The Motivating Power of Visionary Images: Effects on Motivation, Affect, and Behavior

Maika Rawolle

Technische Universität München, Germany

Oliver C. Schultheiss

Friedrich-Alexander University, Erlangen, Germany

Alexandra Strasser

Technische Universität München, Germany

Hugo M. Kehr

Technische Universität München, Germany

In press, *Journal of Personality*

Author Note

The data presented in this manuscript represent portions of Maika Rawolle's dissertation. All vision scripts, PSE pictures, and Inquisit scripts used in this research are available upon request from Maika Rawolle.

We would like to thank the German Research Foundation for supporting this research (HK 725/5-1), Joseph Bäuml at the Technische Universität München for support with the ethics application, and Jane Zagorski for helpful comments on the manuscript.

Please direct all correspondence to Maika Rawolle, Kienbaum Management Consultants, Potsdamer Platz 8, 10117 Berlin, Germany, Email: Maika.rawolle@mail.de

Abstract

Objective:

Visionary images are identity-relevant, picture-like mental representations of a desirable and attainable future appearing regularly in a person's stream of thought. Prior research indicates that both mental and real images provide access to implicit motives. We therefore proposed that visionary images motivate people by arousing their implicit motives and tested this hypothesis in two experimental studies.

Method:

We used guided visualizations to administer motive-domain-specific visionary images (Study 1: achievement and neutral, age: M = 24.4, 51 participants, 34 women; Study 2: affiliation and power, age: M = 24.01, 51 participants, 28 women) to arouse the respective implicit motive. Motivation was measured via residual changes in affective (i.e., changes in affective arousal), behavioral (i.e., performance on a concentration task; behavioral choices in a prisoner's dilemma), and mental (i.e., motive imagery in the Picture Story Exercise) indicators of motivation.

Results:

The results largely confirmed our hypothesis. Visionary images increased motivation in the targeted domain. Some effects were moderated by participants' implicit motives.

Conclusion:

The findings underscore the role of implicit motives in understanding the motivational effectiveness of visionary images.

Keywords: vision, imagery, implicit motives, motivation, visionary image

The Motivating Power of Visionary Images: Effects on Motivation, Affect, and Behavior

A *vision*—the mental image of a desirable future—can help to bring about this future by mobilizing people into action geared toward attaining it (Nanus, 1992). From applied settings, leadership researchers have reported that a vision, defined as an idealized goal to be achieved in the future (Conger, 1999), promotes employee motivation and performance (Kirkpatrick & Locke, 1996) and organizational outcomes (e.g., Baum, Locke, & Kirkpatrick, 1998; Lowe, Kroeck, & Sivasubramaniam, 1996). The organizational literature uses the term vision, but to emphasize that we are not referring to a statement about a vision but to the actual mental image, we use the term *visionary image*. Relatively little is known about what makes visionary images effective (e.g., House & Podsakoff, 1994; Ilies, Judge, & Wagner, 2006). Accordingly, the purpose of this research is to analyze the motivational effects and underlying motivational mechanisms of visionary images. Findings from motivational psychology imply that moving or stationary images such as photographs (e.g., Shantz & Latham, 2009), movies (Schultheiss, Wirth, & Stanton, 2004), and soundless video (Klinger, 1967) arouse implicit motives. Hence, we argue that visionary images are motivationally effective because they arouse implicit motives.

Visionary Image: Definition and Related Constructs

We define visionary images as picture-like mental representations of an identity-relevant, desirable, and attainable future state appearing regularly in a person's stream of thought. The essential defining element—as suggested by its name—is its visual element: the representation of an idea as a *picture-like mental representation* providing a quasi-perceptual simulation of a future reality. Through their quasi-perceptual quality, visionary images provide a glimpse of a future state in which many of the concerns one is currently working on have been achieved, hence providing "a taste" of its incentives. Equally important, according to our definition, visionary images pertain

to the identity that a person's aspires to achieve and are thus linked to a central aspect of the self (Baumeister, 1997). They represent an image-like instantiation of that identity.

But how are visionary images related to other constructs associated with mental simulations of the future? In sum, four features characterize a visionary image and in combination, differentiate it from related constructs: (a) picture-like, (b) identity-relevant, (c) positive, and (d) reflecting a long-term perspective (for an alternative classification of mental future representations, see Oettingen, 1997).

Possible selves (i.e., individuals' cognitive representations of what they might want to become or fear becoming in the future; Markus & Nurius, 1986) resemble visions as they are long-term and relevant to a person's identity, however, they are not necessarily represented as a mental image, and they can also depict a negatively valued future state that a person loathes. *Positive fantasies* (i.e., positive prospects that spontaneously appear in one's stream of thought; e.g., Oettingen, 1999), *goal imagery* (i.e., Schultheiss & Brunstein, 1999), as well as *process and outcome simulations* (i.e., envisioning the process of working toward a goal vs. envisioning the moment of actually achieving it, respectively; e.g., Pham & Taylor, 1999), like visions, are future states represented as mental images. However, these mental images, in contrast to visions, do not necessarily depict identity-relevant live events but rather current personal strivings.

Personal goals (i.e., cognitive representations of desired future states; Austin & Vancouver, 1996) as well as *goal priming* differ from visionary images with regard to both picture-like representation and identity relevance. A doctoral dissertation by Strasser (2011) indicated that participants' descriptions of their personal visions contained more imagery, as measured by self-ratings and computerized linguistic analyses, than descriptions of their personal goals. Further, goals can but do not have to be linked to or derived from a person's identity (Brunstein, 2000), in

contrast to visions, which we defined as identity relevant. Relatedly, goal priming, with its theoretical foundation still under construction (Locke, 2015), is in essence an array of techniques (Locke, 2015) aimed at the automatic activation of goals. A visionary image, by contrast, is not a technique but an identity-relevant, motivational psychological entity. Further, to be effective, visionary images do not require any preset goals but rather arouse a person's implicit motives.

Prior Research

The idea that imagining a desired future promotes motivation has guided decades of research but has produced inconsistent findings. Research on possible selves has indicated that positive possible selves promote effort and persistence on a cognitive task (Ruvolo & Markus, 1992). Dalley and Buunk (2011), in turn, reported that negative (an overweight body) rather than positive (a fit body) future identities fostered healthy food choices and the intention to participate in a weight loss program. Research on mental simulation has supported the notion that imagining concrete future performances promotes motivation (Taylor & Pham, 1990) and helps people to achieve their goals (e.g., Sherman, Skov, Hervitz, & Stock, 1981). Sherman et al. (1981) asked participants to imagine either success or failure on an anagram task and then predict their performance. Participants who imagined success not only expected to perform better but also outperformed those who imagined failure. Similarly, students who imagined success on an exam reported higher motivation to study and higher expectations of success than those in the no-imagery control group or those who had imagined the process of exam preparation. However, the last group began studying earlier, studied longer, and received higher grades (Taylor & Pham, 1996). Taylor and colleagues (e.g., Taylor, Pham, Rivkin, & Armor, 1998) speculate that envisioning the outcome increases expectations of success, motivation, and emotional involvement, whereas envisioning the process prompts action plans and problem-solving activities. Extending this,

Oettingen and colleagues (e.g., Oettingen & Mayer, 2002; Oettingen, Pak, & Schnetter, 2001) demonstrated that mental contrasting, that is, contrasting fantasies about a desired future with the reality promotes goal attainment because it activates a person's expectations of success and determines the strength of commitment. Positive fantasies that are not mentally contrasted with the present reality, in turn, have predicted less effort and lower performance in different areas including relationships, health, and academic achievement (e.g., Kappes, Oettingen & Mayer 2012; Oettingen & Mayer, 2002) because they fail to generate the energy to act (Kappes & Oettingen, 2011) and prevent the person from preparing to cope with obstacles (Oettingen, et al., 2001).

In sum, the findings are somewhat mixed; yet, taken together, they imply that positive mental images about the future have detrimental effects on performance, commitment, and activation. This contradicts findings from previously discussed organizational research that visionary images in organizations foster motivation and performance on individual and organizational levels (e.g., Kirkpatrick & Locke, 1996; Baum et al., 1998; Lowe et al., 1996). We speculate that the effort- and performance-enhancing effects of mental contrasting as well as of process simulations result primarily from the action-regulatory benefits of visualizing the path to a goal (e.g., anticipating hindrances or action planning). Beyond this, negative fantasies about the future or contrasting the future with the current unpleasant reality elicit energy stemming from concern or dissatisfaction. The present research, however, takes a motivational perspective in which the benefits of visionary images arise from aroused implicit motives (Kehr, 2005). The premise for identifying this effect, however, is that, we are considering interindividual differences in implicit motive dispositions, which was not done in the research outlined above. In support of this notion, Schultheiss and Brunstein (1999) found that the imagery of a social-interaction goal that contained incentives for the affiliation and power motive led only to an

increase in general arousal in participants high in both motive patterns. In the following, we introduce the distinction between implicit and explicit motives, followed by a review of research implying that visionary images tap into the implicit motive system.

Implicit and Explicit Motives

In the dual-system model of motivation, McClelland, Koestner, and Weinberger (1989) proposed two distinct motivation systems: a conscious (i.e., explicit) system and an unconscious (i.e., implicit) system (e.g., Kehr, 2004; Schultheiss, 2008; Spangler, 1992). The implicit system comprises a limited number of biologically based motivational needs representing relatively stable capacities to experience specific types of incentives as rewarding or aversive (Atkinson, 1957; Schultheiss, 2008). Research has focused on three specific motivational needs (referred to as *implicit motives* in the following): power, affiliation, and achievement (abbreviated as n Power, n Affiliation, and n Achievement, respectively). Implicit motives are traditionally measured with the Picture Story Exercise (PSE; Schultheiss & Pang, 2007). Here, participants write imaginative stories about ambiguous pictures which are then coded for motive imagery. The explicit motivation system, by contrast, contains individuals' language-based and consciously accessible beliefs about their needs, which are measured via a self-report questionnaire (e.g., Personality Research Form, PRF; Jackson, 1984) related to power, affiliation, or achievement (i.e., explicit motives).

According to Schultheiss' (2001, 2008) information-processing model, rather than responding to verbal stimuli, the implicit motivation system preferentially responds to nonverbal stimuli (Klinger, 1967) such as pictorial stimuli from film scenes or images (e.g., Schultheiss et al., 2004) and affects nondeclarative measures of motivation (e.g., hormone changes, cardiovascular responses, response speed; cf. Brunstein & Maier, 2005; McClelland, 1979; Schultheiss & Stanton, 2009). The explicit motivation system, by contrast, responds to verbal incentives (e.g., demands

or suggestions) and affects declarative measures of motivation (e.g., decisions, judgments, and executive control of behavior; cf. Brunstein & Maier, 2005). The model further suggests that, in order to access the implicit motive system, verbal representations need to be translated into nonverbal ones through mental imagery—a process called referential processing. Much research, for instance, on referential processing (Schultheiss, Patalakh, Rawolle, Liening, & MacInnes, 2011) and goal imagery (Schultheiss & Brunstein, 1999, 2001; see also Job & Brandstätter, 2009), suggests that translating a goal from its original language-based representational format into the quasi-perceptual format of a mental image facilitates its processing by the implicit motive system.

We conclude that a visionary image—due to its quasi-perceptual representational format—accesses the implicit motive system and thereby elicits motivation (Kehr, 2005). Motivation, in the context of this research, is operationally defined as an action impulse stemming from aroused implicit motives comprising affective, cognitive, and behavioral components (e.g., Kehr, 2004).

Thus, we hypothesized: A motive-domain-specific visionary image (i.e., a visionary image tailored to one particular motive domain) will arouse the targeted implicit motive and thereby elicit motivation indicated by changes in motive imagery, affect, behavior, and performance. This effect will be moderated by the individual's implicit motive disposition such that individuals with a strong disposition in the relevant motive domain will show a greater increase in motivation than individuals with a weak disposition. For example, the visionary image of being appointed as a professor with an endowed chair at a prestigious university is mainly power-related and should therefore elicit power motivation, particularly in individuals with a strong implicit power motive.

The Present Research

To test our hypotheses, we conducted two experiments in which we experimentally varied the motivational content of the visionary image in order to arouse a targeted implicit motive. We

measured the resulting motivation (i.e., a state of motivation resulting from implicit motive arousal) by assessing various motivation indicators before and after administering the visionary image, controlling for pre-vision measures to obtain residual change scores (abbreviated as, e.g., *changes in power imagery*). We used behavioral (i.e., changes in performance or behavioral choices), affective (i.e., changes in affective arousal), and mental content (i.e., changes in motive imagery) motivation indicators. We used motivation indicators that have been used successfully in past research (e.g., Atkinson & McClelland, 1948; Brunstein & Maier, 2005; Schultheiss & Brunstein, 1999; Schultheiss et al., 2004; Terhune, 1968). Study 1 examined the effects of an achievement-related visionary image on motive imagery and performance. Study 2 focused on affiliation- and power-related visionary images and their effects on affective arousal and behavioral choices.

Study 1

Study 1 focused on the achievement domain and examined the effects of visionary images on motive imagery and performance on a mental concentration task. We compared an *achievement condition* (relaxation and an achievement-related visionary image) with a *no vision condition* (control condition; relaxation only) in their effects on achievement motivation assessed by residualized changes in achievement imagery and mental concentration task performance.

Traditionally, *changes in motive imagery* in PSE stories have been used to measure the experimental arousal of implicit motives (e.g., Atkinson & McClelland, 1948; Schultheiss et al., 2004). Therefore, we hypothesized an increase in achievement imagery for the achievement condition but not for the control condition.

Changes in performance were assessed with a mental concentration task adapted from Brunstein and Maier (2005), who provided evidence that performance on this task can be predic-

ted by participants' implicit achievement motivation. We hypothesized that participants in the achievement condition would show better performance than those in the no vision condition.

Method

Participants. All 51 (34 women) participants were students from Technische Universität München or University of Munich. They received €15 for participating. Two participants were dropped from the analyses, one for not being a native German speaker and one for dropping out early. The final sample consisted of 49 (age: M = 24.2, SD = 3.0; 33 women) participants.

Design and procedure. We used an aptitude-treatment-interaction (ATI) design to test effects of visions and participants' implicit motives on motivation. *Hope for success* was the between-subjects aptitude factor. *Vision condition* was the treatment factor with two levels to which participants were randomly assigned (achievement vision condition, n = 24; no vision condition, n = 25). The dependent variables were pre-to-posttest changes in achievement motive imagery performance on a mental concentration task (i.e., latencies and error rate).

In the single sessions, which lasted 60 min, participants were first given the pre-vision PSE to assess pre-vision n Achievement before they completed the first mental concentration task. Then they were administered either the achievement-related visionary image or the relaxation exercise. This was followed by the post-vision measurements: the second mental concentration task, the post-vision PSE, and demographic questions. The PSE and all questionnaires from both studies were programmed in Inquisit 2.0 (Millisecond Software, Seattle, WA).

Visionary image administration. Following Kirkpatrick, Wofford, and Baum's (2002) suggestion to classify and evaluate visions according to the extent to which their content reflects one or more of the three motive domains (i.e., affiliation, achievement, or power), we used Winter's (1994) PSE content coding system to develop motive-domain-specific visionary

images, that is, visionary images containing incentives for one specific motive. In order to evoke a standardized visionary image, we decided to operationalize the visionary image by leading participants through a guided visualization, a technique adapted from Schultheiss and Brunstein (1999). Participants lay down on a couch and listened via headphones to a prerecorded script featuring a male speaker. The achievement script included a 4-min relaxation exercise followed by a 7-min vivid description of an achievement-related future scenario. Participants were asked to close their eyes and imagine the described scenario vividly, just like they were dreaming it. We chose a scenario that was likely to be personally relevant to all students: the graduation ceremony. It contained a speech by the dean about achievement and stamina and also mentioned personal successes, improving their grades from the previous year, and the perspective of a successful career. Participants' personal involvement was enhanced with questions such as "What exactly is the dean saying? […] You have once again improved your grades. What are your feelings at this moment?" Participants in the control condition listened to the relaxation exercise only.

After the visualization, we gauged the effectiveness of the visionary image we had administered with three questions that were rated on a 5-point scale (1 = *not at all*; 5 = *very much*). Participants were asked if they had a picture in their mind's eye (*imagery*; $M = 4.67$, $SD = 0.70$), if they could identify with the protagonist (*identification*; $M = 4.17$, $SD = 0.96$), and if they could put themselves in this situation (*empathy*; $M = 4.00$, $SD = 0.72$). The results implied that the visionary image script elicited picture-like visionary images and that the graduation scenario appeared realistic to achieve.

Motive imagery. n Achievement was assessed with the PSE, which is considered to be the standard measure of implicit motives and which shows sufficient validity and reliability

(Schultheiss, Liening, & Schad, 2008, p. 1560; Schultheiss & Pang, 2007). The pre-vision PSE consisted of four pictures chosen to arouse n Achievement; the pictures *gymnast* and *women in a laboratory* had been used in earlier studies (e.g., Brunstein & Maier, 2005; Pang & Schultheiss, 2005), whereas the pictures *lecture hall* and *graduation ceremony* had not been used before. To probe pre-to-post-vision changes, we administered a short three-picture post-vision PSE consisting of *pianist* (Pang, 2010), *workers* (Smith, 1992), and a picture called *tutoring lesson*, which had not been used before. We followed the procedure for computer-based PSE administration described by Schultheiss et al. (2008). PSE stories were coded according to Heckhausen's (1963) scoring system for assessing success-related achievement imagery ("Hope for Success" [HS], 1963; for an English translation, see Schultheiss, 2001). This extensively validated (Brunstein & Maier, 2005; Heckhausen, Schmalt, & Schneider, 1985) scoring system is the assessment method of choice when only n Achievement is measured (cf. Brunstein & Maier, 2005; Schultheiss & Brunstein, 2005). The coder, who was blind to the hypotheses, had previously exceeded 85% agreement on calibration materials prescored by an expert. To additionally ensure reliability, 25% of the PSE stories were content coded by a second independent coder. The two coders achieved a percentage agreement (see Martin & Bateson, 1993) of 95.95%. Participants' means were $M = 373$ ($SD = 103$) for pre-vision protocol length, $M = 299$ ($SD = 87$) for post-vision protocol length, $M = 8.39$ ($SD = 3.28$) for pre-vision HS, and $M = 3.96$ ($SD = 2.81$) for post-vision HS. To prepare the PSE raw scores for data analyses, we followed Schultheiss and Pang's (2007) recommendations. Thus, we did not correct motive scores for protocol length because they were not correlated ($p > .20$). Also, to correct the skewness of the HS scores, we applied a square root transformation prior to all inferential statistical analyses (SQR [1 + score]).

Mental concentration task performance. The mental concentration task is an adaptation of Brickenkamp and Zillmer's (1998) d2 Test of Attention designed to assess individual differences in perceptual speed and selective attention. Brunstein and Schmitt (2004) and Brunstein and Maier (2005) used a similar adaptation to assess achievement motivation. In the task, the letters *d* and *p* were displayed at the center of the computer monitor, accompanied by one, two, or three vertical or horizontal dashes. Participants were asked to press one key if a target (i.e., a *d* with two dashes) was presented and another key if a nontarget (i.e., a *d* having more or fewer than two dashes or a *p* no matter how many dashes it had) was presented. Participants were instructed to react as quickly and accurately as possible. They first completed a set of practice trials, which ended when they had provided 10 correct consecutive responses. The following pre-vision block consisted of 150 trials and the post-vision block of 300 trials. Targets and nontargets were presented in a random order, each with a likelihood of 50%. In contrast to Brunstein and Schmitt's version, participants did not receive feedback to ensure that the motivational effect of feedback would not interfere with the motivational effect of the vision. To minimize the effect of response errors, we removed latencies over 1,200 ms and under 300 ms; this led to the loss of less than 4% of the latency data in the pre-vision block and less than 2% in the post-vision block. We then averaged latencies in the pre-vision block (M = 648 ms, SD = 81) and in the post-vision block (M = 590 ms, SD = 67). Because the pre- and post-vision blocks differed in number of trials, we calculated error rates (N errors/N trials; M = 0.034, SD = 0.025 for pre-vision; M = 0.032, SD = 0.027 for post-vision). Because distributions of error rates and latencies were skewed, we applied a square root transformation of the pre- and post-vision latency scores (SQR [1 + score]) and a log transformation (LOG [1 + score]) of the pre- and post-vision error-rate scores.

Statistical analyses. In both studies, analyses were conducted with SYSTAT 12 and involved mainly the General Linear Model (GLM), comprising analyses of covariance (ANCOVAs), regression analyses, bivariate correlations, and *t* tests. An alpha level of .05 (two-tailed) was employed in all analyses. Because the pre-vision scores were associated with the post-vision scores in both studies, we controlled for interindividual differences at baseline.

Results and Discussion

Preliminary analyses. Table 1 displays the intercorrelations of all variables. Participants' pre-vision HS scores did not differ between the two conditions (*p*s > .40). Also, participants' gender and age had no impact on the results reported below.

Motive imagery. In line with our predictions, an ANCOVA on post-vision HS with condition as the factor and pre-vision HS as a covariate revealed a significant effect of condition on post-vision HS, $F(1, 46) = 5.03$, $p < .05$. After controlling for pre-vision HS, participants in the achievement condition showed higher post-vision HS than those in the control condition. In order to test whether pre-vision HS moderated the effect of condition on post-vision HS, we computed an ANOVA on post-vision HS with condition and pre-vision HS as factors. However, the analysis yielded a nonsignificant interaction between condition and pre-vision HS, $F(1, 44) = 0.00$, $p = .96$, indicating that pre-vision HS did not moderate the effect of condition on post-vision HS.

Concentration task performance. As predicted, an ANCOVA on post-vision performance with condition as the factor and pre-vision performance as a covariate showed that participants in the achievement vision condition, compared with those in the no vision condition, showed significant reductions in latencies, $F(1, 46) = 7.83$, $p < .01$, as well as in error rates, $F(1, 46) = 4.51$, $p < .05$ (see Figure 1). However, these effects were once again not moderated by pre-vision HS for latencies, $F(1, 44) = 0.01$, $p = .92$, or for error rates, $F(1, 44) = 0.26$, $p = .61$.

Using bipartial correlation analyses, we also examined whether changes in HS were associated with changes in performance in the vision condition. After controlling for their respective baseline measures, post-vision HS was associated with a reduction in post-vision latencies, bipartial r = -.44, p = .03, but not with changes in post-vision error rates, bipartial r = -.01, *ns*. By contrast, in the control condition, no significant associations were found between changes in HS and response times, bipartial r = .21, or error rates, bipartial r = -.04, both *ns*.

In sum, the results of Study 1 offer behavioral support for the notion that visionary images elicit motivation: In the vision condition, the achievement-related visionary image led to increased HS as well as to increased performance (i.e., decreases in latencies and error rates) on the mental concentration task, when compared with the control group.

The lack of support for the anticipated moderator effect might be due to the difficulty in finding statistical support for interaction effects (i.e., effects of higher order; McClelland & Judd, 1993) particularly with a relatively small sample size. In our additional analyses, however, increases in HS were tied to greater response speed in the vision condition but not in the control condition. This implies that the increase in performance is related to implicit motivational processes.

Study 2

Study 2 examined whether affiliation- and power-related visionary images have specific effects on motive arousal and social behavior. We contrasted two motives that are known to have opposite effects on many motivational outcomes (McClelland, 1989). Accordingly, we chose appropriate motivation indicators to illustrate these opposing effects: changes in self-reported affective arousal and cooperative versus competitive behavioral choices in a prisoner's dilemma.

Prior research has demonstrated that motive arousal is accompanied by *changes in self-reported affective arousal*. n Power arousal is associated with energetic arousal and tense arousal (McClelland, 1982). n Affiliation arousal, by contrast, is associated with joy and pleasure (McClelland, 1987), which can be assessed as hedonic tone (see below). More recent research has yielded heterogeneous results. Whereas Zurbriggen and Sturman (2002) showed that motive-specific visualizations led to motive-specific affect, their data did not indicate that a person's implicit motive disposition moderated these effects. Other studies, however, did support a link between implicit motives and specific affective responses. Rösch, Stanton, and Schultheiss (2013) found that after showing participants facial expressions of different emotions, those high in n Power or n Achievement showed changes in affective arousal, whereas those high in n Affiliation showed reactions in terms of emotional valence. Moreover, Job, Bernecker, and Dweck (2012) showed that people high in n Affiliation were more satisfied when they experienced calmness and relaxation in their romantic relationships, whereas participants high in n Power were more satisfied when experiencing strength and excitement in relationships.

Hence, we hypothesized that affiliative visionary images would lead to increases in hedonic tone and that this effect would be moderated by the strength of n Affiliation such that participants with higher n Affiliation would have greater increases in hedonic tone. Furthermore, we expected that power-related visionary images would lead to increases in tense arousal and energetic arousal and that this effect would be moderated by the strength of n Power such that participants with higher n Power would have greater increases in tense arousal and energetic arousal.

Previous research has reported that people's implicit motives influence their *cooperative behavioral choices*. In studies using the prisoner's dilemma paradigm, participants high in n Power were noncooperative and tried to exploit their partners, whereas participants high in n

Affiliation were usually cooperative (Kagan & Knight, 1981; Terhune, 1968). Therefore, we hypothesized that participants in the power condition would show more exploitative behavior and that this effect would be moderated by participants' power motive disposition such that participants higher in n Power would show greater increases in exploitative behavior. By contrast, we predicted that participants in the affiliative condition would show more cooperative behavioral choices, which would be moderated by participants' affiliation motive disposition such that participants higher in n Affiliation would show greater increases in cooperative behavior.

Method

Participants. The sample consisted of 51 students (28 women) from the Technical University of Munich or the University of Munich. They were recruited through flyers and paid €19 for their participation. One participant was dropped from the analyses because he withdrew early. The final sample contained 50 participants (age: $M = 24.00$, $SD = 3.71$; 28 women).

Design and procedure. As in Study 1, we used an ATI design with n Affiliation and n Power as between-subjects aptitude factors and condition as a treatment factor. Participants were randomly assigned to conditions (affiliation vision: $n = 26$; power vision: $n = 24$). The dependent variables were changes in self-reported affective and cooperative behavioral choices.

Participants attended single sessions (100 min). They first filled out a self-report measure of affective arousal, then completed the PSE for the assessment of n Affiliation and n Power, and were then administered the guided visualization. This was followed by post-vision assessments of affective arousal, behavioral choices in the prisoner's dilemma, and demographic questions.

Visionary image administration. Visionary images were again administered as a guided visualization of a graduation celebration cast in a power- or affiliation-related frame. Participants in the power condition imagined themselves giving a speech as the host of a party with many

important guests who were expressing their admiration. Vividness and personal relevance were enhanced by questions such as "The guests in front of the stage clap, and some raise their glass to you. What do you see in their faces?" In the affiliation condition, participants imagined themselves with family, friends, and classmates recollecting mutual friendly experiences.

As in Study 1, participants were asked to specify on a 5-point scale (1 = *not at all*; 5 = *very much*) how much imagery (M = 4.56, SD = 0.75), identification (M = 4.12, SD = 0.94), and empathy (M = 3.89, SD = 1.23) they experienced. Results indicated that the guided imagination exercise was successful.

Implicit motives. We measured n Affiliation and n Power (only pre-vision) with a PSE consisting of Pang and Schultheiss' (2005) six-picture set. The stories were blind-coded for affiliation and power motive imagery by a trained scorer using Winter's (1994) *Manual for Scoring Motive Imagery in Running Text*. The two coders achieved a percentage agreement (see Martin & Bateson, 1993) of 91.4% for n Affiliation and 96.2% for n Power. We computed a square root transformation of all motive scores and a log transformation of the word count (LOG [1 + score]) to render them more normally distributed. PSE protocol length (M = 567, SD = 161) was significantly correlated with participants' n Power (M = 5.16, SD = 2.87), r = .36, p = .01, and n Affiliation (M = 4.68, SD = 2.69), r = .44, $p < .005$. Therefore, we used a regression analysis to correct the motive scores for the influence of protocol length and converted the residuals to z scores.

Self-reported affective arousal. Participants' pre-vision (T1) and post-vision (T2) affective arousal was assessed using an adaptation of the UWIST Mood Adjective Check List (UMACL; Matthews et al., 1990) with the three subscales *energetic arousal*, *tense arousal*, and *hedonic tone*. We used a subset of four items from the energetic arousal scale (*active*, *energetic*,

passive, and *sluggish*) as well as four from the tense arousal scale (*nervous*, *jittery*, *calm*, and *relaxed*; cf. Schultheiss & Brunstein, 1999). The hedonic tone scale (consisting of eight items: *happy*, *satisfied*, *contented*, *cheerful*, *sad*, *depressed*, *dissatisfied*, and *sorry*) was used in its entirety. Items were presented in a random order with the primer "Right now I feel…," and participants were asked to endorse each item using a 4-point scale (*definitely not*, *slightly not*, *slightly*, and *definitely*). After recoding negatively keyed items, sum scores were calculated for each scale and each assessment because all scales were found to have satisfactory internal consistencies at T1 and T2 (Cronbach's αs between .75 and .88). Participants' means were 24.84 (*SD* = 3.64) for pre-vision hedonic tone, 25.78 (*SD* = 4.50) for post-vision hedonic tone, 12.26 (*SD* = 2.56) for pre-vision energetic arousal, 12.04 (*SD* = 2.66) for post-vision energetic arousal, 8.92 (*SD* = 2.54) for pre-vision tense arousal, and 7.24 (*SD* = 2.31) for post-vision tense arousal.

Cooperative behavior. The prisoner's dilemma, which was adapted from Terhune (1968), was designed to incite a conflict between the social incentive to cooperate and the individual incentive to exploit. Participants received on-screen instructions informing them that both partners were playing for points, which would accumulate over the trials such that, in the end, they would receive money according to the results of their game: 1 Eurocent per point. The payoff matrix was shown on the screen explaining how the payoffs were contingent upon the joint choices of the two players: If both players chose cooperation, each would receive 60 points. If both chose noncooperation, each would receive 20 points. If one chose noncooperation when the other chose cooperation, the one choosing noncooperation would get 65 points, and the one choosing cooperation would get 15 points. In total, participants could make up to €6.50 (about $7.20 USD).

In order to standardize the conditions (i.e., the reactions of the game partner) and to keep direct social interaction from interfering with the effects of the vision, the game partner was

simulated by a computer. However, as n Power and n Affiliation are social motives that respond to social interaction, we told participants that they were competing against a real game partner who was in an adjacent room. Consistent with this framing, the experimenter left the room, ostensibly to attend to the other participant after the real participant had been seated. Also, the game was frequently interrupted by the message "waiting for partner" on the screen. By ticking a box on the screen, participants could choose whether they wanted to cooperate and thus share points with the game partner or keep all the points for themselves. The game consisted of a no-feedback phase (3 trials) and a feedback phase (7 trials). The no-feedback phase allowed us to assess the effect of the motive without the effect of interacting with the partner. In the feedback phase, participants were told that they would receive outcome feedback but that the partner would not. In all trials but the fifth and the 10^{th}, participants were told that the partner had cooperated. According to Terhune (1968), this helps to avoid arousing suspicion in participants high in n Affiliation and keeps them from switching to a defensive, noncooperative mode.

The choices after all three types of feedback (i.e., no feedback, cooperation, and noncooperation) were significantly and positively correlated (rs > .29, ps < .04). First, we differentiated between the feedback types when computing analyses of behavioral choices, but these analyses did not differ substantially from those conducted with an overall cooperation score. Therefore, we computed an overall cooperation score (M = 16.22, SD = 3.13) by summing the number of cooperation choices across all 10 trials. Because the cooperation scores were skewed, they were square-root-transformed prior to all inferential statistical analyses (SQR [1 + score]).

Results and Discussion

Preliminary analyses. Table 2 displays the intercorrelations of all variables. Participants' motive scores (i.e., n Affiliation and n Power) did not differ between the experimental conditions

(*p*s > .21). Also, participants' age had no impact on the results, whereas gender had an impact on some effects as reported below.

Self-reported affective arousal. To test whether affiliative visionary images would increase hedonic tone and whether power-related visionary images would increase energetic and tense arousal, we computed three ANCOVAs on post-vision self-reported affective arousal (i.e., hedonic tone, tense arousal, or energetic arousal) with condition as between-subjects factor and pre-vision affective arousal as a covariate.

The results for hedonic tone showed that participants in the affiliative condition, relative to those in the power condition, reported significant increases in hedonic tone, $F(1, 47) = 7.70$, $p = .007$. Analyses including n Affiliation, n Power, and their interactions with condition as additional factors revealed that this main effect was moderated by participants' n Affiliation only, $B = -2.43$, $SE = 1.19$, $t(45) = -2.04$, $p = .05$. n Affiliation was a nonsignificant positive predictor of hedonic tone in the affiliative condition, $B = 1.36$, $SE = 0.93$, $t(23) = 1.45$, $p = .16$, whereas in the power condition, n Affiliation was a nonsignificant negative predictor of hedonic tone, $B = -1.06$, $SE = 0.76$, $t(21) = -1.39$, $p = .18$. This significant interaction uniquely accounted for a 6.8% increase in the amount of variance explained in post-vision hedonic tone.

Participants in the power condition, compared with those in the affiliative condition, showed significant increases in tense arousal, $F(1, 47) = 4.52$, $p = .04$. Neither n Power nor n Affiliation moderated the main effect of condition on tense arousal.

Contrary to our expectations, we found no main effect of condition on changes in energetic arousal, $F(1, 47) = 2.01$, $p = .16$. However, when we included n Power, n Affiliation, and their interactions with condition as additional factors in the analysis, only the n Power x Condition interaction was significant, $B = 1.48$, $SE = 0.68$, $t(45) = 2.18$, $p = .03$. In the power condition, parti-

cipants' n Power was a marginally significant positive predictor of energetic arousal, $B = 1.06$, $SE = 0.54$, $t(21) = 1.94$, $p = .07$, whereas in the affiliative condition, n Power was a nonsignificant negative predictor of energetic arousal, $B = -0.644$, $SE = 0.502$, $t(23) = -1.28$, $p = .21$. This significant interaction uniquely accounted for an increase in explained variance of 7.5% in post-vision energetic arousal. Energetic arousal, rather than tense arousal, is an indicator of approach motivation and a precursor of instrumental action (Matthews et al., 1990). Thus, we speculated that energetic arousal is especially strong if a visionary image matches the implicit motive.

Cooperative behavior in a prisoner's dilemma. An ANOVA with condition as the factor revealed a significant main effect of condition on cooperative behavior, $F(1, 48) = 10.38$, $p = .002$. Participants in the affiliation vision condition showed significantly more cooperative behavior ($M = 4.28$, $SD = 0.28$) than those in the power vision condition ($M = 3.96$, $SD = 0.42$).

Analyses including both motive variables and their respective interactions with condition revealed that both motive x condition terms predicted unique variance in cooperative behavior: significantly so for the n Power x Condition interaction, $B = -0.267$, $SE = 0.095$, $t(44) = -2.82$, $p = .007$; at a marginal level of significance for the n Affiliation x Condition interaction, $B = -0.183$, $SE = 0.097$, $t(44) = -1.90$, $p = .06$. These interactions accounted for 13.4% of the variance in cooperative behavior above and beyond first-order effects. Follow-up analyses indicated that in the power condition, n Power ($B = -0.209$, $SE = 0.073$), $t(21) = -2.85$, $p = .01$, but not n Affiliation ($B = -0.013$, $SE = 0.071$), $t(21) = -0.19$, $p = .85$, uniquely predicted cooperative behavior. By contrast, in the affiliation condition, n Affiliation ($B = 0.169$, $SE = 0.061$), $t(23) = 2.78$, $p = .01$, but not n Power ($B = 0.059$, $SE = 0.058$), $t(23) = 1.02$, $p = .32$, uniquely predicted cooperative behavior. As depicted in Figure 2, n Power predicted less cooperative behavior after a power

vision but not after an affiliative vision, whereas n Affiliation predicted more cooperative behavior after an affiliative vision but not after a power vision.

General Discussion

The aim of this research was to provide evidence for the motivational power of visionary images and to shed light on the underlying motivational processes. In two experiments, we tested the proposition that motive-domain-specific visionary images arouse implicit motives and thereby elicit motivation (Kehr, 2005), particularly in individuals with strong motive dispositions. Our findings generally supported the validity of these hypotheses in the three motive domains and with respect to various motivation indicators: changes in motive imagery, self-reported affective arousal, performance, and cooperative behavioral choices.

In line with our expectations, Study 1 showed that engaging in an achievement-related visionary image resulted in higher achievement motive imagery and better performance on a mental concentration task than in the control condition, which involved a relaxation exercise but no visionary image. However, it failed to confirm the expected interactive effects between visionary image and implicit motive. Study 2, in turn, not only supported the prediction that visionary images would affect a person's self-reported affect and behavior in that an affiliation-related visionary image increased a person's cooperative behavior when compared with a power-related visionary image. It also confirmed the expected interaction effects between visionary images and implicit motives on both self-reported affect (energetic arousal, hedonic tone) and cooperative behavior. Further analyses revealed that the strength of the targeted implicit motive positively predicted the motivational response; more precisely, the power-related visionary image had a stronger motivational effect on participants high in n Power than on those low in n Power, whereas the affiliation-related vision had a stronger motivational effect on participants high in n Affiliation than

on those low in this motive. This implies that one's implicit motive disposition determines the strength of one's response to motivational incentives and lends even more support to the notion that implicit motivational processes account for the motivational effects of visionary images.

The finding that the motivating effects of visionary images are reflected in a person's subjective affective arousal is in line with McClelland (1986). In support of his speculation that affiliation motivation reflects *being*, whereas power and achievement motivation reflect *doing*, we found that power-related visionary images promote a state of activation (i.e., tension and energetic arousal), whereas affiliative visionary images promote hedonic emotional states, findings that are consistent with Zurbriggen and Sturman's (2002) results. Our finding that motive-specific affect was moderated by the corresponding implicit motive is moreover consistent with Atkinson's (1957) hypothesis that implicit motives enhance affective responses of motive-congruent incentives. However, Zurbriggen and Sturman (2002) did not find evidence for the notion that a person's implicit motive disposition influences the intensity of the emotional experience during a visualization exercise containing incentives for the respective motive. Future research is needed to resolve this inconsistency and to validate the proposition of a motive-specific affective experience for n Achievement.

Study 2 yielded evidence that visionary images energize and aid the selection of instrumental behavior, two key effects of motivation (McClelland, 1987). It illustrated a behavioral selection effect using the prisoner's dilemma paradigm: Visionary images had a substantial effect on participants' willingness to cooperate. Further, some of the effects in Study 2 (i.e., on energetic arousal, hedonic tone, and cooperative behavioral choices) were stronger for individuals whose implicit motive disposition thematically matched the content of the vision.

These findings underpin the significance of implicit motivational processes in accounting for a vision's influence on motivation and behavior and are in line with the notion that the quasi-perceptual representational format of mental images grants them access to the implicit motive system (cf. Schultheiss & Brunstein, 1999). Further, these findings might help to explain the inconsistency in research on the motivational effects of an imagined future. Whereas many studies have found no or negative effects of positive fantasies on motivation (e.g., Kappes & Oettingen, 20011; Oettingen et al., 2001; Oettingen & Mayer, 2002), others (e.g., Ruvolo & Markus, 1992; Sherman et al., 1981), including the present research, have yielded positive effects. We speculate that if research on positive mental future images disregards the moderating effect of implicit motive dispositions, it might overlook their motivational effects and lead to inconsistent results. Our finding that the power-related visionary image elicited increases in energetic arousal in participants high in n Power but decreases in those low in n Power provides an example of this issue.

Further, we argue that although approaches such as the use of negative fantasies or mentally contrasting a desired future with an unpleasant reality may enhance performance and activation, these effects arise in part from dissatisfaction with the status quo. The present research suggests an alternative approach: utilizing motivational effects that stem from aroused implicit motives. Even if this effect were not as strong, it should be more beneficial to a person's well-being in the long run because it is based on hope and anticipated pleasure rather than distress or dissatisfaction. Research in the field of health psychology underscores the notion that painting a positive future self is beneficial to emotional well-being (e.g., Sheldon & Lyubomirsky, 2006).

Limitations and Future Directions

For the purpose of operationalizing the construct of visionary images in the laboratory, we evoked a standardized mental image in our participants by using guided visualization. As this

process involved spoken language, one could argue that the reported effects of the visionary images might be based on semantic priming, which is conceptualized as activation of associative language networks (e.g., Collins & Loftus, 1975). However, we think that this alternative explanation of our findings is unlikely to hold true for the following reasons: First in both studies, we have documented that the guided visualizations were effective in evoking mental images in participants. And second, Engeser and Baumann (2014) found that semantic priming did not affect implicit motivation. Thus, our operationalization of visionary images cannot be assumed to operate through semantic primes and the motivational processes that we found to be engaged through visionary images can be assumed to be based on implicit motive arousal through picture-like mental representations. This is also consistent with our basic definition of visionary images as mental image — we do not see them as semantic networks.

The two studies used relatively small sample sizes, which could explain why the hypothesized moderator effect of the implicit motive disposition was found only in Study 2. From published research on the moderator effect of implicit motives we had expected a more pronounced, moderately high effect size for the presumed moderator effect in Study 1. Hence, future research should use larger samples to test the hypotheses. Having said this, Study 1 did reveal that increases in achievement motive imagery went along with greater response speed in the vision condition but not in the control condition, a result that underpins the significance of implicit motivational processes.

A further limitation is that in Study 1, the control group received the relaxation exercise only and thus had 7 min less guided visualization time than participants in the vision condition. This is a potential confounding factor and should be avoided in future studies. Moreover, future

research should rule out alternative explanations for the effects, for instance by including more control conditions (e.g., semantic and goal priming conditions).

Another unsettled issue involves identifying the determinants of the motivational strength of visionary images. The present research implies that two aspects are relevant: The extent to which the visionary image (a) gives rise to mental imagery and (b) has a motivational incentive value that, ideally, matches the individual's implicit motives. Furthermore, future research is needed to explore how to enhance a vision's motivational incentive value. Kehr (2005) speculated that visionary images, just like pictorial material from the PSE, can be monothematic or multithematic (i.e., offering incentives for one specific or more than one motive domain, respectively).

Also, future research should explore additional benefits of visionary images. Due to their access to the implicit motive system, visionary images are likely to be more closely associated with people's implicit motives than their goals. Hence, they could have the capacity to promote congruence between the implicit and explicit motive systems. Recent research offered initial support for this notion: Goals that were derived from a personal visionary image were more motive congruent than goals that were not derived from a personal vision (Strasser, Rawolle, Schultheiss, & Kehr, 2014). Kappes, Schwörer, and Oettingen (2012) reported that an aroused or strong need positively predicted the number of positive fantasies relevant to addressing this need.

Although we tried to create personally meaningful visionary images and our postadministration checks verified that we had effectively elicited mental images that participants identified with, we still evoked visionary images via external manipulation in order to ensure standardized conditions. In order to test the ecological validity of the results, they need to be

replicated in the field by examining personal visionary images and predicting motivational outcomes in a longitudinal design.

Lastly, in order to adapt this line of research to the growing body of, thus far, mostly theoretical research on the motivational effects of organizational visions (e.g., Kehr, 2005), our hypotheses need to be tested in applied settings to examine, for instance, the effects of organizational visions on employee performance and other organizational outcomes. We assume that such effects would be especially likely if the vision was in a pictorial instead of an abstract format and if the vision was framed to maximize a match with employees' motives by including incentives for multiple motives.

Conclusion

To conclude, the present paper introduces the concept of visionary images as picture-like mental simulations of an identity-relevant, desirable, and attainable future state and yields empirical evidence that a visionary image can be motivationally effective by arousing a person's implicit motives. Using well-established implicit motivation indicators, this research implies that implicit motivational processes are relevant when examining the motivational effects of mental images of the future. It thereby complements prior psychological research in this field and extends it to a previously unrelated field of research: organizational research on the beneficial effects of visions for employee motivation and organizational performance. We hope that these findings will inspire more empirical research on visionary images.

Declaration of Conflicting Interests

The authors declare no potential conflicts of interest with respect to the research, authorship, or publication of this article.

Funding

The authors disclose receipt of the following financial support for the research, authorship, and publication of this article: Grant HK 725/5-1 from the German Research Foundation supported the preparation of this manuscript.

References

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

Atkinson, J. W., & McClelland, D. C. (1948). The projective expression of needs. II. The effects of different intensities of the hunger drive on thematic apperception. *Journal of Experimental Psychology, 28*, 643-658.

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin, 120*, 338-375.

Baum, J. R., Locke, E. A., & Kirkpatrick, S. A. (1998). A longitudinal study of the relation of vision and vision communication to venture growth in entrepreneurial firms. *Journal of Applied Psychology, 83*, 43-54.

Baumeister, R. F. (1997). Identity, self-concept, and self-esteem: The self lost and found. In: R. Hogan, J. Johnson, & S. Briggs, (Eds.), *Handbook of Personality Psychology* (pp. 681-710). San Diego, CA: Academic Press.

Brickenkamp, R., & Zillmer, J. (1998). *d2 Test of attention*. Seattle, WA: Hogrefe International.

Brunstein, J. C. (2000). Motivation and performance following failure: The effortful pursuit of self-defining goals. *Applied Psychology: An International Review, 49*, 340-356.

Brunstein, J. C., & Maier, G. W. (2005). Implicit and self-attributed motives to achieve: Two separate but interacting needs. *Journal of Personality and Social Psychology, 89*, 205-222.

Brunstein, J. C., & Schmitt, C. H. (2004). Assessing individual differences in achievement motivation with the Implicit Association Test. *Journal of Research in Personality, 38*, 536-555.

Collins, A. M., & Loftus, E. F. (1975): A spreading-activation theory of semantic processing. *Psychological Review, 82*, 407-428.

Conger, J. A. (1999). Charismatic and transformational leadership in organizations: An insider's perspective on these developing streams of research. *Leadership Quarterly, 10*, 145-179.

Dalley, S. E. & Buunk, A. P. (2011). The motivation to diet in young women: Fear is stronger than hope. *European Journal of Social Psychology, 41*, 672–680.

Engeser, S. & Baumann, N. (2014). Does achievement motivation mediate the semantic achievement priming effect? *Journal of Experimental Psychology: General, 143,* 1861–1874.

Heckhausen, H. (1963). *Hoffnung und Furcht in der Leistungsmotivation [Hope and fear components of achievement motivation]*. Meisenheim am Glan, Germany: Anton Hain.

Heckhausen, H., Schmalt, H.-D., & Schneider, K. (1985). *Achievement motivation in perspective.* New York: Academic Press.

House, R. J., & Podsakoff, P. M. (1994). Leadership and effectiveness: past perspectives and future directions for research. In J. Greenberg (Ed.), *Organizational behavior: The state of science* (pp. 45-82). Hillsdale, NJ: Erlbaum.

Ilies, R., Judge, T., & Wagner, D. (2006). Making sense of motivational leadership: The trail from transformational leaders to motivated followers. *Journal of Leadership and Organizational Studies, 13*, 1-22.

Inquisit 2.0.50401 [Computer software]. (2005). Seattle, WA: Millisecond Software LLC.

Jackson, D. N. (1984). *Personality Research Form* manual. Port Huron, MI: Research Psychologists Press.

Job, V., & Brandstätter, V. (2009). Get a taste of your goals: Promoting motive-goal congruence through affect-focus goal fantasy. *Journal of Personality, 77*, 1527-1560.

Job, V., Bernecker, K., & Dweck, C. S. (2012). Are implicit motives the need to feel certain affect? Motive-affect congruence predicts relationship satisfaction. *Personality and Social Psychology Bulletin, 38*, 1552-1565.

Kagan, S., & Knight, G. P. (1981). Social motives among Anglo American and Mexican American children: Experimental and projective measures. *Journal of Research in Personality, 15*, 93-106.

Kappes, H. B., & Oettingen, G. (2011). Positive fantasies about idealized futures sap energy. *Journal of Experimental Social Psychology, 47*, 719-729.

Kappes, H. B., Oettingen, G., & Mayer, D. (2012). Positive fantasies predict low academic achievement in disadvantaged students. *European Journal of Social Psychology, 42*, 53-64.

Kappes, H. B., Schwörer, B., & Oettingen, G. (2012). Needs instigate positive fantasies of idealized futures. *European Journal of Social Psychology, 42*, 299-307

Kehr, H. M. (2004). Integrating implicit motives, explicit motives, and perceived abilities: The compensatory model of work motivation and volition. *Academy of Management Review, 29*, 479-499.

Kehr, H. M. (2005). Das Kompensationsmodell von Motivation und Volition als Basis für die Führung von Mitarbeitern [The compensatory model of motivation and volition as a basis for leadership]. In R. Vollmeyer & J. Brunstein (Eds.), *Motivationspsychologie und ihre Anwendung* (pp. 131-150). Stuttgart, Germany: Kohlhammer.

Kirkpatrick, S.A., & Locke, E.A. (1996). Direct and indirect effects of three core charismatic leadership components on performance and attitudes. *Journal of Applied Psychology, 81*, 36-51.

Kirkpatrick, S. A., Wofford, J. C., & Baum, J. R. (2002). Measuring motive imagery contained in the vision statement. *The Leadership Quarterly, 13*, 139-150.

Klinger, E. (1967). Modeling effects on achievement imagery. *Journal of Personality and Social Psychology, 7*, 49-62.

Locke, E. A. (2015). Theory building, replication, and behavioral priming: Where do we need to go from here? *Perspectives on Psychological Science, 10*, 408-414.

Lowe, K. B., Kroeck, G. K., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytical review of the MLQ literature. *Leadership Quarterly, 7*, 385-425.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist, 41*, 954-969.

Martin, P., Bateson, P. P. G., & Bateson, P. (1993). *Measuring behaviour: An introductory guide.* Cambridge, GB: Cambridge University Press.

Matthews, G., Jones, D. M., & Chamberlain, A. G. (1990). Refining the measurement of mood: The UWIST Mood Adjective Checklist. *British Journal of Psychology, 81*, 17-42.

McClelland, D. C. (1979). Inhibited power motivation and high blood pressure in men. *Journal of Abnormal Psychology, 88*, 182-190.

McClelland, D. C. (1982). The need for power, sympathetic activation, and illness. *Motivation and Emotion, 6*, 31-41.

McClelland, D. C. (1986). Some reflections on the two psychologies of love. *Journal of Personality, 54*, 334-353.

McClelland, D. C. (1987). *Human motivation*. New York: Cambridge University Press.

McClelland, D. C. (1989). Motivational factors in health and disease. *American Psychologist, 44*, 675-683.

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

McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties of detecting interactions and moderator effects. *Psychological Bulletin, 114*, 376-390.

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

Nanus, B. (1992). *Visionary leadership*. San Francisco: Jossey-Bass.

Oettingen, G. (1999). Free fantasies about the future and the emergence of developmental goals. In J. Brandstädter & R. M. Lerner (Eds.), *Action and self-development: Theory and research through the life span* (pp. 315-342). Thousand Oaks, CA: Sage.

Oettingen, G., & Mayer, D. (2002). The motivating function of thinking about the future: Expectations versus fantasies. *Journal of Personality and Social Psychology, 83*, 1198-1212.

Oettingen, G., Pak, H., & Schnetter, K. (2001). Self-regulation of goal setting: turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology, 80*, 736-753.

Pang, J. S. (2010). The Achievement Motive: A Review of Theory and Assessment of N Achievement, Hope of Success, and Fear of Failure. In O. C. Schultheiss & J. C. Brunstein (Eds.), *Implicit Motives* (pp. 30-70). New York: Oxford University Press.

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

Rösch, A. G., Stanton, S. J., & Schultheiss, O. C. (2013). Implicit motives predict affective responses to emotional expressions. *Frontiers in Psychology*, 4, (985).

Ruvolo, A. P., & Markus, H. R. (1992). Possible selves and performance: The power of self-relevant imagery. Special Issue: Self-knowledge: Content, structure, and function. *Social Cognition, 10*, 95-124.

Schultheiss, O. C. (2001). An information processing account of implicit motive arousal. In M. L. Maehr & P. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 12: New directions in measures and methods, pp. 1-41). Greenwich, CT: JAI Press.

Schultheiss, O. C. (2008). Implicit motives. In O. P. John, R. W. Robins & L. A. Pervin (Eds.), *Handbook of Personality: Theory and Research* (3rd ed., pp. 603-633). New York: Guilford.

Schultheiss, O. C., & Brunstein, J. C. (1999). Goal imagery: Bridging the gap between implicit motives and explicit goals. *Journal of Personality, 67*, 1-38.

Schultheiss, O. C., & Brunstein, J. C. (2005). An implicit motive approach to competence. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 31-51). New York: Guilford.

Schultheiss, O. C., & Stanton, S. J. (2009). Assessment of salivary hormones. In E. Harmon-Jones & J. S. Beer (Eds.), *Methods in social neuroscience* (pp. 17-44). New York: Guilford.

Schultheiss, O. C., Liening, S., & Schad, D. (2008). The reliability of a Picture Story Exercise measure of implicit motives: Estimates of internal consistency, retest reliability, and ipsative stability. *Journal of Research in Personality, 42,* 1560-1571.

Schultheiss, O. C., & Pang, J. S. (2007). Measuring implicit motives. In R. W. Robins, R. C. Fraley & R. Krueger (Eds.), *Handbook of Research Methods in Personality Psychology* (pp. 322-344). New York: Guilford.

Schultheiss, O. C., Patalakh, M., Rawolle, M., Liening, S., & MacInnes, J. J. (2011). Referential competence is associated with motivational congruence. *Journal of Research in Personality, 45*, 59-70.

Schultheiss, O. C., Wirth, M. M., & Stanton, S. J. (2004). Effects of affiliation and power motivation arousal on salivary progesterone and testosterone. *Hormones and Behavior, 46,* 592-599.

Shantz, A., & Latham, G. P. (2009). An exploratory field experiment on the effect of subconscious and conscious goals on employee performance. *Organizational Behavior and Human Decision Processes, 109,* 9-17.

Sherman, S. J., Skov, R. B., Hervitz, E. F., & Stock, C. B. (1981). The effects of explaining hypothetical future events: From possibility to actuality and beyond. *Journal of Experimental Social Psychology, 17,* 142-158.

Smith, C. P. (Ed.). (1992). *Motivation and personality: Handbook of thematic content analysis*. New York: Cambridge University Press.

Spangler, W. D. (1992). Validity of questionnaire and TAT measures of need for achievement: Two meta-analyses. *Psychological Bulletin, 112,* 140-154.

Strasser, A., Rawolle, M., Schultheiss, O. C., & Kehr, H. M. (2014). *The relevance of mental images: Personal visions bridge the gap between implicit motives and personal goals*. Manuscript in preparation.

Sheldon, K. M., & Lyubomirsky, S. (2006). How to increase and sustain positive emotion: The effects of expressing gratitude and visualizing best possible selves. *The Journal of Positive Psychology, 1,* 73-82.

Taylor, S. E., & Pham, L. B. (1996). Mental simulation, motivation, and action. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 219-235). New York: Guilford.

Taylor, S. E., Pham, L. B., Rivkin, I. D., Amor, D. A. (1998). Harnessing the imagination: Mental simulation, self-regulation, and coping. *American Psychologist, 53,* 429-439.

Terhune, K. W. (1968). Motives, situation, and interpersonal conflict within prisoner's dilemma. *Journal of Personality and Social Psychology, 8,* 1-24.

Tichy, N. M., & Devanna, M. A. (1986). *The transformational leader*. New York: Wiley.

Winter, D. G. (1994). *Manual for scoring motive imagery in running text* (4th ed.). Department of Psychology, University of Michigan, Ann Arbor: Unpublished manuscript.

Zurbriggen, E. L., & Sturman, T. S. (2002). Linking motives and emotions: A test of McClelland's hypotheses. *Personality and Social Psychology Bulletin, 28,* 521-535.

Table 1

Correlations of Pre-Vision Implicit Motives, Post-Vision Motive Imagery, and Pre- and Post-Vision Performance on the Mental Concentration Task in Study 1

	1	2	3	4	5	6
Pre-vision implicit motive scores						
1. Pre-vision hope for success	--					
Post-vision motive imagery scores						
2. Post-vision hope for success	.45***	--				
Pre- and post-vision performance scores						
3. Pre-vision reaction times	.46***	.42***	--			
4. Post-vision reaction times	.49***	.32*	.91***	--		
5. Pre-vision error rates	-.23	-.22	-.42***	-.39**	--	
6. Post-vision error rates	-.25	-.24	-.43***	-.45***	.62***	--

Note. Pre-vision motive scores, post-vision motive imagery scores, and pre- and post-vision reaction time scores were square root transformed; pre- and post-vision error rate scores were log transformed.

* $p < .05$. ** $p < .01$. *** $p < .005$.

Table 2

Correlations of Pre-Vision Implicit Motives, Pre-and Post-Vision Self-Reported Affective Arousal, and Post-Vision Cooperative Behavioral Choices in a Prisoner's Dilemma in Study 2

	1	2	3	4	5	6	7	8	9
Pre-vision implicit motive scores									
1. n Affiliation	--								
2. n Power	-.18	--							
Pre- and post-vision affective arousal scores									
3. Pre-vision hedonic tone	-.04	-.23	--						
4. Post-vision hedonic tone	.04	-.20	.27	--					
5. Pre-vision tense arousal	.04	-.03	-.22	-.12	--				
6. Post-vision tense arousal	.05	.09	-.16	-.27*	.33*	--			
7. Pre-vision energetic arousal	.20	-.40**	.52***	.29*	-.03	.00	--		
8. Post-vision energetic arousal	-.03	-.11	.22	.48***	-.18	-.08	.42***	--	
Post-vision cooperative behaviour									
9. Post-vision cooperative behavior	.22	-.34*	.05	.25	.13	-.12	.21	-.15	--

Note. Pre- and post-vision self-reported affect scores (except for pre-vision energetic arousal) were square root transformed, pre- and post-vision alpha-amylase levels were log transformed.

* $p < .05$. ** $p < .01$. *** $p < .005$

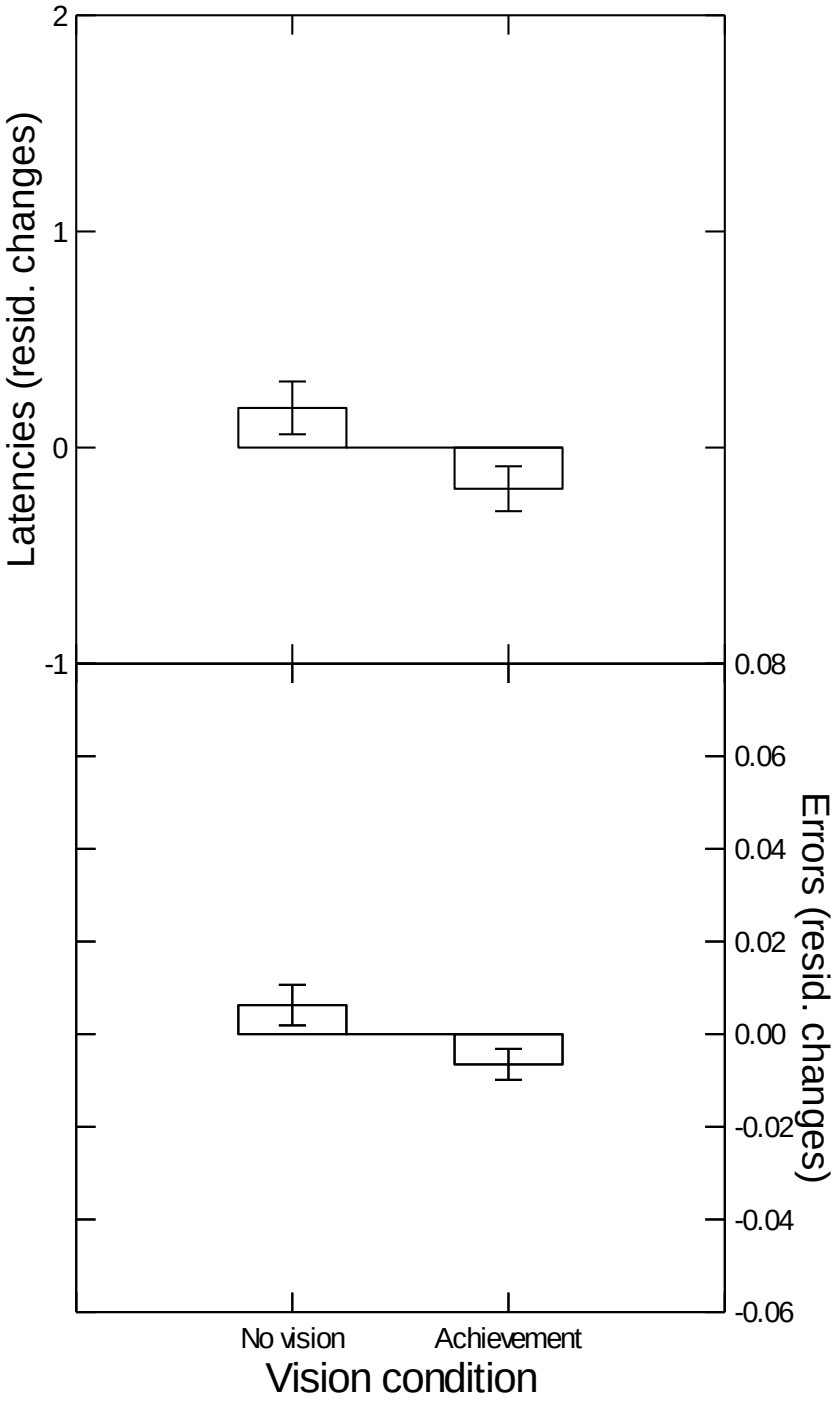
2
1
0
-1
Latencies (resid. changes)
0.08
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
Errors (resid. changes)
No vision
Achievement
Vision condition

Figure 1. Effects of vision condition on residualized changes in latencies and error rates.

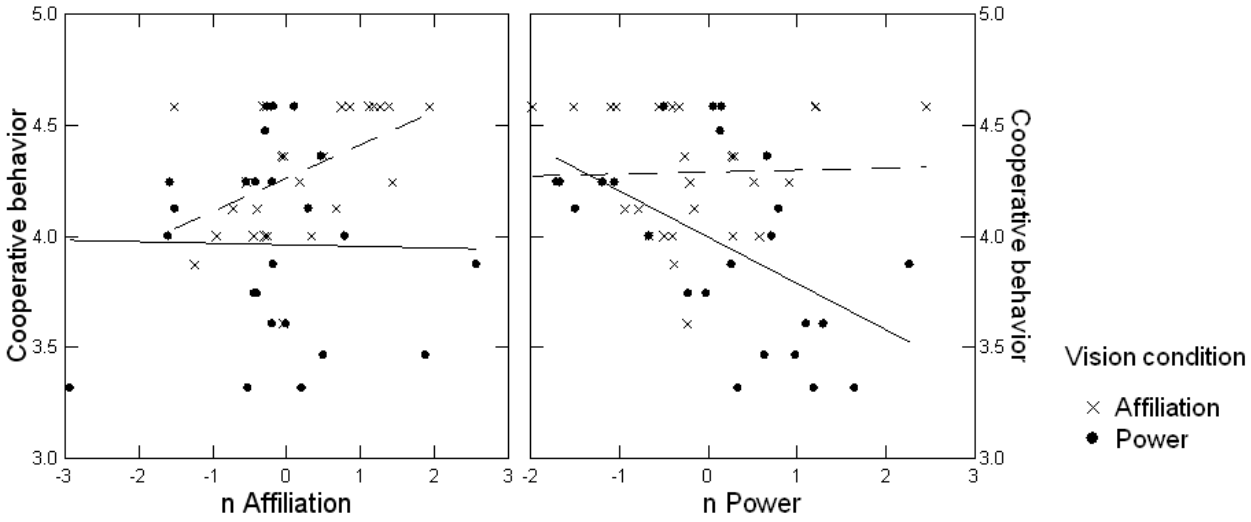

Figure 2. Cooperative behavioral choices in the prisoner's dilemma as a function of pre-vision n Power and n Affiliation (*z* scores) and vision condition. Striped line/crosses: affiliative vision condition; solid line/solid dots: power vision condition.