PERSPECTIVES ON BEHAVIORAL SELF-REGULATION

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The Speed of Goal Pursuit

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In the early 1990s, Heckhausen and Gollwitzer (1987; Gollwitzer, 1990; Heckhausen, 1991) suggested a model of action phases that describes people's attempts to realize their wishes and desires. The model assumes that on the long way from wishes to goal attainment, various different tasks have to be solved, and it associates a different action phase with each of these tasks. The first task to be solved in the so-called *predecisional phase* is selecting between one's various wishes and desires by turning some of them into binding goals. This transition to goal commitment is described as a decision that commits the person to actually performing goal-directed actions. The next task to be solved is the promotion of action initiation, which is done in the *preactional phase*. This is commonly achieved by planning when, where, and how one wants to get started with goal implementation. In the subsequent third phase (called *actional phase*), the task is to bring the started goal pursuit to a successful ending, even if barriers, hindrances, difficulties, slow downs, and so forth are encountered. Finally, after relevant outcomes have been achieved, the individual's task is to evaluate whether the actually achieved outcomes match the originally desired outcomes. On the basis of this evaluation, it will be decided whether further goal pursuit is necessary and worthwhile. This *postactional phase* comprises the last of the four action phases.

In the past, we have focused on the question of whether these different action phases are associated with a typical kind of information processing

(e.g., Gollwitzer, Heckhausen, & Steller, 1990; Gollwitzer & Kinney, 1989; Taylor & Gollwitzer, 1996). More specifically, we postulated that deliberating one's wishes and desires leads to a deliberative mind-set, whereas planning the implementation of a chosen goal leads to an implemental mind-set. As it turned out, people's information processing in a deliberative mind-set differs drastically from their information processing in an implemental mind-set (Gollwitzer, 1991). In general, people process information in ways that are functional to solving the task at hand, which is making the best choice between desires and getting started with goal-directed actions, respectively.

We also analyzed what kind of planning is most conducive to solving the task of the preactional phase (i.e., initiating goal-directed actions without delay). We observed that very simple plans that link suitable anticipated situations (good opportunities) to appropriate goal-directed actions are powerful self-regulatory tools when it comes to getting started (Gollwitzer, 1993, 1996). Such plans, called *implementation intentions*, automatize action initiation and thus guarantee that goal-directed actions will be elicited even when the individual is distracted by performing other tasks, is caught up in ruminative thoughts, or is simply tired.

Only very recently we have been concerned also with the task of the actional phase: bringing started goal pursuit to a successful ending. It is assumed (Gollwitzer & Rohloff, 1997) that any falling back on this task leads to a spontaneous effort increase and potentially to performance improvement. The commitment resting on one's decision to achieve the set goal pushes the individual toward goal attainment. A threat to this goal commitment should stimulate a reactive effort increase in an attempt to stick to one's commitment. Accordingly, it is not just explicit failure experiences that should trigger this spontaneous response. Any threat to this goal commitment, even if it is only caused by a temporal slowdown in the speed of goal pursuit, should suffice. In order to test this assumption, we developed a new experimental paradigm in which participants can be given false feedback on their changes in speed (velocity) with which they approach the goal. Before we report the collected data, we would like to discuss Carver and Scheier's view of the speed of goal pursuit.

SPEED OF GOAL PURSUIT AS PERCEPTUAL INPUT TO THE METAMONITORING FEEDBACK LOOP

The speed of reducing a discrepancy to a set standard is, according to Carver and Scheier, regulated by a system that serves a metamonitoring function. This process operates simultaneously and in parallel with

the behavior-guiding function served by the action loop feedback system. The metamonitoring system is thus checking on how well the action loop is doing at reducing its discrepancies. In more technical terms, "the perceptual input for the metamonitoring loop is a representation of the rate of discrepancy reduction in the action system over time." To make this easier to grasp, Carver and Scheier state that the action loop deals with distance, whereas the metamonitoring loop deals with velocity (speed).

The reference value for the perceptual input of the metamonitoring loop is an acceptable or desirable rate of discrepancy reduction. The primary output of the metamonitoring loop is, according to Carver and Scheier, affect in the sense of feeling positively or negatively. If the metamonitoring system detects a high speed of discrepancy reduction, there should be positive affect; if it senses a low speed, there should be negative affect. In support of these ideas, Carver and Scheier refer to the work by Hsee and Abelson (1991) who observed that people link velocity to satisfaction. For instance, students report that they would feel more satisfied if an improvement in class standing from the 30th percentile to the 70th percentile occurs during a short period of time (3 weeks) as compared to a long period of time (6 weeks). And when asked which change in value of a stock would be more satisfying (different charts are presented), subjects prefer fast velocities when the outcome was improving and slow velocities when the outcome was declining. Lawrence, Carver, and Scheier (1997) conducted an experiment where participants personally experienced different velocities of change. Manipulated performance feedback was given over time on an ambiguous task. Various speed patterns were established, whereby all participants finally ended up with a medium performance on the task. However, some subjects experienced a positive change of performance over time (starting poor and gradually improving), whereas others experienced a negative change (starting well and gradually worsening). With improving performances, high speeds led to better moods than low speeds, and with declining performances, low speeds led to less bad moods than high speeds.

Carver and Scheier also speculate about people's affective responses to accelerations and decelerations. Moving from a low-speed level to a high-speed level with a high velocity (fast acceleration) is not assumed to produce positive affect, but surprise. And the same is assumed for fast reductions from a high-speed level to a low-speed level (fast deceleration). Carver and Scheier admit that there is no direct evidence for this assumption, but they point to suggestive support for this position in the literature on emotion.

Most important, Carver and Scheier argue that the affect produced by the metamonitoring loop influences action. Based on a line of thought

called the cruise control model, it is suggested that people respond to the negative affect produced by low velocities of discrepancy reduction with an effort increase, as things are not moving forward fast enough. Positive feelings associated with a high speed of moving toward the goal lead to coasting (an effort decrease) as things are going better than they need to. As "a discrepancy is still a discrepancy, and discrepancies are to be reduced," either quality of affect or deviation from the standard speed represents an error and should lead to changes in output focused at discrepancy reduction. Carver and Scheier argue that it makes sense to assume that people reduce positive discrepancies in speed because, as they are typically working on several goals simultaneously, continuing to serve one goal effectively has the cost of ignoring other pressing goals. In addition, it is pointed out that the effort increase postulated for negative speed discrepancies does not have to be understood solely in terms of invigorating a given course of goal-directed action. Rather, switching to other, more effective behaviors to meet the goal is also implied.

REDUCTION IN SPEED OF GOAL PURSUIT AS A THREAT TO GOAL COMMITMENT

According to our theorizing (Gollwitzer & Rohloff, 1997), slowdowns in the speed of moving toward a goal (in comparison to a desired speed) contradict a person's commitment to goal attainment. As a consequence, reactive efforts to hold on to the goal should be triggered. We do not assume that a person needs to experience negative affect for such reactive effort increases to occur. In line with theorizing by Bargh and Gollwitzer (1994; Bargh, Gollwitzer, Chai, & Barndollar, 1997), we assume that much of people's goal pursuit should run off implicitly and does not need explicit thoughts or feelings as a triggering condition. Therefore, people should respond to slowdowns in speed of progress toward the goal by a spontaneous effort increase that is not based on negative affect.

Moreover, our theorizing implies that positive speed discrepancies do not contradict a person's commitment to goal attainment. Accordingly, such positive discrepancies should not lead to a reduction in effort; rather, people should continue to strive with a high velocity. Only when other important goals have to be served at the same time might one observe a decrease in effort, as solely promoting the goal at hand could imply a threat to these competing goal commitments. But when these competing goals can be served one by one, a high-speed approach to the goal at hand seems highly functional, as this would allow the person to readily complete the goal at hand and move on to competing goals in time.

It becomes apparent that our theorizing on changes in speed in goal pursuit does not assign a functional role to positive and negative affect. Still, we assume that changes in affect can be associated with changes in speed of goal pursuit. In our view, this depends on the quality of the standard to which a person compares his or her speed of progress. In the case of social standards (i.e., the speed of progress is compared to another person), negative or positive affect should be experienced as one feels like a loser or winner. This negative affect, however, should not further the person's effort increase, but instead hamper it. In the case of an ipsative standard (i.e., the person compares the present speed of progress with the speed of progress he or she had achieved before), we do not expect intensive affective responses to an increase or decrease in speed and no effect of affect on effort increase or decrease, respectively.

A NEW EXPERIMENTAL PARADIGM FOR STUDYING THE EFFECTS OF SPEED DISCREPANCIES

To give participants false feedback on their changes in the speed with which they approach a task goal, we asked two participants at a time to take part in the following experiment. Participants are told that they would take part in an experiment in which they have to perform arithmetic tasks that are commonly used in social cognition experiments on cognitive load. The problem, however, is that these tasks probably create not only cognitive load but also changes in mood. To test for this, participants would have to report on their mood repeatedly while performing the tasks. Moreover, to create a realistic dual-task situation, participants were also asked to attend carefully to the information provided on their speed of progress toward goal attainment. Participants would have to report on their speed later on.

The arithmetic tasks are then presented at the computer screen, and the participants solve one task after the other in a self-paced manner. The tasks consist of one to three numbers presented in an upper line, and one to three numbers presented in a lower line. Participants are asked to compute the sum of each line and then subtract the smaller sum from the larger sum. The participants' goal is to make 350 points, and participants are told that each correct task is awarded with 1 to 10 points depending on its difficulty. Proximity to the goal is indicated on the screen by a column that rises in steps of 50 points. Irrespective of their performance, participants receive the same false feedback about their proximity to the goal (i.e., whenever 15 tasks are completed the column rises one step).

What is varied, however, is the perception of the velocity in moving toward the goal.

RESULTS OF AN EXPERIMENT

In a study by Gollwitzer and Rohloff (1997) using this paradigm, two different groups of participants were created. In the social comparison group, participants received false feedback about their changes in speed with respect to the partner participant. In the ipsative comparison group, participants received false feedback on changes in speed with respect to their own prior baseline speed. In both comparison groups, participants' false feedback on their velocity changed after each fifth task. In the social comparison group, this feedback was said to be related to the momentary speed of their partner participant. In the ipsative comparison group, this feedback was said to be related to the 10 tasks performed at the beginning of the experiment (i.e., the so-called baseline phase).

Within each of the two comparison groups, four different velocity patterns of moving toward the goal were implemented. The patterns differed from each other in the following way: At the beginning and the end of task performance, the velocities of all different patterns were the same and described a zero discrepancy. In between, the patterns differed drastically. Pattern B showed a zero discrepancy throughout the full course of goal pursuit. In Pattern A, participants learned that they slowed down after the beginning but recovered toward the end. In Patterns C and D, participants found that they increased in speed after the beginning, but slowed down towards the end—this was more pronounced in Pattern D than in Pattern C.

At eight different points in time, separated by about 5 minutes each (depending on the participants' performance), participants were asked to fill out a questionnaire that assessed various aspects of mood, such as hedonic tonus (bad mood–good mood), tension arousal (calm–nervous, relaxed–anxious), energetic arousal (not energized–energized, passive–active) and anger (not angered–angered, well-balanced–irritated). Moreover, participants reported on their being surprised and on being satisfied/dissatisfied with the momentary situation. For the seven time periods cut out by these eight assessments, we later computed participants' effort expenditure by determining the amount of time they needed for completing one arithmetic task. We actually took the mean of the last 15 tasks. In addition, we computed quality of performance by dividing the achieved number of correct tasks through the time participants took to solve these tasks.

Based on our theorizing, we postulated that the negative discrepancy in speed of goal pursuit indicated in Pattern A implies a threat to participants' goal commitment. It is therefore responded to with effort and performance increases. People should spontaneously try to hold on to the desired velocity and thus increase effort and performance. This should be true no matter whether goal pursuit is solitary or social. We established two different positive speed discrepancy groups, because our theorizing differs from Carver and Scheier's metamonitoring loop notion with respect to the effect of positive discrepancies on effort expenditure. Contrary to Carver and Scheier, we do not assume that an above-standard speed leads to reduction in effort and performance; moving faster than standard neither threatens a person's goal commitment nor renders it obsolete. To Carver and Scheier, however, an above-standard speed is as much a deviation from the standard as a below-standard speed, and both types of discrepancies are responded to by adjustments toward the standard speed.

Speed Discrepancy Effects on Effort and Performance

Negative speed discrepancies led to an increase in effort and performance as compared to zero discrepancies, and this was true for both the social comparison group and the ipsative comparison group. This observation is in line with Carver and Scheier's theorizing as well as our own perspective. Positive speed discrepancies, on the other hand, no matter whether these were minor or major, did not induce any reduction in effort and performance for both the social comparison group and the ipsative comparison group. This contradicts Carver and Scheier's metamonitoring loop notion and supports our commitment notion of goal pursuit.

Speed Discrepancy Effects on Affect and Satisfaction

Negative speed discrepancies produced a lower hedonic tonus (bad mood–good mood) than positive discrepancies, but only in the social comparison condition and not in the ipsative comparison condition. This questions Carver and Scheier's postulate that affect is the error signal of the metamonitoring loop that triggers the output function of that loop (i.e., an adjustment in the rate of progress). As negative speed discrepancies had produced an effort and performance increase in the ipsative comparison group, it appears that this adjustment runs off without assigning a functional role to affect. The observation that positive/negative affect is triggered by positive and negative speed discrepancies only in the social comparison group is interesting in its own right. One might

want to argue that the social comparison feedback produced a heightened self-focus and thus a more emotional self-evaluation. However, at the end of the experiment, participants of both feedback comparison groups did not differ either in terms of private or public self-consciousness or in the perceived importance of the feedback they received for self-evaluation. It seems possible then that the social comparison feedback simply stimulated competitive urges, which in turn emotionalized the participants.

Moreover, other aspects of affect were also affected by speed discrepancies in the social comparison feedback group. Participants' anger showed the same pattern as hedonic tonus. No reliable differences in tension arousal were observed. Moreover, the energetic arousal of the high-speed discrepancy group differed from the remaining groups, which were all the same. Finally, when we analyzed participants' experienced satisfaction with the situation at hand, we discovered that negative speed discrepancies led to more dissatisfaction than positive discrepancies, and this was true for social and ipsative comparison feedback. This observation seems to suggest that satisfaction is of a more reflective quality and thus originates no matter whether one falls short with respect to another person's speed of progress toward a goal or with respect to one's own prior progress.

Lack of Mediation of Effort/Performance Increases Through Negative Affect and Dissatisfaction

We computed regression analyses (following Baron & Kenny, 1986) to explore the question of whether negative affect and dissatisfaction mediated the observed effort and performance increases after negative speed discrepancies as compared to zero speed discrepancies. As it turned out, neither the various measured aspects of affect (hedonic tonus, tension arousal, energetic arousal, or anger) nor dissatisfaction qualified as an effective mediator. These findings suggest again that affect does not serve the signaling function ascribed to it in Carver and Scheier's metamonitoring loop theorizing. It is interesting, that we even observed within participants who had received negative speed discrepancy feedback (social comparison group) that negative affect hampered performance and reduced effort. This also suggests that negative affect does not signal negative speed discrepancies and thus lead to effort and performance increases.

There seems to be good reason, however, why negative affect fails to serve the signaling function ascribed to it by Carver and Scheier. How could a vague psychological quality such as negative or positive affect be a reliable indicator of a present negative or positive speed discrepancy?

Negative affect may originate from many different sources, such as a sick, tired, or exhausted body or a negative environmental stimulus (e.g., noise). This implies that negative affect would mostly mislead people in assuming that an ongoing goal pursuit is associated with a negative speed discrepancy and thus lead to an unnecessary invigoration of goal pursuit. Similar arguments can be advanced with respect to the assumption that positive affect signals to the comparator of the metamonitoring loop that a reduction in effort is called for. People would frequently coast their goal pursuits simply because pleasant internal and external stimuli are present. Moreover, as Carver and Scheier point out, people commonly pursue more than one goal at a time. Assuming that a person's responding to speed discrepancies is regulated via general positive/negative affect, it would seem impossible for the individual to detect which of the ongoing goal pursuits needs intensification. The person should not be able to distinguish the various positive/negative affects stemming from the different goal pursuits, because these do not carry distinct features. Our commitment notion of goal pursuit gets around this problem. We assume that a negative speed discrepancy with respect to a certain goal pursuit leads to spontaneous effort and performance increases in this goal pursuit alone. Each threat to one of the person's goal commitments is specific in the sense that only this goal is affected. There is no need to interpret vague signals.

Our observation that dissatisfaction did not play a mediating role between negative speed discrepancy and effort/performance increase also speaks to the model of Hsee and Abelson (1991). Hsee and Abelson postulated that people's striving for satisfaction is pervasive and, therefore, concluded that people prefer high speeds because of the associated feelings of satisfaction. According to this hypothesis, the effects of negative speed discrepancies on effort and performance should be mediated by feelings of dissatisfaction. Our data do not support this hypothesis. Therefore, we wonder whether it is indeed satisfaction that people go for when trying to move fast toward a goal.

Acceleration

Carver and Scheier suggest that intense accelerations (moving quickly from a low-speed level to a high-speed level) and decelerations (moving quickly from a high-speed level to a low-speed level) produce surprise. Even though we explicitly asked participants for surprise experiences, our participants did not report more surprise after accelerations or decelerations (as compared to zero accelerations or zero decelerations). What we observed instead was a difference in tension arousal between

participants who experienced acceleration and participants who experienced deceleration. Apparently, decelerations made our participants anxious and tense, whereas accelerations reduced such feelings. One could argue that the accelerations and decelerations implemented in our experimental study were not intense enough to produce surprise. On the other hand, even intense accelerations and decelerations may not guarantee surprise experiences, as other variables (e.g., expectations, control beliefs, level of prior and subsequent speed) should also play an important role.

Hsee, Salovey, and Abelson (1994) observed an effect of acceleration on satisfaction. Participants had looked at two different hypothetical developments of stock. Both stock developments ultimately reached the same rate of progress (velocity), but one of them arrived at this level of progress after a period of intense acceleration and the other after a period of weak acceleration. Participants preferred the stock with strong acceleration. Hsee, Salovey, and Abelson do not offer an explanation of this finding. However, if one assumes that participants consider the velocity of stock development at the beginning as a standard to which they compare the velocity of stock development at the end, it follows that participants perceive a strong positive speed discrepancy in the first case of stock development and a weak positive speed discrepancy in the second case. In other words, we are not dealing here with an acceleration effect on satisfaction but with a speed discrepancy effect on satisfaction—an effect that was also observed in our experiment.

Goal Distance and Goal Attainment

We observed that the hedonic tonus of participants' affect tended to become more positive at the end of goal pursuit. Apparently, a small distance to goal attainment leads to more positive affect than a large distance. Certainly, such distance effects should depend on the joy or pain associated with making progress toward the goal (people should feel bad when they come to the end of a pleasant activity, and they should feel good if the activity is unpleasant) and the anticipated positive consequences of goal attainment. It is difficult to accept the postulate of Carver and Scheier, however, that goal distance should have no effect at all on a person's positive/negative affect.

Carver and Scheier also postulate that goal attainment per se should fail to affect a person's positive/negative feelings. In our study, goal attainment led to positive affect and satisfaction, and it reduced tension arousal and anger. We had measured these variables shortly before and shortly after goal attainment. Even though goal attainment per se may not have affective consequences, one must keep in mind that goal attainment gives people access to the consequences of goal attainment. If these are positive (e.g., a positive self-evaluation, a positive evaluation by significant others, progress toward some important life goal), goal attainment should be associated with positive affect.

Goal Commitment and Speed Discrepancy Effects on Effort/Performance

Our commitment theory of goal pursuit states that negative speed discrepancies produce increases in effort and performance because negative speed discrepancies are a threat to goal commitment. If this notion is correct, it follows that negative speed discrepancies should produce stronger effort and performance increases in people who feel a strong commitment to the goal as compared to people with a weak commitment to the goal. Accordingly, we inquired about participants' commitment to the task at hand (i.e., making 350 points by computing simple arithmetic tasks) by asking them repeatedly during task performance whether they would prefer to perform a different task. When we split participants into low versus high commitment groups on the basis of these assessments, the high commitment group showed a stronger effort/performance increasing effect of negative speed discrepancies than the low commitment group. It is interesting, that not only high levels but also low levels of commitment evidenced the negative speed discrepancy effect on effort and performance for the social comparison feedback group.

SUMMARY

We have focused on Carver and Scheier's ideas about the metamonitoring feedback loop, which is said to monitor the speed of reducing discrepancies toward a set goal. Carver and Scheier make explicit predictions of how perceived speed discrepancies affect positive/negative feelings and subsequent efforts. We have contrasted these predictions with our own view, which we labeled the commitment theory of goal pursuit. By reporting on findings obtained by use of a new paradigm that allows us to manipulate perceived speed discrepancies, we discussed the differences between these two perspectives. The two perspectives overlap in predicting effort and performance increases as a result of negative speed discrepancies. Differences in perspectives are related to Carver and Scheier's expectation that (a) positive speed discrepancies lead to reduced effort and performance, and (b) performance increases and decreases are

mediated by negative and positive affect, respectively. We predicted and observed instead that positive speed discrepancies leave effort and performance unaffected and that effort and performance increases as spontaneous responses to negative speed discrepancies are not mediated by negative affect.

In the present analyses of the differences between Carver and Scheier's and our perspective, we ignored the content of the goal. Some goal theories (for a review see Gollwitzer & Moskowitz, 1996), however, argue that the type of goal content greatly affects how goal pursuit is regulated. In Dweck's (1996) theory, for instance, learning goals put the person in a better position to cope with failure than performance goals. What type of goal content is relevant to the observed speed discrepancy effects on effort and performance? The relation between speed discrepancies and effort/performance should be different with avoidance goals as compared to approach goals. In the experiment reported above, positive speed discrepancies in approaching the goal did not lead to a decrease in effort; instead, participants kept performing on a high level. It seems possible, however, that positive speed discrepancies lead to drastic decreases in effort with avoidance goals. This is because having moved effectively away from a negative event makes further avoidance less necessary, whereas having effectively approached a goal makes further approach still necessary until one has attained one's goal.

Finally, the goal we set in our experiment was not associated with a deadline. Participants could take as much time as they wanted to reach the 350 points. But, although people find it painful, most goals in our everyday life do have deadlines. Such time-sensitive goals should make people respond even more readily to fallbacks in speed of goal pursuit than observed in this study. Future research might also want to explore the question of how speed discrepancies are noticed or detected by the individual. In this study, we gave our participants explicit feedback. But in our everyday lives, such changes will have to be detected by the person involved. Questions arise with respect to when and how often people compare with others' or their prior velocity to receive feedback on changes in speed.

It is most intriguing, that results of the presented study suggest that speed discrepancies based on social comparisons as compared to ipsative comparisons differentially influence effort and performance as well as people's affective experiences. Apparently, speed discrepancies based on social comparisons do have strong affective consequences, whereas those based on ipsative comparisons fail to do so. And negative speed discrepancies based on social comparison feedback increase effort and performance even when there is low commitment to the goal, whereas negative speed discrepancies based on ipsative comparisons necessitate

a high commitment for effort and performance increases to occur. We take these findings to mean that the human being is a social animal and, when people are placed into competitive situations, their goal pursuit becomes additionally energized and emotionalized, the latter being a potential hindrance for effective goal pursuit.

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