1 and 3 were conducted in a laboratory setting with student samples. More precisely, Study 1 used a correlational design and provided an open innovation context, whereas Study 3 used an experimental design and provided a competition paradigm in order to experimentally elicit the implicit and explicit power motives. Study 2 was conducted in an educational field setting with teachers and their students, and it used a multilevel correlational design.

The findings supported my hypotheses in most cases. Study 1 revealed that an aroused agentic motive promoted flow. This effect was mediated by high affective preferences, which indicate whether or not the current task is pleasant for the person. The finding that an implicit motive led to high affective preferences is in line with the assumption that implicit motives function as affect amplifiers (Atkinson, 1957). Atkinson (1957) stated that the pleasantness of an incentive is not an inherent property of motive-relevant stimuli. In fact, an individual's underlying implicit motive determines a stimulus' valence. Hence, implicit motives increase the affective incentive value of conditional stimuli and make them more pleasuring to a person.

Furthermore, this mediating effect of affective preferences is also in line with the revised model of flow experiences introduced by Keller and Landhäußer (2012). The model emphasizes the importance of subjective value, which is characterized by a subjective attachment to a task, particularly for the intensity of flow during a task. The model proposes that people reach higher levels of flow when they experience a demand-skill balance and when they are subjectively attached to the activity. For example, a guitar player who loves to play guitar should experience a higher intensity of flow than a guitar player who is not so enthusiastically attached to guitar playing (Keller & Landhäußer, 2012). The basis for the subjective value assigned to a task is regulatory compatibility, which is achieved when people experience a compatibility of personal and situational factors that are involved in performing a task (Keller & Bless, 2008). Keller and Landhäußer assume that regulatory compatibility can be based on various types of compatibilities. Thus, one possible way to attain regulatory compatibility may be the arousal of a person's implicit motives through motive-specific incentives contained in tasks. When regulatory compatibility is established through elicited implicit motives, it can promote the occurrence of flow.

At the proximal level, Study 1 revealed that high affective preferences, high cognitive preferences, and high perceived abilities interact with each other to foster high levels of flow. Hence, this result confirms the hypothesized assumption of the compensatory model (Kehr, 2000, 2004b) and contributes to previous research that has empirically indicated only the importance of cognitive preferences for flow so far (Engeser & Rheinberg, 2008). On the one hand, high affective preferences stemming from aroused implicit motives seem to orient attention toward specific tasks that are enjoyable for a person. On the other hand, high cognitive preferences seem to channel attention to the task itself and prevent distraction from other tasks (Kehr, 2004b). This assumed attention process is also supported by McClelland

(1987), who stated that explicit motives channel implicit motives that are already aroused in the direction of certain acts that are in line with conscious purposes, values, and beliefs. Also, the traditional flow model stressed the importance of attention for flow (Csikszentmihalyi, 1975; 1988). The model proposed that attention is channeled from stimuli unrelated to the task at hand to the task itself when demands are balanced by skills. Limiting the stimulus field allows the merging of action and awareness, which is an important component of flow (Csikszentmihalyi, 1975). In line with the traditional flow model and the compensatory model (Kehr 200, 2004b), low perceived abilities prevent flow when no affective preferences are aroused and conflicting cognitive preferences seem to be activated. In this case, low perceived abilities seem to be associated with a low degree of automation and frequent activity interruptions that counteract the experience of flow (Kehr, 2004b).

Study 2 confirmed the second research question. It showed that indeed people high in power-motive congruence achieve high levels of flow experience. This result was replicated in Study 3. Hence, in two studies with different designs and different contexts, I was able to show that the congruence of high implicit and explicit power motives can also foster the experience of flow, and thus the results extend previous flow research by revealing that flow can also occur in the power domain. Study 3 additionally suggests that the combination of a strong implicit and weak explicit power motive is more important for the emergence of flow than a weak implicit and strong explicit power motive.

Putting these results together with research on achievement-motive congruence (Rheinberg et al., 2005; Schattke, 2011; Steiner, 2006), the general assumption proposed by the compensatory model (Kehr, 2000, 2004b) could be confirmed: Specifically, flow results when the implicit motive is aroused, the congruent explicit motive is activated, and perceived abilities are sufficient. Therefore, the present research adds some new and essential ingredients to Csikszentmihalyi's (1975) conception of flow, because he did not consider the importance of aroused implicit and explicit motives as distal components for flow nor did he consider the impact of high affective preferences and cognitive preferences as proximal components.

Moreover, the present research provides indirect evidence for the assumption that action opportunities (demands of the environment; Csikszentmihalyi, 1975) comprise motive-specific incentives that arouse different motives. The results suggest that teaching students and beating an opponent in a contest seem to be action opportunities that contain the power motive-specific incentive of having an impact on others. Likewise, it can be concluded that action opportunities that provide a demand-skill balance contain the achievement-motive-specific incentive of improving one's performance. This would explain why the effect of the demand-skill balance on flow is moderated by the achievement motive (Eisenberger et al., 2005; Engeser & Rheinberg, 2008; Schüler, 2007). In line with that, Rheinberg (2002b) proposed that motives function as specific colored glasses that make certain aspects of a situation salient and highlight them as important.

Furthermore, the present research provides an explanation for Csikszentmihalyi's (1975) early finding that chess player also attained flow through beating strong opponents and achieving high scores in a hierarchy of rankings. These motive-specific incentives may be particularly good at arousing the power motive. Thus, these incentives do not have to be conceptualized as exotelic elements of the game as Csikszentmihalyi (1975) proposed, but can also be conceptualized as autotelic elements of the game because the incentive for acting out lies in the activity itself. Therefore, acting out this activity can also be intrinsically rewarding. This person (motives) x situation (motive-specific incentive) perspective was tested in the achievement domain by Schüler (2010) and Schattke (2011), who both showed that achievement-motive-congruence affected flow only when the situation also contributed to achievement-motive-specific incentives.

Adding motives as ingredients to the recipe for flow may also explain the occurrence of microflow (Csikszentmihalyi, 1975). These are trivial activities such as reading a book or talking to people without expressed purpose that were also assumed to fit the traditional flow model of demand-skill balance but at a lower complexity. However, when Massimi and Carli (1988) reformulated the flow model as a quadrant model and a low balance of demands and skills was proposed to result in apathy, the new model did not allow for flow during trivial activities anymore. Perhaps motives can explain why flow also occurs in such activities. For example, talking to others without expressed purpose may be an expression of an aroused implicit affiliation motive in order to maintain a relationship. Likewise, being in flow when someone reads a book may depend on the contents of the book. When a person high in power motivation reads a book about a spy who protects the world against villains, he or she might strongly identify with the spy and might attain flow by imagining him or herself experiencing the adventures described in the book.

Beyond these results, Studies 2 and 3 made contributions to additional research topics in this area. Study 2 revealed that teachers' classroom management, when it consisted of a well-structured classroom environment and had clear rules, promoted students' flow experience. This result is in line with other research on classroom management that has shown a positive effect of classroom management on subject-related interest, positive attitudes, and students' engagement (Kunter, et al., 2007; Reeve, Nix, & Hamm, 2003; Skinner & Belmont, 1993; Weinert & Helmke, 1995). Hence, the present research extended this line of research by showing that classroom management is also positively related to the experience of flow. However, I could not confirm my hypothesis that teachers' flow experience would affect students' flow. Therefore, my results are contrary to the findings of Bakker (2005), who reported a crossover effect of teachers' flow on students' flow. Furthermore, teachers' power-motive congruence did not predict students' flow. A more detailed discussion of these findings can be found in the Discussion of Study 2 (Chapter 5.3).

Study 3 contributed to research on the implicit power motive and its relation to implicit learning. The study confirmed that high levels of uninhibited power motivation (UPM) predicted better implicit learning as indicated through a more accurate execution of a visuomotor sequence when the performance was reinforced by a victory over an opponent and a less accurate execution when the performance was associated with a defeat. Moreover, high levels of UPM also predicted better learning gains after a victory compared to high levels of inhibited power motivation (IPM). These results are in line with previous research that shows that the implicit power motive selects behaviors instrumental for attaining its key incentive of having an impact on others (Schultheiss & Rhode, 2002; Schultheiss, Wirth, et al., 2005). At the same time, the power motive has been found to prevent behaviors that can be harmful to attaining the incentive (McClelland, 1987). Notably, participants were not aware of the fact that they learned a sequence during the contest. Therefore, behavior may be shaped by implicit motives in conjunction with motive-specific incentives even without an individual's knowledge. Likewise, as in previous studies, the learning effect was found only for the learning indicator response accuracy but not for response speed. A more detailed discussion that also offers a possible explanation for why this effect was found only for accuracy can be found in the Discussion of Study 3 (Chapter 6.3).

7.1 Implications for practice

The present research indicates that motive congruence has positive effects for individuals such as promoting flow, which is in line with previous research on motive congruence (Baumann et al., 2005; Brunstein et al., 1998; Hofer & Chasiotis, 2003; Hofer, et al., 2006; Hofer et al., 2010; Schüler, et al. 2008; Schultheiss et al., 2008). Consequently, at the personal level, people should try to realistically evaluate their implicit motives and bring them in line with their explicit motives in order to be optimally motivated. Rheinberg (2002a;

see also Rheinberg & Engeser, 2010) recommends two techniques for achieving motive congruence: retrospective diagnosis and prospective incentives.

Retrospectively, individuals should find out which activities have a high priority for them even without the promise of an external reward. Moreover, they can imagine pleasant activities that they could happily carry out endlessly. For these activities, people should find out what is special about these activities or situations. Which incentives must an activity or task contain to be enjoyable and effective? Which incentives are more likely to prevent pleasure? Likewise, asking for successful outcomes that were not enjoyable for people may help in evaluating their implicit motives because in this case, they may have followed a motive-incongruent goal.

Prospectively, before taking on new tasks or projects, individuals should avoid focusing exclusively on desirable outcomes, but should rather imagine exactly what they will have to do when they are working on the tasks and how it will make them feel. This imagination technique introduced by Schultheiss and Brunstein (1999) helps to make tasks readable for implicit motives. By doing so, people will be able to determine whether or not their goals match their own implicit motives. Hence, people can assume how much effort and volitional strength they need to invest in order to reach these goals and can thus decide whether or not they want to strive for them.

Beyond that, Kehr and Rosenstiel (2006) developed a self-management training program in which participants learn how to bring their implicit and explicit motives in line and how to set motive-congruent goals as well as how to reduce goal conflicts. Moreover, barriers for actions are analyzed, helping to identify incentives that can prevent the arousal of implicit motives. Likewise, enriching tasks with motive-fitting incentives or reframing tasks that contain incentives that are not in line with a person’s motives can be trained. All of these techniques increase the likelihood of experiencing flow in everyday life at work and during leisure time.

From a leadership perspective, it would be valuable for managers in companies or teachers at school to try to arouse their employees' or students' motives as well in order to promote flow. Employees and students in flow will show higher levels of valence (Aellig, 2004; Csikszentmihalyi, 1975, 2004; Rheinberg, 2008; Rheinberg et al., 2007; Schallberger & Pfister, 2001; Schüler, 2007), be more creative (Csikszentmihalyi, 1997; MacDonald et al., 2006), and perform better (Engeser & Rheinberg, 2008; Jackson, Thomas, Marsh, & Smethurst, 2001; Nakamura & Csikszentmihalyi, 2002; Puca & Schmalt, 1999; Schüler, 2007).

The power motive plays an important role for performance in school in particular. For students, grades are an important way to gain recognition. Costa and McClelland (1971, cited in McClelland, 1987) showed that eighth-grade students high in implicit power motivation worked harder to get higher grades over 4 years and were thus ranked higher in their class when they graduated from high school. By contrast, achievement motivation did not predict grades earned in school.

7.2 Limitations and future directions

Several limitations of the present research have already been discussed in the Discussion chapters of the respective studies (Chapters 4.3, 5.3, 6.3). In addition, some more general limitations will be discussed here and future directions for research on motives and flow will be revealed.

The first general limitation of the present research relates to the measurement of flow. In the present studies, the Flow Short Scale (Engeser & Rheinberg, 2008) was used to assess flow. Therefore, participants' flow was interrupted in order to measure it. Consequently, flow was assessed only retrospectively. Moreover, for individuals in Study 3, it may have taken some time to reach the flow state again. Future research would profit from the development of nondeclarative indictors of flow. If available, flow could be assessed during an activity without interrupting a person. Some first theoretical attempts have discussed the role of the neurotransmitter dopamine as a correlate of flow (Marr, 2001) and a down regulation of task-irrelevant processes that relate to the prefrontal activity in the brain (Csikszentmihalyi, 1990; Dietrich, 2003; Hamilton, Haier, & Buchsbaum, 1984). Empirical studies have focused more on cardiovascular measures such as heart rate variability (Keller et al., 2011; Manzano, Theorell, Harmat, & Ullén, 2010), facial electromyographic indicators (EMG; Kivikangas, 2006; Manzano et al., 2010; Nacke & Lindley, 2009), electrodermal activity (Kivikangas, 2006), and cortisol (Keller et al., 2011; Pfeifer, 2012). However, most cardiovascular patterns are still diffuse and show inconsistent results. Regarding the relation between flow and cortisol, Pfeifer (2012) suggests an inverted u-shaped function. Based on the proposition that cortisol is an indicator of physiological arousal, she empirically showed that cortisol and flow are positively related as long as cortisol values are at a normal level. Thus, a certain level of arousal seems to promote flow. By contrast, after the oral administration of cortisol simulating a cortisol response to a strong stressor, flow decreased. Hence, experiencing strong stressors seems to hinder flow. These nondeclarative indicators may complement information about the flow state; although they should not be substituted for self-report measures because of the character of flow as a subjective experience (see also Pfeifer, 2012). However, recent research has just begun to look for biological correlates, and much future research needs to be done in this area.

Second, I did not manipulate the arousal of explicit motives exclusively in any of the studies. According to Schultheiss (2001, 2008), the explicit power motive may be elicited, for example, through verbal instructions that highlight the task as an opportunity to have an impact on others. Study 3 suggests that an aroused implicit motive is more important for flow than an elicited explicit motive. However, the experimental arousal of explicit motives would help to shed more light on the underlying process of how and when the explicit motive channels the implicit motive in fostering flow.

Moreover, I examined only the congruence between the implicit and explicit power motives. However, the compensatory model (Kehr, 2004b) proposes that flow can also be promoted by partial congruence between implicit and explicit motives (i.e., the arousal of implicit motives without activation of competing explicit motives). In order to test this assumption, the implicit power motive and other explicit motives such as the explicit affiliation motive need to be aroused simultaneously in future studies.

In addition, I did not consider explicit goals, which are also part of the explicit motive system (Kehr, 2004b; Weinberger & McClelland, 1990). Correlational research has revealed that explicit motives and personal goals are related but distinct components of the explicit motive system (Rawolle, Patalakh, & Schultheiss, 2012). In contrast to explicit motives as more abstract cognitive representations of preferences, goals are specific, individualized, and cognitively elaborated representations of what people intend to achieve in their current life situation (Job, Langens, & Brandstätter, 2009). "These 'self'-generated motivators are the explicit system's propelling forces that link a person's self-views to the enactment of future-oriented goals and plans" (Brunstein, 2010, p. 351). Research has shown that on the one hand, the congruence of implicit motives and goals promotes higher emotional well-being (Hofer et al., 2006; Hofer, Busch, & Kiessling, 2008; Hofer & Chasiotis, 2003; Schultheiss, et al., 1998). On the other hand, flow is associated with positive activation during an activity and happiness after an activity (Aellig, 2004; Keller et al., 2011; Landhäußer & Keller, 2012; Rheinberg et al., 2007; Schallberger & Pfister, 2001). Hence, striving for motive-congruent goals may also lead to flow that in turn fosters emotional well-being (i.e., happiness and satisfaction). Particularly for long-term goals, individuals could benefit from reaching flow from time to time. It could put them back on track while striving for their goals. Future studies may wish to compare the impact of explicit motives and goals in interaction with implicit motives on flow, especially when a person is striving for long-term goals.

Another limitation of the present research is that I did not assess any forms of positive affect such as arousal (i.e., energetic and tense arousal) or valence (i.e., hedonic tone). However, positive affect is closely related to implicit motives and flow. Energetic arousal and tense arousal indicate a state of motivational activation that facilitates instrumental behavior, whereas valence indicates the consumption of an affectively charged reward (cf. Matthews et al., 1990; Rawolle, 2010; Schultheiss & Brunstein, 1999; Weinberger & McClelland, 1990). Both motivational activation and consumption are associated with implicit motivation. More precisely, achievement and power motivation are associated with increases in energetic and tense arousal whereas affiliation motivation seems to be associated with high levels of valence (McClelland, 1982; Rawolle, 2010). These relations are in line with Aellig's (2004) results that flow during climbing, which contains incentives for the achievement motive in particular, is associated with high levels of energetic arousal and medium levels of tense arousal. Only during climbing breaks or after the climbing activity did they report high levels of valence. Therefore, flow seems to be a task-intrinsic incentive that is affectively rewarding for climbers high in achievement motivation, and thus they try to get back to the mountains as soon as possible in order to repeat the experience of flow (cf. Rheinberg, 2008). However, further research needs to be conducted to analyze the relations between implicit motives, flow, and positive affect.

Because the present research applied the compensatory model (Kehr, 2000, 2004b) to the power domain and Schattke (2011) had already shown its application to the achievement domain, future research should study whether the model can also be applied to the affiliation domain by taking the implicit affiliation motive into account. The affiliation motive is an enduring concern about establishing and maintaining or restoring positive relationships with others (Atkinson et al., 1958). As Csikszentmihalyi (1975) described, some of his interviewed chess players attained flow through interacting with friends. This statement implies that incentives arousing the affiliation motive may also foster flow. One study already explored the relation between the explicit affiliation motive and daily experiences using the traditional ESM technique and the Experience Sampling Form (Wong & Csikszentmihalyi, 1991). The Experience Sampling Form (Csikszentmihalyi et al., 1977; Csikszentmihalyi & Larson, 1987) usually also asks people about their demand-skill balance. However, in Wong and Csikszentmihalyi's (1991) study, no results were presented regarding the relation of the explicit affiliation motive and the balance of demands and skills. The paper reported only that women high in the explicit affiliation motive felt happier, better about themselves, more involved, and more in control when interacting with a friend compared to women low in the explicit affiliation motive. These findings indicate that women may have experienced flow because their affiliation motive was aroused by affiliative incentives when interacting with another.

Furthermore, the present research focused on the preconditions of flow and did not comment on its consequences. Interview studies have proposed a positive effect of flow on personal growth and life satisfaction (Csikszentmihalyi, 1975, 1996, 1997, 2004). Therefore, most findings regarding the consequences of flow have been based on qualitative research. So far, surprisingly little quantitative research has been conducted. At the one hand, we know that flow has positive consequences such as satisfaction and happiness (Aellig, 2004; Csikszentmihalyi & LeFevre, 1989; Rheinberg, 2008; Rheinberg et al., 2007; Schallberger & Pfister, 2001; Schüler, 2007). Moreover, some researchers have found a positive relation between flow and performance, but only when individual differences such as the perceived importance of the performance (Engeser & Rheinberg, 2008), conscientiousness (Demerouti, 2006), or the implicit (Engeser & Rheinberg, 2008; Schüler, 2007) and the explicit achievement motives (Eisenberger et al., 2005) were taken into account as well. Additionally, MacDonald et al. (2006) found a positive correlation between levels of group flow and creativity. Other studies have failed to find a relation between flow and performance (Keller & Bless, 2008; Keller & Blomann, 2008; Schiefele & Roussakis, 2006; Schüler & Brunner, 2009; Stoll & Lau, 2005). To conclude, the picture regarding the positive consequences of flow on performance is still fuzzy, and future research is necessary to sharpen it.

However, a person in flow can also experience negative consequences such as tunnel vision, addiction, high risk taking, or the disregarding of goals that are important but do not promote flow and require volitional regulation (cf. Schüler, 2012). Csikszentmihalyi (1990) already assumed himself that, flow is not good in an absolute sense. Likewise, the definition of flow as a state "in which people are so intensely involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it" (Csikszentmihalyi, 1990, p. 4) implicates potential down-sides of flow as it refers to possible costs. Likewise, the second study of the presented research revealed a negative relation between teachers' flow and students' flow. However, this correlation was no longer significant when taking into account the nested structure of the data. Nevertheless, one potential negative consequence because of the loss of reflective self-consciousness in the flow state (Csikszentmihalyi, 1975) may be that when individuals enter the flow state, they are focused only on themselves and are thus not aware of what is going on around them. This might have direct negative consequences not only for individuals themselves such as addiction (Kim & Davis, 2009; Partington, Partington, & Olivier, 2009; Thatcher, Wretschko, & Fridjhon, 2008) or higher risk-taking (Rheinberg, 1991; Sato, 1988; Schüler & Pfenninger, 2011), but also for other people around them such as students at school or employees in companies. For others, it seems more helpful when teachers and leaders create a well-structured environment with clear goals (see also Linsner, 2009).

In sum, additional studies are needed to explore the circumstances under which flow entails positive or negative consequences. Thereto, longitudinal designs may also be used in order to empirically examine the long-term effects of flow on personal growth and life satisfaction.

7.3 Conclusion

The present research adds some new and essential ingredients to Csikszentmihalyi's (1975) conception of flow by confirming important assumptions of the compensatory model (Kehr 2000, 2004b) regarding flow. The empirical findings revealed that an aroused agentic motive promotes flow and that this relation is mediated by affective preferences. In addition, the interaction of high affective preferences, high cognitive preferences, and high perceived abilities fosters high levels of flow. Moreover, the present research provides the first empirical evidence that flow can also be reached in the power domain when the implicit and explicit power motives are in line with each other. The findings complement previous research on the achievement motive (Clavadetscher, 2003; Eisenberger et al., 2005; Engeser & Rheinberg, 2008; Rheinberg, et al., 2005; Schüler, 2007; 2010; Schattke, 2011, Steiner, 2006). The theoretical framework of the compensatory model that I tested in the present research and extended with an explanation of the underlying processes of how power motivation is related to flow may help in the study of flow in other contexts.

In general, the theoretical framework of the compensatory model (Kehr 2000, 2004b) and the underlying assumptions regarding the interplay of action opportunities and motives outlined in this dissertation may contribute to explaining how flow can be attained in different contexts and therefore may broaden the scope of flow research beyond the achievement domain.

8 Zusammenfasssung [Summary]

Flow-Erleben ist ein Zustand, in dem Personen gänzlich und ohne Selbstreflexion in einer glatt laufenden Tätigkeit aufgehen und trotzdem das Gefühl haben, den Geschehensablauf gut unter Kontrolle zu haben (Schiepe-Tiska & Engeser, 2012; Rheinberg, 2008). Neuere Forschungsergebnisse fordern Csikszentmihalyi's (1975) Annahme heraus, dass eine Balance zwischen Anforderungen und Fähigkeiten Flow-Erleben begünstigt. Sie zeigen, dass dieser Zusammenhang zum Beispiel durch das Leistungsmotiv moderiert wird (Eisenberger et al., 2005; Engeser & Rheinberg, 2008; Schattke, 2011; Schüler, 2007, 2010).

Das Kompensationsmodell der Motivation und Volition (Kehr, 2000, 2004b) bietet eine allgemeinere Erklärung zur Entstehung von Flow-Erleben an, und integriert Motive und Fähigkeiten in ein gemeinsames Modell. Das Modell sagt vorher, dass Flow erlebt wird, wenn (a) die implizite Motive einer Person angeregt sind, die zu affektiven Präferenzen gegenüber einer Tätigkeit führen, (b) keine konkurrierenden expliziten Motive angeregt sind, die zu andersthematischen kognitiven Präferenzen führen (partielle Kongruenz) oder das kongruente explizite Motiv angeregt ist, welches zu hohen kognitiven Präferenzen führt (vollständige Kongruenz), und (c) die Fähigkeiten zur Ausführung der Tätigkeit subjektiv als ausreichend wahrgenommen werden. Abgeleitet aus den Annahmen des Modells sollte es auch möglich sein, Flow zu erleben, wenn andere Motive angeregt sind wie zum Beispiel das implizite und explizite Machtmotiv.

Studie 1 testete mithilfe eines korrelativen Designs, ob der Zusammenhang zwischen impliziten Motiven und Flow-Erleben durch affektive Präferenzen mediiert wird, und ob die Komponenten affektive Präferenzen, kognitive Präferenzen und subjektive Fähigkeiten miteinander interagieren, um Flow-Erleben zu begünstigen. Die Studien 2 und 3 überprüften mithilfe eines Mehrebenen-Designs und eines Experiments ob der Flow- Zustand auch von

Personen erreicht werden kann, die eine Kongruenz zwischen ihrem impliziten und expliziten Machtmotiv erleben.

Die Ergebnisse unterstützten meine Hypothesen in den meisten Fällen. Studie 1 belegte, dass affektive Präferenzen den Zusammenhang zwischen implizitem agentischen Motiv und Flow-Erleben mediierte. Darüber hinaus zeigte eine hierarchische Regression, dass die Interaktion von hohen affektiven Präferenzen, hohen kognitiven Präferenzen und hohen subjektiven Fähigkeiten zu hohem Flow-Erleben führte. Die Studien 2 und 3 belegten, dass Personen mit einem kongruenten impliziten und expliziten Machtmotiv ebenfalls Flow erleben können, wenn ihre Motive angeregt sind. Die Ergebnisse von Studie 3 legen außerdem nahe, dass eine Kombination von starkem implizitem und schwachem explizitem Machtmotiv wichtiger für das Erleben von Flow ist, als ein schwaches implizites und starkes explizites Machtmotiv.

Die Ergebnisse ergänzen bisherige Forschungsergebnisse zum Leistungsmotiv (Rheinberg et al., 2005; Schüler; 2010; Schattke, 2011, Steiner, 2006). Sie erweitern Csikszentmihalyi's (1975) Konzeption zur Entstehung von Flow-Erleben indem sie wichtige Annahmen des Kompensationsmodells (Kehr 2000, 2004b) belegen. Darüber hinaus erweitern die Ergebnisse den Anwendungsbereich der Flow-Forschung über die Leistungsdomäne hinaus. Für die Praxis bedeutet es, dass Personen allgemein Flow erleben können, wenn sie ihre impliziten Motive kennen und diese in Übereinstimmung mit ihren expliziten Motiven bringen.

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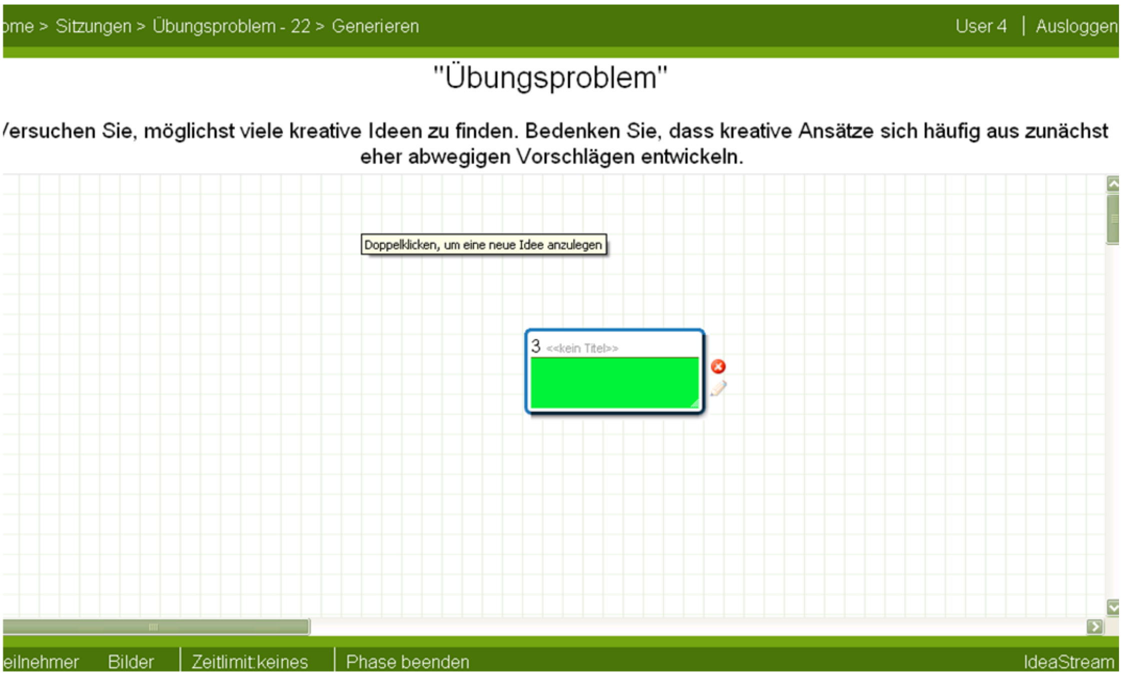
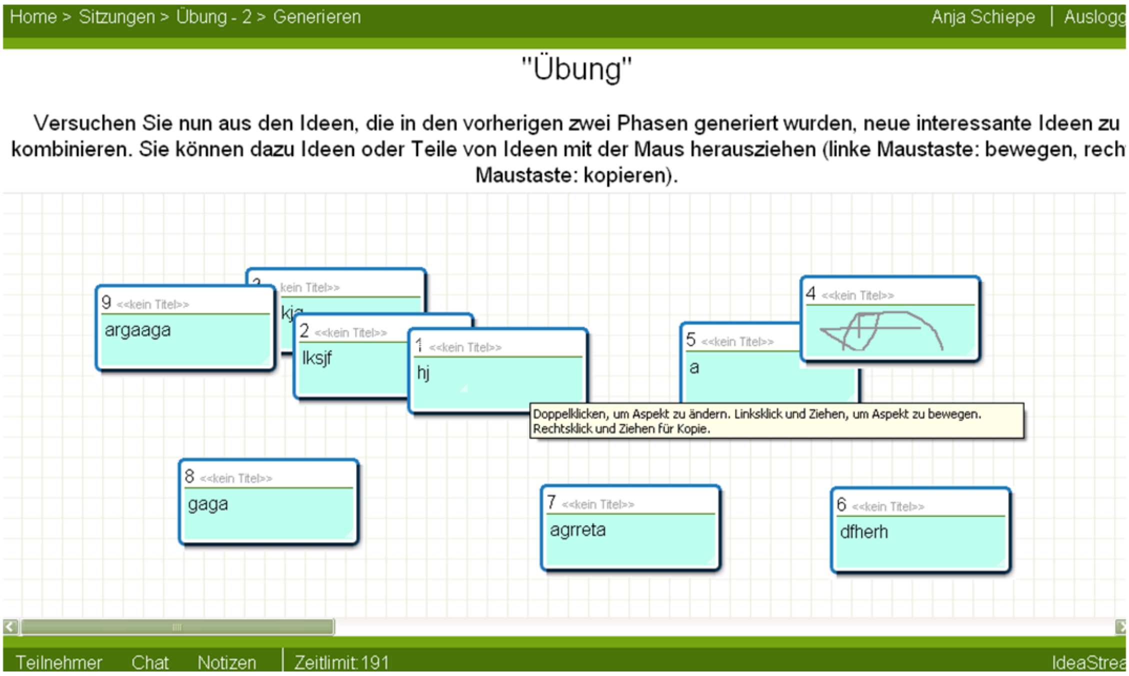
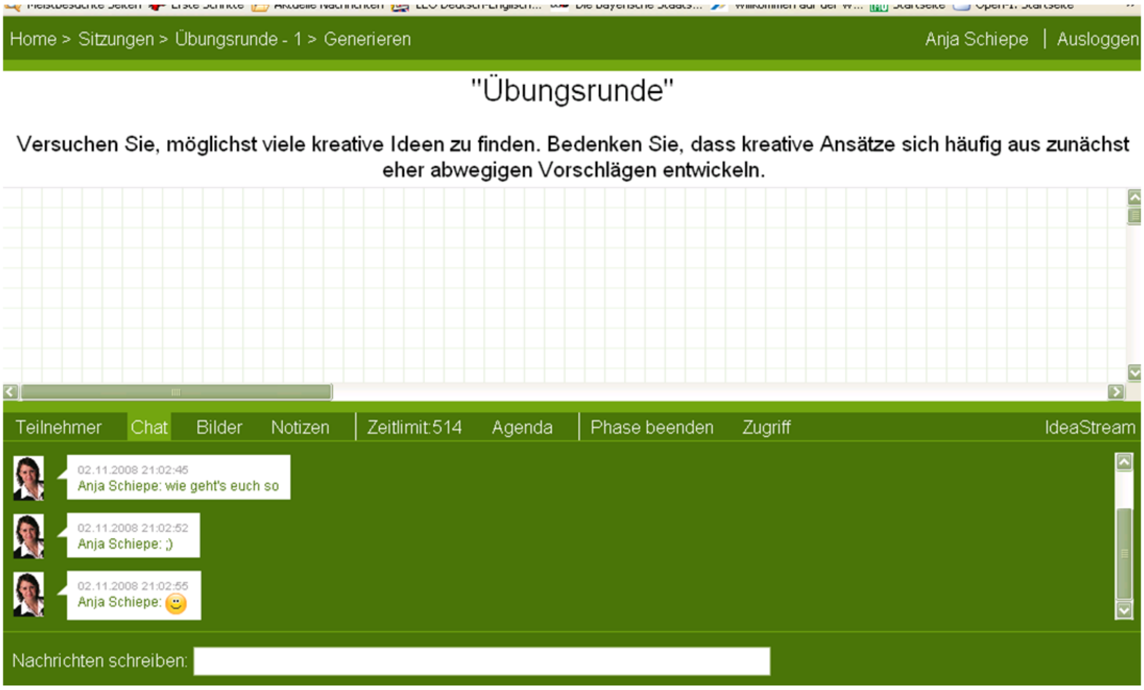
Appendix A – IdeaStream Screenshots



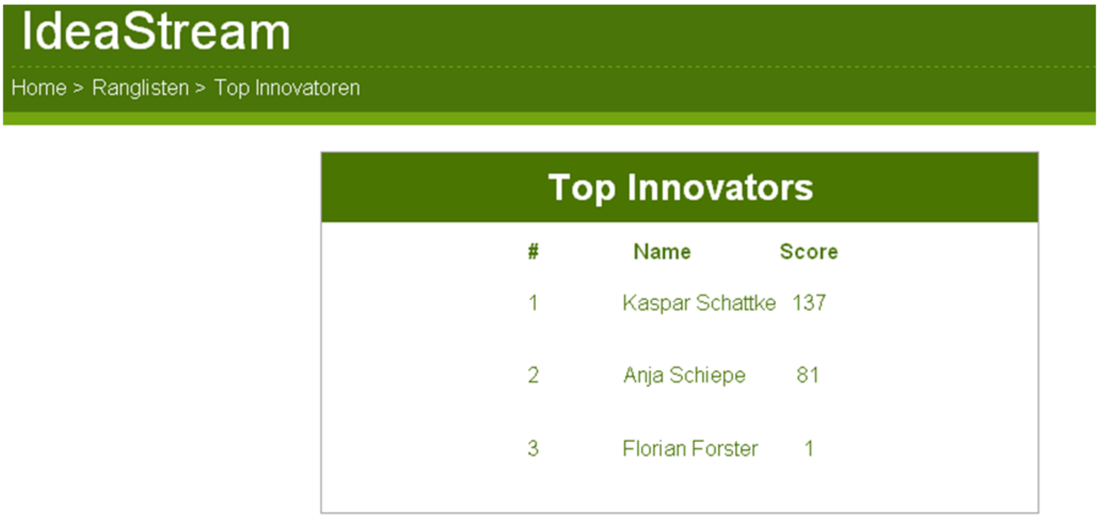




Home > Sitzungen > Übungsrunde - 1 > Generieren
Anja Schiepe | Ausloggen
"Übungsrunde"
Versuchen Sie, möglichst viele kreative Ideen zu finden. Bedenken Sie, dass kreative Ansätze sich häufig aus zunächst eher abwegigen Vorschlägen entwickeln.
Teilnehmer Chat Bilder Notizen Zeitlimit:514 Agenda Phase beenden Zugriff IdeaStream
02.11.2008 21:02:45
Anja Schiepe: wie geht's euch so
02.11.2008 21:02:52
Anja Schiepe: ;)
02.11.2008 21:02:55
Anja Schiepe:
Nachrichten schreiben:

Home > Sitzungen > Übungsrunde - 1 > Generieren
Anja Schiepe | Ausloggen
"Übungsrunde"
Versuchen Sie, möglichst viele kreative Ideen zu finden. Bedenken Sie, dass kreative Ansätze sich häufig aus zunächst eher abwegigen Vorschlägen entwickeln.
Doppelklicken, um eine neue Idee anzulegen
Teilnehmer Chat Bilder Notizen Zeitlimit:455 Agenda Phase beenden Zugriff IdeaStream
ich singe und tanze gern
Ideen aus Notizen | Notizen löschen


IdeaStream
Anja Schie
Home > Ranglisten
Top Innovatoren
Die Rangliste der besten Innovatoren der Plattform.
Mein Innovationsrang
Zeigt Ihnen, an welcher Position sie sich mit ihren Ideenbeiträgen im Vergleich zu den anderen Innovatoren befinden.
Meine Innovationsperformance
Zeigt Ihnen, wie Sie sich mit ihren Ideenbeiträgen über die Zeit verbessert haben.


IdeaStream
Home > Ranglisten > Top Innovatoren
Top Innovators
Name Score
1 Kaspar Schattke 137
2 Anja Schiepe 81
3 Florian Forster 1

Appendix B – The 3-Component Scale

1. Verglichen mit anderen Tätigkeiten, arbeite ich gern mit der Plattform. (ap)
2. Ich will meine Aufgaben mit der Plattform möglichst gut lösen. (cp)
3. Die Aufgaben mit der Plattform kann ich meist gut bewältigen. (pa)
4. Ich habe Lust, mit der Plattform zu arbeiten. (ap)
5. Wenn ich will, kann ich bei meiner Arbeit mit der Plattform gute Ergebnisse erzielen. (pa)
6. Ich will mich intensiv mit der Plattform auseinandersetzen. (cp)
7. Auch wenn die Arbeit mit der Plattform manchmal schwierig ist, habe ich Freude daran, mit ihr zu arbeiten. (ap)
8. Es ist wichtig, meine Aufgaben mit der Plattform zu lösen. (cp)
9. Ich denke, dass ich bei der Arbeit mit der Plattform gute Ergebnisse erzielen werde. (pa)
10. Die Arbeit mit der Plattform macht mir großen Spaß. (ap)
11. Ich habe die nötigen Fähigkeiten, um die Aufgaben mit der Plattform gut zu lösen. (pa)
12. Für mich ist es wichtig, bei der Arbeit mit der Plattform ein gutes Ergebnis zu erzielen. (cp)

ap = affective preferences

cp = cognitive preferences

pa = perceived abilities

Appendix C – Advertising Flyer for Study 3

Appendix D – Goal Imagination Exercise

Setzen Sie sich bequem und entspannt auf den Stuhl. Legen Sie Ihre Arme auf die Armlehnen. Lassen Sie Ihre Schultern hängen. Schließen Sie nun Ihre Augen und lenken Sie Ihre ganze Aufmerksamkeit auf Ihre Atmung. Sie atmen ein -aus – ein und aus – Mit jedem Atemzug merken Sie, wie Sie ruhiger werden und gleichmäßiger atmen. Spüren Sie, wie ihr Körper schwer wird und tiefer in den Stuhl sinkt. Auch Ihre Arme und Beine werden schwerer und schwerer. Sie spüren, wie die Anspannung des Tages langsam ihren Körper verlässt. Sie atmen weiter langsam ein-und aus-ein- und aus. Ihr Körper wird immer schwerer und schwerer. Eine angenehme Wärme durchströmt Ihren Körper. Sie genießen die entspannende Schwere und die wohltuende Wärme, die sich weiter ausbreitet. Bitte lassen Sie Ihre Augen geschlossen und fühlen Sie sich angenehm warm und entspannt.

Bitte stellen Sie sich nun die folgende Situation möglichst genau und lebhaft vor: Sie sitzen auf einem gepolsterten Stuhl mit Armlehnen und vor Ihnen auf dem Tisch steht ein Computer. Die Luft im Raum ist trocken und warm. Es liegt ein leises Surren der Computer in der Luft. Sie hören, wie Ihr Konkurrent schräg hinter Ihnen sitzt, und unruhig mit den Füßen scharrt. Sie legen die Hände auf die entsprechenden Tasten der Tastatur und sind bereit den Wettkampf zu beginnen. Auf dem Bildschirm vor Ihnen startet der Countdown. Erst ist der Bildschirm schwarz – dann 5-4-3-2-1 und los… Der erste Stern erscheint auf dem Bildschirm und Sie drücken so schnell wie möglich die entsprechende Taste. Der nächste Stern erscheint. Während Sie mit den Fingern die entsprechenden Tasten drücken, hören Sie das klickende Geräusch Ihres Konkurrenten, der ebenfalls die Antwort-Tasten drückt. Er ist schnell, aber Sie sind schneller. Ein neuer Stern erscheint auf Ihrem Bildschirm, und wieder einer - bis plötzlich das Rennen vorüber ist. Ihr Bildschirm färbt sich grün und informiert Sie darüber, dass Sie die erste Runde gewonnen haben. Ihr Konkurrent, der gerade erkannt hat, dass er Zweiter ist, atmet hörbar ein.

Wie fühlen Sie sich in diesem Moment?

Der Countdown für die zweite Runde beginnt. 5-4-3-2-1und los Sie drücken so schnell Sie können die Tasten, die der Position des Sterns auf dem Bildschirm entsprechen. Sie fühlen, dass Sie schnell sind – vielleicht sogar schneller als in der letzten Runde. Aber plötzlich färbt sich Ihr Bildschirm rot und Sie stellen fest, dass Ihr Konkurrent schneller gewesen sein muss.

Wie fühlen Sie sich in diesem Moment?

Weiter geht's mit der dritten Runde. Diesmal drücken Sie ganz schnell die richtigen Tasten sobald der Stern erscheint, fest entschlossen Ihren Gegner diesmal zu besiegen, schneller zu sein als er,…Und JA – jetzt sind Sie zuerst fertig geworden und Ihr Bildschirm färbt sich in ein beruhigendes grün. Ihr Gegner knurrt leise. Aber Sie warten schon ungeduldig auf die nächste Runde, fest entschlossen wieder zu gewinnen. Und weiter geht das Rennen. Sie gewinnen immer mehr Runden. Ihr Konkurrent dagegen schafft es nur noch sehr selten zu gewinnen. Schließlich ist die letzte Runde vorbei. Sie erkennen, dass Sie mehr Runden gewonnen haben als ihr Konkurrent. Sie waren schneller. Er konnte am Ende nicht mithalten. Sie haben gewonnen.

Wie fühlen Sie sich jetzt?

Lenken Sie nun Ihre Aufmerksamkeit langsam wieder auf Ihre Atmung zurück. Atmen Sie tief ein und spüren Sie Ihren Körper auf dem Stuhl. Erinnern Sie sich an Ihre Umgebung, den Raum, den Stuhl auf dem Sie sitzen. Bewegen Sie Ihre Finger, ballen Sie Ihre Hände zu einer Faust, recken und strecken sie sich. Wenn Sie soweit sind, öffnen Sie bitte Ihre Augen.

Appendix E – Screenshot of SRT Instructions

Erklärung

Ich erkläre an Eides statt, dass ich die der **Fakultät TUM School of Management** der Technischen Universität München zur Promotionsprüfung vorgelegte Arbeit mit dem Titel

In the Power of Flow:

The Impact of Implicit and Explicit Motives on Flow Experience with a Special Focus on the Power Domain

am **Lehrstuhl für Psychologie** unter der Anleitung und Betreuung durch **Prof. Dr. Hugo M. Kehr** ohne sonstige Hilfe erstellt und bei der Abfassung nur die gemäß § 6 Abs. 5 angegebenen Hilfsmittel benutzt habe.

Ich habe keine Organisation eingeschalten, die gegen Entgelt Betreuerinnen und Betreuer für die Anfertigung von Dissertationen sucht, oder die mir obliegende Pflichten hinsichtlich der Prüfungsleistungen für mich ganz oder teilweise erledigt.

Ich habe die Dissertation in keinem anderen Prüfungsverfahren als Prüfungsleistung vorgelegt.

Ich habe den angestrebten Doktorgrad noch nicht erworben und bin nicht in einem früheren Promotionsverfahren für den angestrebten Doktorgrad endgültig gescheitert.

Die Promotionsordnung der Technischen Universität München ist mir bekannt.

München, den 07.01.2013 ________________________________

(Anja Schiepe-Tiska)