

How to Resist Temptation: The Effects of External Control Versus Autonomy Support on Self-Regulatory Dynamics

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ABSTRACT The purpose of the present study ($N = 80$ undergraduate students) was to examine two issues: First, does external control lead to an increase in resistance to temptation more than the use of autonomy support? Second, what are the long-term effects of these types of educational style? Based on the Personality Systems Interaction (PSI) theory, external control was expected to increase resistance to temptation for those participants who lack initiative and self-motivation (i.e., state-oriented participants). Consistent with expectations, resistance to temptation was greater for state-oriented participants with externally controlled instructions than for individuals who received autonomy-supportive instructions. This was reflected by their performance on a visual discrimination task during distracter, compared to baseline, episodes. However, external control had negative long-term effects on state-oriented participants as indexed by alienation from their own preferences in free-choice behavior. Action-oriented participants were less influenced by experimental conditions.

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HOW TO RESIST TEMPTATION: THE EFFECTS OF EXTERNAL CONTROL VERSUS AUTONOMY SUPPORT ON SELF-REGULATORY DYNAMICS

“I can resist everything except temptation”

(Oscar Wilde, 1892, 1974)

Self-regulatory functions, such as resistance to temptation and self-motivation, have stimulated renewed interest in psychological research (e.g., Bembenutty, 1999; Boekaerts, Pintrich, & Zeidner, 2000; Bossong, 1994; Corno, 2001; Dewitte & Schouwenburg, 2002; Kuhl, 2000): How do we get ourselves to stick to boring activities in the presence of attractive alternatives? Another question that is even more important for parents, teachers, employers, and advisors relates to the development of self-regulatory skills: How do we teach children or adults to resist temptation successfully? The present study investigated the effects of two common intervention methods: autonomy support and control. Many educational systems still employ coercive teaching methods. Teachers use external control rather than autonomy support to get students to concentrate on their work (e.g., “You should stop talking now” or “You must concentrate on your task because I will evaluate your performance” vs. “I know the task is not much fun. That’s why you may want to concentrate so you can handle the task”). But does control really help students stick to an unattractive task when tempting distractors are present? We assume it does for some people, but we expect that control comes with a high price in the long run.

The present research combined motivational and personality approaches to resistance to temptation to investigate the interaction of contextual factors (control vs. autonomy support) and dispositional factors (state vs. action orientation). Most of the research examining contextual factors is based on the Self-Determination Theory (SDT; Deci & Ryan, 1985). However, research on dispositional factors and their interactions with contextual factors has been done within the framework of the Personality Systems Interaction Theory (PSI; Kuhl, 2000, 2001). In the following paragraphs, we discuss each of the two theories in more detail and elaborate on the hypotheses concerning short-term and long-term effects of the above-mentioned types of educational style.

Self-Determination Theory

One of the central tenets of SDT is the concept of basic psychological needs, such as autonomy, competence, and relatedness. Meeting these organismic needs is essential for psychological growth, integrity, and well-being. Autonomy-supportive conditions are assumed to help individuals satisfy their organismic needs and to promote internal behavioral regulation. In contrast, controlling conditions offer less opportunity for individuals to satisfy their needs and have been found to promote external behavioral regulation. For example, numerous studies have shown that controlling events (e.g., reward or evaluation) lower intrinsic motivation for attractive tasks (Deci, Koestner, & Ryan, 1999). Compared to the large number of studies on motivation for attractive tasks, little research has been done on the effects of autonomy support and control on motivation for unattractive tasks.

According to Deci, Eghrari, Patrick, and Leone (1994), most people are inherently motivated to internalize the regulation of uninteresting, yet important, activities. Deci et al. (1994) found that the types of internalization are qualitatively different under conditions of control and autonomy support. More specifically, controlling conditions lead to *introjection*, which refers to “taking in” values or regulations without accepting them as one’s own. Conversely, autonomy-supportive conditions facilitate the *integration* of values and regulations with one’s self. According to Deci et al. (1994), these two types of internalization can be determined by the relationship between free-choice behavior and self-reported feelings. Integration is indicated by a significantly positive correlation between free-choice persistence and positive feelings about a task. Introjection, however, is indicated by a nonsignificant or negative correlation between the two measures.

How does social context influence the way people accomplish a certain task? Externally controlled events have been found to decrease performance on complex and creative tasks (Deci & Ryan, 1987). In contrast, conditions of control and autonomy support do not have any effects on performance of easy tasks. Resistance to temptation is often required when having to concentrate on easy but boring tasks as opposed to complex and creative tasks. However, resistance to temptation does not concern task performance per se but *self-regulatory performance*, that is, the ability to stay focused on an unattractive task in the presence of tempting alternatives. Thus, resistance to temptation is best measured by comparing performance

during distracter episodes with performance at baseline. To our knowledge, this type of self-regulatory performance has not so far been studied within the framework of SDT. Assor, Kaplan, and Roth (2002) found that autonomy-supportive conditions promote internal regulation and foster students' efforts in class much more than externally controlled conditions. Therefore, it seems consistent with SDT to predict that autonomy-supportive conditions (e.g., acknowledging participants' negative feelings about an unattractive task and providing a meaningful rationale for accomplishing it) help participants concentrate on a task and thus resist temptation.

Personality Systems Interaction Theory

PSI theory predicts individual differences in response to differing educational styles; some participants (i.e., action-oriented) are expected to profit from autonomy support, whereas others (i.e., state-oriented) are expected to show better resistance to temptation with external control. Relying on external sources of regulation can compensate for self-regulatory deficits. The focus of the present study was on decision-related state orientation (SOD) and action orientation (AOD) because of their important role in self-regulated implementation of intentions (Kuhl & Goschke, 1994). These two orientations can be found on opposite ends of a bipolar continuum: Low scores indicate SOD, whereas high scores reflect AOD on the decision-related, action control scale. SOD describes the inability to self-generate positive affect that is needed to act quickly upon one's decisions, whereas AOD is characterized by self-motivation and initiative. A large body of research supports the conceptualization of state and action orientation in terms of self-regulation of affect (Kuhl, 2001; Kuhl & Beckmann, 1994b).

Brunstein (2001) found AOD to be positively correlated with increments in students' positive affect and energy over the course of a semester ($r = .27$, $p < .01$). Koole and Jostmann (2004) not only found that action-oriented individuals are characterized by the ability to generate positive affect in difficult (demanding) situations but that the mechanism underlying this ability operates on a subconscious level. As postulated by PSI theory, a lack of this self-motivation ability (SOD) has negative consequences for goal pursuit. For example, Kuhl (1982) found that state-oriented students carry out fewer leisure activities than they had planned. Beswick and Mann

(1994) found SOD to be positively correlated with a self-report measure ($r = .70$, $p < .001$) and a behavioral measure (i.e., meeting deadline for an assignment) of procrastination ($r = .30$, $p < .01$). Bossong (1994) demonstrated that action-oriented students managed to study regularly during the week before an exam. State-oriented students intended the same study behavior. Nevertheless, they worked very little during the first six days and had to increase their efforts on the last day more than they had planned. Thus, state-oriented students were more influenced by the deadline (external regulation) than by their own plans (identified regulation). Similar results were obtained for individual differences in general procrastination (Dewitte & Schowenborg, 2002): Procrastinators postponed their study intentions in favor of fun alternatives more than non-procrastinators because they were not able to ward off temptations. Finally, SOD has a negative association with dietary restraint and is positively associated with overeating (Palafí, 2002).

Taken together, the findings cited above clearly demonstrate the relevance of decision-related action control in generating positive affect that is needed to realize one's intentions, especially when confronted with unattractive tasks and situations that require resistance to temptation. Furthermore, these empirical findings raise an interesting question: How do individual differences in self-regulation interact with different types of educational style and instructions? To our knowledge, this question has not yet been addressed.

Short-Term Effects of Instructional Style on Resistance to Temptation

The degree to which external control helps one to stick to a boring task despite tempting distractors was expected to depend on a person's action control disposition. Action-oriented individuals use positive self-motivating strategies to realize their intentions ("I am capable of finding the pleasant aspects of an initially unpleasant activity"). They prefer an autonomy-oriented mode of volition (*self-regulation*)¹ defined as a "democratic" consideration of many

1. The term "self-regulation" is used in two different ways: (1) as a summary for a variety of volitional functions and different modes of volitional regulation and (2) as a specific mode of volitional regulation that is integrated and autonomy oriented. Throughout this paper, we will use the term "self-regulatory mode of volition" when referring to this specific meaning.

different needs and preferences (Kuhl & Fuhrmann, 1998). However, these individuals do not depend on external sources of regulation (e.g., encouragement by an interaction partner or instructions exerting control) because they can self-regulate their feelings and actions. Conversely, state-oriented individuals have difficulty acting upon their decisions. Due to their inability to self-generate positive affect, they often use negative self-motivating strategies ("In order to motivate myself, I imagine what would happen if I didn't finish the task on time") and a self-suppressive mode of self-regulation (*self-control*). The latter is characterized by "dictatorial" enforcement of explicit intentions against emotional preferences and needs (Kuhl & Fuhrmann, 1998). External control is associated with self-suppression because explicit, verbalized goals (e.g., assignments) are imposed on the system with the effect that any competing action tendency is suppressed. Presumably, self-suppression helps resist temptation because this mode shuts off any competing action tendencies emanating from the self.

Results obtained in a study by Fuhrmann and Kuhl (1998) on nutritional behavior lend support to the assumption that state-oriented participants benefit from external sources of regulation. When trying to meet dietary goals (e.g., "eat more broccoli," "eat fewer French fries"), state-oriented participants showed increased compliance with goals that were recommended by someone else (an external source), especially when these goals required impulse control (i.e., "eating less unhealthy food"). In contrast, action-oriented participants showed increased compliance with goals that were self-selected. In a similar vein, participants high in self-control met significantly more dietary goals when training emphasized self-punishment for failure. However, participants low in self-control were better able to attain their goals when training encouraged self-reward for success. The above findings show that controlling conditions can help state-oriented participants suppress tempting impulses. Why do state-oriented participants rely on this type of regulation? This question relates to the long-term effects of external control and will be discussed in the next section.

To summarize, the first part of the present study examined the hypothesis that participants with poor self-regulatory abilities are more vulnerable to environmental influence than participants with high self-regulatory abilities. Specifically, state-oriented participants are expected to profit from controlling instructions when trying to resist temptation, that is, they are expected to show no decline in performance on a simple

visual discrimination task with a distracter compared to baseline without distracter when instructions are stated in a controlling manner.

Long-Term Effects of Instructional Style on Free-Choice Behavior

The facilitating effect of external control on resistance to temptation is expected to be associated with some costs, which were explored in the second part of our study: What are the effects of control in the long run? On the one hand, control can help state-oriented individuals shut off temptations and meet social expectations despite low self-motivating abilities. On the other, control is expected to induce negative affect or stress to a greater extent than autonomy support. According to PSI theory, negative affect leads to self-suppression and introjection of goals (Baumann & Kuhl, 2003b; Kuhl & Kazén, 1994). A person who is continuously exposed to control may become entrapped in a “loss-of-autonomy” cycle (Kuhl & Beckmann, 1994a): Pursuing introjected goals makes it difficult to self-generate motivation for goal enactment and leads to conflict. In an attempt to overcome these difficulties, state-oriented individuals will often further increase their efforts of self-control (e.g., “I put pressure on myself to get things done”), which, in turn, augments the level of self-suppression in the effort to shield the explicit goal against competing action tendencies. Consequently, goal attainment is frequently not supported by the self, which plays an important role in promoting intrinsic motivation (Deci & Ryan, 1985; Sheldon & Kasser, 1995) and regulating affect (Koole & Jostmann, 2004; Linville, 1987; Showers & Kling, 1996). Introjection and excessive use of self-control result in a vicious cycle that further fosters the process of self-suppression.

The second hypothesis examined in the present study states that frequent exposure to control leads to alienation, which describes a difficulty in perceiving one's own emotional needs and preferences and/or a failure to behave in accordance with one's emotional preferences even when such behavior is not in conflict with any deliberate intention (Kuhl & Beckmann, 1994a). To test the hypothesis that even a short exposure to control is associated with alienation, participants' free-choice behavior was assessed subsequent to the main task. According to findings reported by Ryan, Koestner, and Deci (1991), free-choice behavior is not always in accordance with emotional preferences; in a condition emphasizing ego involvement rather than task involvement, there was little correlation between free-choice

persistence and self-reported levels of intrinsic motivation. Continuing with an uninteresting task despite the opportunity to engage in a more interesting activity (e.g., reading magazines or simply waiting for the experimenter to return) can be regarded as an instance of alienation. Frequently, participants try to justify their choices with statements such as "I wanted to prove something," "I did what I felt I ought to do." However, these statements reflect controlled reasons for action (Sheldon & Elliot, 1998) and are examples of alienation.

Our alienation hypothesis predicted reduced correlations between free-choice persistence and task interest under conditions of external control as compared to autonomy-supportive conditions, especially for state-oriented participants. In contrast, experimental manipulations were expected to influence action-oriented participants less because of these participants' ability to self-regulate affect, which facilitates access to their self-system (e.g., needs and preferences).

To summarize, control was expected to increase (a) resistance to temptation in a group of state-oriented participants during a visual discrimination task and (b) alienation during subsequent free-choice behavior compared to autonomy support.

Standardized Assessment of Resistance to Temptation

The Self-Regulation Test for Children (SRTC; Kuhl & Kraska, 1992, 1994) was used to measure resistance to temptation. This computer-aided test examines participants' performance on a simple visual discrimination task—once in the presence and once in the absence of an interesting distracter activity. Though test construction for measuring resistance to temptation has been difficult in the past, the SRTC has proven to be an exemplary instrument for standardized assessments of resistance to temptation. Typical problems in test construction that required clarification related to (a) *intentional shift*, (b) *individual differences in motivation*, and (c) *cognitive deficits*. Instead of indicating self-regulatory deficits, decreased performance during trials with distracters could result from the fact that (a) participants have changed their intention (e.g., they have decided to watch the distracter rather than continue working on the boring task), (b) the distracter is not as attractive as the task, and (c) shifts in attention are due to the novelty rather than the motivational quality of the distracter. Improvements regarding these three

problems are presented after a more detailed description of the SRTC procedure (see section “Dependent Variables of the SRTC”).

The SRTC was standardized and validated with a sample of 987 elementary school children in Germany. It proved to have sufficient internal consistency, substantial temporal stability, and promising validity (Baumann & Kuhl, 2003a; Heise, Zachowski, Gerjets, Kuhl, & Rotenberger, 2003; Kuhl & Kraska, 1989, 1992, 1993, 1994). For example, the theoretically expected relationships between SRTC scores and teachers’ ratings of self-regulatory behavior in the classroom were significant (Kuhl & Kraska, 1992, 1993). Further evidence for its validity stems from a study that revealed a significant interaction between children’s self-regulatory knowledge and distracter effects in the SRTC (Kuhl & Christ, 1993). Kuhl and Fuhrmann (1998) have successfully used the SRTC with adults. In their study, different cover stories about the distracter led to differences in performance. The experimental group was informed about the contingency between the distracter activity and possible increase/decrease of their test scores (see below). This group showed the expected performance decrements during distracter episodes. Furthermore, a decrease in performance in the informed group showed a significant negative correlation with self-regulatory abilities assessed by questionnaires. In contrast, the control group that was not informed about the purpose and consequences of the distracter activity did not show any performance decrements during distracter episodes. Test performance in the control group was uncorrelated with self-regulatory abilities. A significant correlation with subjective theory of mind provided further validation to the SRTC (Chasiotis & Kiessling, 2004).

In sum, the SRTC has been empirically validated as a measure of self-regulatory functions. (Note that in SRTC, performance during distracter episodes is controlled for performance at baseline.)

METHOD

Participants

Eighty undergraduate psychology students (63 women and 17 men)² from the University of Rochester volunteered to participate in the study. Their

2. Including the factor Gender in the analyses reported below did not yield any significant main effects or interaction with Gender. Women did not resist temptation more than men. The finding is consistent with research showing that gender differences in resistance to temptation are generally very small (Silverman, 2003).

mean age was 19.6 years (range 17 to 40 years). Participants were given course credit for their participation.

Materials

The Action Control Scale (ACS; Kuhl, 1994) was administered. In the present study, the decision-related dimension (SOD vs. AOD) was relevant because it is theoretically associated with self-regulation of positive affect that is necessary for the implementation of intentions and goal maintenance.³ Sample items are “When I know I must finish something soon: (a) I have to push myself to get started, or (b) I find it easy to get it done and over with,” and “When I don’t have anything in particular to do and I am getting bored: (a) I have trouble getting up enough energy to do anything at all, or (b) I quickly find something to do.” In these two sample items, options “(a)” reflects state-oriented response alternatives and options “(b),” action-oriented responses. The scale ranges from 0–12 with lower scores indicating state-oriented hesitation and higher scores indicating action-oriented initiative. The ACS has sufficient reliability (Cronbach’s alphas > .70) and adequate construct validity (Kuhl & Beckmann, 1994b). The factorial structure of the ACS-90 confirms the theoretical distinction made between decision-related and failure-related components of action orientation (Dieffendorf, Hall, Lord, & Strean, 2000; Kuhl & Beckmann, 1994b). In the present study, AOD had an internal consistency of $\alpha = .70$.

The English version (Kuhl & Kraska, 1994) of the Self-Regulation Test for Children (SRTC; Kuhl & Kraska, 1992) was used to measure resistance to temptation. In the present sample, internal consistency of performance across six baseline and six distracter episodes was $\alpha = .93$ and $\alpha = .91$, respectively.

The Volitional Components Inventory (VCI; Kuhl & Fuhrmann, 1998) was used to assess participants’ self-rated general competence in self-regulatory functions. In the present study, the impulse control scale was particularly relevant. It consists of four items. Sample items are: “It often happens to me that I cannot resist a sudden impulse” and “If a temptation arises, I often feel helpless to resist it” (both items reversed). In the present sample, internal consistency was $\alpha = .73$.

3. In contrast, failure-related action orientation (AOF) is theoretically associated with self-regulation of negative affect that is more important for maintaining self-access (e.g., choosing self-compatible goals that satisfy one’s own needs). Performance-related action orientation (AOP) was not relevant either because it captures the ability to stay immersed in a pleasant activity, whereas the present task required inhibition of a pleasant (distracter) activity.

The Intrinsic Motivation Questionnaire (IMI; Ryan, 1982) was administered to assess participants' interest in the main task of the SRTC. It consists of seven items. Sample items on the task interest/enjoyment scale are "I would describe this task as very interesting" and "I enjoyed doing this task very much." Seven additional items were included to assess participants' interest in the distracter activity of the SRTC. Sample items on the distracter interest/temptation scale are "I was interested in the monkey race" and "The climbing competition between the monkeys was irrelevant to me" (reversed). Both scales ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). In the present sample, internal consistencies were $\alpha = .74$ for task interest/enjoyment and $\alpha = .84$ for distracter interest/temptation.

Procedure

The study was introduced as a visual attention task designed to find out more about attention to learn how to help children with attention-deficit and hyperactivity disorder (ADHD). The ACS-90 and VCI were administered at the beginning of the experiment. Afterwards, participants were introduced to the SRTC computer program. They were asked to do a simple visual discrimination task for play money. The computer screen was divided into four squares. The task was presented in the lower left-hand square. Participants had to push one key when one bar appeared and another key when two bars appeared. For each correct response, a "penny" was added to their account and a fixation mark was shown in the center of the task area. As soon as participants pushed the space bar, the next stimulus was presented. The number of earned pennies was written above the quarter of the screen with the bar task. In addition, the lower right-hand square of the screen showed a wallet. For every ten pennies participants had earned for completing the task, a dime was added to their wallet. During distracter episodes, a climbing competition between a "good" monkey and a "bad" monkey in a tree that was accompanied by a clicking noise appeared in the upper right-hand square.⁴ When the good monkey won the competition, it would slide down to the wallet and add

4. In SRTC there are two additional distracter conditions that were excluded from the present analyses: (1) In a *silent* distracter condition, the monkey race was not accompanied by a clicking noise. This distracter condition was less salient and not tempting enough for adults. Nevertheless, including silent distracter episodes in the analyses yielded the same pattern of significant results. (2) In a *forced* distracter condition, the monkey race replaced the task in the lower left square. In order to obtain the discrimination task, participants had to move the distracter to the upper right square by pushing a key marked with a tree. This condition required initiative rather than inhibition of a competing action tendency.

anywhere from one to four dimes to the account, and when the bad monkey won, it took away one to four dimes from the wallet.⁵ Participants were informed that they had no control over the monkey race and that its outcome was purely coincidental. However, they had full control over the task with the bars. At baseline, neither the distracter nor the wallet was shown on the screen. Each baseline and distracter episode lasted 15 s. The test consisted of four practice and six test blocks that lasted 1 minute each (one 15 s baseline and three 15 s distracter episodes, respectively).

Participants were randomly assigned to one of two experimental conditions (control vs. autonomy support). Forty participants were asked to do their best on the visual discrimination task in a *controlling* manner: "You should look very carefully at the bars and work fast in order to get more pennies so they can be substituted for dimes. We want to see how good you are at the task, so you have to concentrate to show that you're good. We will evaluate your performance based on the number of dimes in your wallet. The number of dimes you have will be compared with that of other students who have completed the same task. Your data will only be useful to us if you score in the upper third. So you must pay attention, and you should try to work as fast as possible to meet this criterion."

Forty participants were asked to do their best at completing the visual discrimination task in an *autonomy-supportive* manner: "The more carefully you look at your game and the faster you work, the more pennies you will get. You can check your own performance by looking at the number of dimes in your wallet. You might find the task a bit boring. But that's exactly the type of task that is difficult for children with attention deficits. So it is important for us to get information about how to do well on just this kind of task. So this is a time to pay attention and do your very best so we will be able to construct an instrument for children with attention deficits."

After the SRTC task, the experimenter left the room for the alleged reason of copying an additional questionnaire. Participants were invited to do whatever they liked; for example, they could read some magazines provided on another table in the lab or continue with additional trials (i.e., four blocks) of the visual discrimination task. Free-choice persistence with the SRTC was assessed by the number of correct keys pressed. After 4 min, the experimenter returned with a copy of the IMI and asked participants to rate their interest in the computer task and to indicate

5. Actually, the computer program added and subtracted only one to three dimes. Participants were told a higher amount in order to adapt wins and losses to the higher performance of adults and to raise the importance of the monkey competition.

whether they had intended to work on the task or to watch the monkey race instead. Finally, participants were debriefed concerning the purpose of the study and received course credit for their participation. The session lasted about 60 min.

Dependent Variables of the SRTC

The performance measure of self-regulatory abilities could be confounded with the degree of interest in the task and the attractiveness of the distracter (*individual differences in motivation*). For example, a person who is highly interested in the task does not need self-regulation to keep working during distracter episodes. Accomplishing the task very quickly during distracter episodes merely reflects high task motivation for this person. However, it also indicates high self-regulatory efficiency for a person who is less interested in the task and more attracted to the monkey race. This problem of standardizing the conflict situation is reduced in SRTC by having both task and distracter attractiveness originate from the same motivational source. The more eager participants are to earn money for the task, the more interested they should be in the influence the monkey has on their account. Consequently, the impact of differences in task and distracter motivation on self-regulatory efficiency should be controlled.

SRTC: Speed. Normally, there is a confounding of a “tempting” event and its sudden appearance and novelty (*cognitive deficits*). Attractive stimuli not only require resistance to temptation but also basic attentional skills such as the suppression of the orienting response. These different processes are decoupled in the SRTC by separating the first and second half of each distracter episode. During the first half of the distracter episode, the appearance of the monkey race is new, but not motivationally relevant. The monkeys start to climb the tree, but there are no consequences for the participants’ accounts so far. Performance decrements during the first 7.5 s interval are indicative of deficits in basic cognitive-attentional functions (Kuhl & Kraska, 1992). The results of the monkey race do not become apparent until the second half of the distracter episodes. The good or bad monkey slides down and adds or withdraws a variable amount of money from participants’ accounts. At this point, the distracter is not new any more, but it is motivationally relevant. It stirs participants’ curiosity. Performance decrements during the second 7.5 s interval are taken as indicators of self-regulatory deficits in resistance to temptation with the usual confounding of cognitive deficits removed.

The theoretical distinction between these two types of distraction was supported by a factor analysis of speed differences (distracter episodes minus baseline). Distracter-related changes in performance during the two

intervals loaded on orthogonal factors (Kuhl & Kraska, 1992). Therefore, analyses were conducted for the second, motivationally relevant interval of distracter episodes.

SRTC: Accuracy. To rule out a speed–accuracy trade-off, hit rates were analyzed. Because the visual discrimination task was rather easy, no significant effects were expected for accuracy.

SRTC: Speed variance. The main dependent variable (speed) remains ambiguous. For example, high speed during distracter episodes could be due to high compensatory efforts in order to make up for failure in resistance to temptation. This alternative interpretation can be ruled out when looking at speed variance (i.e., average variance of reaction times). Successful compensation of low resistance to temptation is expected to yield a pattern of prolonged reaction times followed by very short reaction times (i.e., high speed variance), whereas concentrating on the task should be indicated by low speed variance. The combination of high speed and low speed variance is taken as an indicator of high resistance to temptation.

In a similar vein, one might argue that speed decrements during distracter episodes could be due to an intentional shift instead of failure to resist temptation: A conflict-free decision to look at the distracter should result in reduced speed variance. Presumably, participants who are still committed to working on the main task are more likely to make up for prolonged reaction times than participants who are not committed to the task any longer. Compensatory efforts of committed participants after brief distractions should result in increased speed variance. Therefore, the combination of reduced speed and increased speed variance is taken as an indicator of low resistance to temptation.

As for speed differences, factor analytical results of speed variance differences (distracter minus baseline) confirmed the theoretical distinction between the two 7.5 s intervals: Distracter-related changes in speed variance during the first and the second interval loaded on orthogonal factors (Kuhl & Kraska, 1992). The same factor structure was found when entering differences in speed and speed variation at the same time. Therefore, it seemed reasonable to restrict data analyses to the second (motivationally relevant) interval.

RESULTS

Descriptives

According to their AOD scores, 38 participants were classified as state oriented because their scores were below the sample median

(i.e., lower than 7, $M = 4.37$, $SD = 1.57$) and 42 as action oriented because their scores were above the median (i.e., a score of 7 or higher, $M = 9.02$, $SD = 1.58$). In the externally controlled condition, there were 22 state-oriented (17 women and 5 men) and 18 action-oriented (13 women and 5 men) participants, and in the autonomy-supportive condition, there were 16 state-oriented (12 women and 4 men) and 24 action-oriented (21 women and 3 men) participants. AOD scores did not differ significantly between instruction conditions for state-oriented and action-oriented participants.

Manipulation Check of Intention

In the postexperimental questionnaire, all participants indicated that they had intended to work on the visual discrimination task. None of the participants indicated that they had intended to watch the monkey race. Thus, attentional shifts can be regarded as unintended.

Manipulation Check of Interest

Task interest. To check for interindividual differences in task interest, a Personality (state vs. action orientation) \times Instruction (control vs. autonomy support) analysis of variance (ANOVA) was computed. There was a significant main effect of Personality, $F(1, 76) = 4.12$, $p < .05$. State-oriented participants were less interested in the task than action-oriented participants (SOD: $M = 3.41$ vs. AOD: $M = 3.84$). There was no interaction with experimental conditions. More importantly, there was no significant relationship between interest in the task and resistance to temptation. Partial correlations between task interest and speed ($r = .02$) as well as speed variance ($r = -.06$) during distracter episodes, controlling for baseline episodes, were not significant.

Distracter interest. To check for interindividual differences in temptation, a Personality \times Instruction ANOVA was computed. There were no significant main effects or interactions. More importantly, there was no significant relationship between interest in the distracter and resistance to temptation. Partial correlations between interest in the distracter and speed ($r = .08$) as well as speed variance ($r = .07$) during distracter episodes, controlling for baseline episodes, were not significant. Findings support the assumption that the

SRTC measures self-regulatory efficiency independent of interindividual differences in task and distracter motivation.

Task versus distracter preference. Ratings of interest were analyzed using a Personality (state vs. action orientation) \times Instruction (control vs. autonomy support) \times Activity (task vs. distracter) mixed ANOVA, with the latter as a within-participant factor. Results yielded a highly significant main effect of Activity, $F(1, 76) = 64.02, p < .001$. The monkey race ($M = 4.86$) was substantially more interesting than the visual discrimination task ($M = 3.64$). There were no significant main effects or interactions of personality and instruction. Additional *t*-tests show that task interest was significantly lower than the neutral middle score of 4 on the bipolar 1-7 scale, $t(79) = -3.23, p < .01$, whereas distracter interest was significantly higher than the neutral middle score, $t(79) = 7.41, p < .001$. Results support the assumption that the distracter functions as a temptation.

Validity of SRTC Scores

To test the validity of our main dependent variable, speed difference scores (distracter minus baseline) during the first (cognitively relevant) and the second (motivationally relevant) interval were correlated with the self-report measure of general impulse control. The correlation was significant for the motivationally relevant interval: Higher speed difference scores (i.e., higher resistance to temptation) were associated with higher self-reported impulse control in daily life ($r = .23, p < .04$). Consistent with expectations, there was no significant correlation between speed scores and self-report for the cognitively relevant interval ($r = -.04, ns$). The difference between correlations in the two intervals was significant, $t(77) = 2.03, p < .05$. Findings further support the distinction between the two intervals of the SRTC.

Because SOD was expected to be an important moderator in resistance to temptation, the correlation between SRTC scores and self-reported impulse control was calculated separately for each personality group. There was a highly significant correlation for state-oriented participants, $r = .57, p < .001$, indicating that speed increments during motivationally relevant distracter episodes were associated with lower self-reported impulse control in daily life. In

contrast, this correlation was not significant for action-oriented participants, $r = -.07$, indicating a ceiling-effect in this high ability group. Consistent with this interpretation and the conceptualization of decision-related state versus action orientation, self-reported impulse control was significantly higher in the AOD group ($M = 2.07$, $SD = .32$) than in the SOD group ($M = 1.55$, $SD = .49$), $t(78) = -5.63$, $p < .001$. In both groups, impulse control did not correlate significantly with speed during cognitively relevant distracter episodes.

Short-Term Effects of Instructional Style on Resistance to Temptation

SRTC: Speed

The number of correct keys pressed (speed) was analyzed using a Personality (state vs. action orientation) \times Instruction (control vs. autonomy support) \times Distracter (baseline vs. distracter) mixed ANOVA, with the latter as within-participant factor. Results yielded a significant main effect of Distracter, $F(1, 76) = 12.01$, $p < .001$. Mean number of keys pressed was $M = 125.32$ at baseline and $M = 123.24$ during distracter episodes. Results support the presumed distracter effect of the monkey race. Consistent with our hypothesis, the Personality \times Instruction \times Distracter interaction attained significance, $F(1, 76) = 7.98$, $p < .01$.⁶ As presented in Table 1, state-oriented participants in the externally controlled condition did not show a significant decrease in speed due to the distracter. On a descriptive level, they worked even faster during distracter episodes compared to baseline. In contrast, state-oriented participants in the autonomy-supportive condition had a significant decrease in speed during distracter episodes, $t(15) = -3.20$, $p < .01$. For state-oriented participants, resistance to temptation was significantly different between instruction conditions, $t(36) = 3.06$, $p < .005$. Action-oriented

6. To examine results for “graduated” instead of dichotomized action-orientation scores, hierarchical regression analyses were conducted on variables of resistance to temptation. Speed during distracter episodes was entered as a dependent variable, speed at baseline was entered as Block 1, graduated action orientation scores and instruction condition (dummy coded) entered as Block 2, and their interaction term entered as Block 3. Consistent with ANOVA results, the regression analysis yielded a significant Personality \times Instruction interaction effect, $\beta = -.58$, $t(75) = -2.39$, $p < .02$.

Table 1

Speed and Speed Variation During Distracter and Baseline Episodes,
as a Function of Personality (Decision-Related State versus Action
Orientation) and Instruction

	n	Speed (Correct Key Presses)			Speed Variation (in ms)		
		Distracter	Baseline	Diff. ¹	Distracter	Baseline	Diff. ²
External Control							
State Orientation	22	130.73	129.82	0.91	130	141	-11
Action Orientation	18	117.33	120.72	-3.39	163	149	14
Autonomy Support							
State Orientation	16	121.19	126.38	-5.19	151	132	19
Action Orientation	24	122.13	123.91	-1.78	148	137	11

¹High (positive) values in speed difference indicate high resistance to temptation.

²Low (negative) values in speed variation difference indicate high resistance to temptation.

participants were less influenced by instruction conditions. The decrease in speed during distracter episodes, as compared to baseline, reached significance in the externally controlled condition, $t(17) = -2.56, p < .01$, and was not significant in the autonomy-supportive condition. For action-oriented participants, resistance to temptation did not differ significantly between instruction conditions, $t(40) = -.92, ns$. Findings support the hypothesis that state-oriented participants profit from externally controlled conditions and show deficits in self-regulation in the autonomy-supportive condition.

SRTC: Accuracy

Consistent with results from studies with children, accuracy in SRTC was high ($M = 93.68\%$). Nevertheless, increases in speed might be due to a more lax response criterion. Therefore, mean hit rates were analyzed using a Personality \times Instruction \times Distracter mixed ANOVA. There were no significant effects. The correlation between speed and accuracy was not significant ($r = -.08, ns$). Our results do not support any alternative interpretation of our data in terms of a speed-accuracy trade-off.

SRTC: Speed Variance

To rule out further alternative interpretations, mean variances in reaction time (in ms) were analyzed using a Personality \times Instruction \times Distracter mixed ANOVA. Results yielded a significant main effect of Distracter, $F(1, 76) = 9.38, p < .005$. Mean speed variances were $M = 139.62$ ms at baseline and $M = 147.09$ ms during distracter episodes. Results further support the effectiveness of the distracter. Consistent with our hypothesis, there was a significant Personality \times Instruction \times Distracter interaction, $F(1, 76) = 8.47, p < .005$.⁷ As presented in Table 1, state-oriented participants in the externally controlled condition had significantly lower speed variance during distracter episodes compared to baseline, $t(21) = -2.44, p < .03$. In contrast, state-oriented participants in the autonomy-supportive condition had a significantly higher variance in speed during distracter episodes compared to baseline, $t(15) = 2.48, p < .03$. For state-oriented participants, this difference in resistance to temptation between instruction conditions was significant, $t(36) = -3.57, p < .001$. Action-oriented participants were less influenced by the mode of instruction. The increase in speed variance during distracter episodes, as compared to baseline, reached significance in the externally controlled condition, $t(17) = 3.31, p < .01$, and was not significant in the autonomy-supportive condition. For action-oriented participants, resistance to temptation did not differ significantly between instruction conditions, $t(40) = .42, ns$.

Long-Term Effects of Instructional Style on Free-Choice Behavior*Free-Choice Persistence With SRTC*

To test individual differences in free-choice persistence with a visual discrimination task, the number of correct keys pressed in the

7. A hierarchical regression analysis was conducted on speed variance during distracter episodes with action orientation, instruction condition, and their interaction term as independent variables, controlling for baseline speed variance. The analysis revealed a significant Personality \times Instruction interaction effect, $\beta = .002, t(75) = 2.14, p < .04$. This finding was consistent with reported ANOVA results.

optional trials during the waiting period was analyzed with a Personality \times Instruction ANOVA. There were no significant main effects or interactions. In the externally controlled condition, the mean numbers of correct keys pressed were $M = 354$ ($SD = 277$) and $M = 324$ ($SD = 269$) for state-oriented and action-oriented participants, respectively. In the autonomy-supportive condition, the mean numbers of correct keys pressed were $M = 421$ ($SD = 229$) and $M = 394$ ($SD = 264$) for state-oriented and action-oriented participants, respectively. Free-choice persistence did not differ as a function of personality or instruction.

To examine the nature of free-choice persistence, correlations between the number of correct keys pressed and interest in the task were calculated separately for state-oriented and action-oriented participants for both instruction modes. As can be seen in Table 2, free-choice persistence was significantly correlated with task interest in the autonomy-supportive condition: State-oriented and action-oriented participants persisted longer when they were more interested in the task. In contrast, in the externally controlled condition, there was no significant correlation between persistence and task interest. State-oriented participants' free-choice behavior was not intrinsically motivated. They persisted or stopped working on the task irrespective of whether they were interested in it or not. For state-oriented participants, correlations were significantly different between conditions, $z = 2.12$, $p < .035$. For action-oriented participants, correlations were not significantly different between conditions, $z = .66$, ns .

Table 2
Correlations Between Free-Choice Persistence and Intrinsic Motivation (i.e., Interest in the Discrimination Task) as a Function of Personality and Experimental Condition

	External Control	Autonomy Support
State Orientation	-.03 (n = 22)	.62** (n = 16)
Action Orientation	.30 (n = 18)	.49* (n = 24)

* $p < .05$.

** $p < .01$.

DISCUSSION

The aim of the present study was to investigate contextual factors (autonomy support vs. control) and dispositional factors (state vs. action orientation) that influence college students' resistance to temptation and free-choice persistence. To our knowledge, self-regulatory performance such as resistance to temptation has not been investigated within the framework of Self-Determination Theory. Similarly, individual differences relating to effects of autonomy support and control have not been examined either. Our hypothesis (based on PSI theory) predicted a Personality \times Instruction interaction: Participants with poor self-regulatory abilities (SOD) were expected to be more influenced by instruction conditions than participants with better self-regulatory skills (AOD). More specifically, control was expected to *increase* resistance to temptation but to *reduce* self-congruent free-choice behavior in state-oriented participants. In line with this assumption, state-oriented participants demonstrated short-term benefits (i.e., higher resistance to temptation) and long-term costs (i.e., alienation in a free-choice period) under conditions of external control.

Short-Term Effects of Instructional Style on Resistance to Temptation

Consistent with our hypothesis, state-oriented participants were highly resistant to temptation under conditions of external control and had poor resistance to temptation in autonomy-supportive conditions (see Table 1). Action-oriented participants were less influenced by the experimental variations of instruction. These findings are likely to be due to a greater dependence on situational factors when self-regulatory abilities are low. State-oriented participants need external sources of regulation to overcome their deficits in self-motivation. In contrast, action-oriented participants are more robust towards environmental conditions, presumably because of their high ability to self-regulate affect (Baumann & Kuhl, 2002; Beckmann & Kuhl, 1984; Brunstein, 2001; Koole & Jostmann, 2004).

The finding that SOD is associated with superior resistance to temptation under conditions of control (see Table 1) may be explained by self-suppression: As long as the situation supports the self-suppressive strategy associated with SOD (i.e., under external control), no competing action tendency can emanate from the

self. For example, when a teacher assigns his or her students to a certain task, their self-system may not become activated (especially if the students are state-oriented). Consequently, the self cannot object to this unpleasant assignment, and thus the task is simply executed. When self-suppression is removed by encouraging autonomy, state-oriented individuals may have increased difficulty sticking to the task because competing tendencies emanating from the self cause distraction. According to PSI theory, these difficulties occur because the frequent experience of self-suppression deprives individuals of the opportunity to integrate goals with the self (Baumann & Kuhl, 2003b; Kuhl & Kazén, 1994). Although autonomy-supportive conditions may help individuals attain self-integrated goals, the situation is completely different for goals based on social expectations. These goals are often *introjected* and in conflict with implicit needs and preferences, that is, with the most basic components of the self. Improved self-access (e.g., under rewarding or autonomy-supporting conditions) cannot facilitate the achievement of introjected goals because they are not integrated with the self. On the contrary, realization of introjected goals may become subject to protest from the self (activated in autonomy-supportive conditions) because these goals are not an integrated part of it. Findings by Dewitte and Schouwenburg (2002) support this interpretation. According to their study, procrastinators postponed their study activities mainly because they had difficulty resisting fun alternatives. Apart from upcoming exams, no further external constraints aiming at suppression of alternative actions were placed on these students. Notice that procrastinators have increased SOD scores (Beswick & Mann, 1994; Blunt & Pychyl, 1998; Bossong, 1994).

The finding that action-oriented individuals show lowered resistance to temptation in either experimental condition is compatible with the interpretation of self-suppression. Because action-oriented individuals are less self-suppressive than state-oriented individuals, they should be exposed to more temptations emanating from the self-system (e.g., "I would like to know which monkey won this race"). Their self-regulatory performance possibly depends on the degree to which they integrate a goal with their self-system (e.g., identify with the task). This should be more likely to happen in autonomy-supportive conditions than with external control. Present findings suggest that the autonomy instruction was not completely convincing because action-oriented participants continued to show

fairly low resistance to temptation in the autonomy condition. We expect that action-oriented participants do show better resistance to temptation when they really identify with a task.

Taken together, the results obtained in our study support the assumption derived from PSI theory (Kuhl, 2001) that different social contexts (external control vs. autonomy support) do not have the same effects for all people. There is a significant interaction between context and individual differences in self-regulation. Somewhat unexpected from the SDT perspective (Deci & Ryan, 1985), there was a positive effect for state-oriented participants in a controlling context: The external source of regulation enabled state-oriented participants to compensate for their deficits in self-regulated performance.

Alternative Interpretations

The use of a standardized measure of resistance to temptation (SRTC) offers the opportunity to discount many alternative interpretations of the findings reported above.

Efficient compensation and intentional shift. Two alternative interpretations of the speed data can be ruled out by speed variance results. For example, one might argue that state-oriented participants in the externally controlled condition did not show much resistance to temptation but were very efficient in compensating for speed decrements. Compensatory efforts should yield a pattern of longer reaction times followed by reduced reaction times. This, in turn, should result in an increased variance of response times. The compensation hypothesis is ruled out by a significantly reduced speed variance in this group and supports the assumption of a rigid and efficient protection from distraction (see Table 1). In a similar vein, one might argue that state-oriented participants in the autonomy-supportive condition were not low in resistance to temptation but actually *intended* to watch the monkey race. However, a significantly increased speed variance in this group is better explained by a self-regulatory deficit interpretation. Otherwise, it is difficult to explain why they should try to make up for decreases in speed.

Individual differences in motivation. One might argue that state-oriented participants in the externally controlled condition were

more highly motivated to work on the task and not interested in the distracter. However, this alternative interpretation can be ruled out because the conflict situation in the SRTC is standardized: The motivation to look at the distracter (to stay informed about the number of points accumulated) should increase proportionately with interest in the task. Therefore, the difference between motivation for task versus distracter should be stable across participants with different levels of task motivation. Consistent with this assumption, changes in performance during distracter episodes were independent of participants' interest in the task as well as their temptation to watch the monkey race. Consequently, changes in task performance during distracter episodes were indicative of participants' self-regulatory ability to resist temptation.

Cognitive deficits (distraction). Another alternative interpretation is that performance decrements were due to cognitive distraction (i.e., a distracting event in the visual field). However, the finding that the monkey race was rated as substantially more interesting than the bar-pressing task indicates its motivational relevance. More importantly, reductions in speed during distracter episodes did not correlate with self-rated impulse control when the monkey race appeared as a new event on the computer screen (i.e., during the first half of distracter episodes) but only when it came to an end and affected participants' score (i.e., during the second half of distracter episodes). Furthermore, the significant correlation with self-rated impulse control that we found further supports the validity of the SRTC: Only speed decrements in motivationally relevant distracter episodes were associated with lower self-rated impulse control. This effect was greater for state-oriented participants, that is, for those experiencing self-regulatory deficits. In this group, the correlation explained more than 30% of variance of the two measures. Taken together, alternative interpretations of the SRTC performance data can be ruled out.

Long-Term Effects of Instructional Style on Free-Choice Behavior

Further data analyses revealed a trade-off between short-term and long-term effects of control. Although state-oriented participants profited from control when trying to resist a motivationally relevant distracter, they experienced negative consequences of control in the

long run: State-oriented participants did not behave according to their preferences in a subsequent free-choice situation (see Table 2). They continued to work on the visual discrimination task even when they were not interested or stopped working despite great interest in the task. Introducing a task in an authoritative manner resulted in self-suppression that outlasted task completion. The more integrated, self-regulatory mode of volition (presumably based on participation of the implicit self in action control) seems to work according to a “use it or lose it” principle. Individuals who do not use this volitional mode regularly lose access to the self. They cannot behave according to their emotional preferences even when given the opportunity to do so. In contrast, individuals who typically act in an integrated self-regulatory mode of volition (i.e., action-oriented participants) seem to preserve some degree of self-access even when conditions do not support autonomy. This assumption is confirmed by a nonsignificant correlation between persistence and task interest for action-oriented participants in the externally controlled condition. Thus, a high ability to self-regulate affect may buffer the negative effects of controlling conditions to some degree.

Taken together, results support assumptions derived from SDT and PSI theory about external control having negative consequences in the long run. Such control can lead to alienation from personal preferences, especially for state-oriented participants. Alienation can be considered as a psychological cost factor associated with the short-term benefits of facilitated self-control that has been observed in state-oriented individuals exposed to externally controlled conditions. The present research demonstrates the importance of a personality view on motivation in order to understand the functional mechanisms underlying short-term and long-term effects of control and autonomy support.

REFERENCES

- Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology*, **72**, 261–278.
- Baumann, N., & Kuhl, J. (2002). Intuition, affect and personality: Unconscious coherence judgments and self-regulation of negative affect. *Journal of Personality and Social Psychology*, **83**, 1213–1223.
- Baumann, N., & Kuhl, J. (2003a). Der Selbstregulations- und Konzentrationstest für Kinder (SRKT-K) und Erwachsene und der Selbstregulations-Strategietest

- für Kinder (SRST-K). In J. Stiensmeier-Pelster & F. Rheinberg (Eds.), *Diagnostik von Motivation und Selbstkonzept* (pp. 183–200). Göttingen, Germany: Hogrefe.
- Baumann, N., & Kuhl, J. (2003b). Self-infiltration: Confusing assigned tasks as self-selected in memory. *Personality and Social Psychology Bulletin*, **29**, 487–497.
- Beckmann, J., & Kuhl, J. (1984). Altering information to gain action control: Functional aspects of human information processing in decision-making. *Journal of Research in Personality*, **18**, 223–279.
- Bembenutty, H. (1999). Sustaining motivation and academic goals: The role of academic delay of gratification. *Learning and Individual Differences*, **11**, 233–257.
- Beswick, G., & Mann, L. (1994). State orientation and procrastination. In J. Kuhl & J. Beckmann (Eds.), *Volition and personality: Action versus state orientation* (pp. 391–396). Göttingen, Germany: Hogrefe.
- Blunt, A., & Pychyl, T. A. (1998). Volitional action and inaction in the lives of undergraduate students: State orientation, procrastination, and proneness to boredom. *Personality and Individual Differences*, **24**, 837–846.
- Boekaerts, M., Pintrich, P. R., & Zeidner, M. (2000). *Handbook of self-regulation*. New York: Academic Press.
- Bossong, B. (1994). Scholastic stressors and achievement-related anxiety. In J. Kuhl & J. Beckmann (Eds.), *Volition and personality: Action versus state orientation* (pp. 397–406). Göttingen, Germany: Hogrefe.
- Brunstein, J. C. (2001). Persönliche Ziele und Handlungs- versus Lageorientierung: Wer bindet sich an realistische und bedürfniskongruente Ziele? [Personal goals and action versus state orientation: Who builds a commitment to realistic and need-congruent goals?] *Zeitschrift für Differentielle und Diagnostische Psychologie*, **22**, 1–12.
- Chasiotis, A., & Kiessling, F. (2004). Bleibt die Spezifität der Beziehung zwischen Theory of mind und inhibitorischer Kontrolle über die Lebensspanne bestehen? [Does the specificity of theory of mind and inhibitory control persist over the life-span?] *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie*, **36**, 105–114.
- Corno, L. (2001). Volitional aspects of self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed.). Mahwah, NJ: Erlbaum.
- Deci, E., Eghrari, H., Patrick, B., & Leone, D. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality*, **62**, 119–142.
- Deci, E., Koestner, R., & Ryan, R. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, **125**, 627–668.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology*, **53**, 1024–1037.
- Dewitte, S., & Schouwenburg, H. C. (2002). Procrastination, temptations, and incentives: The struggle between the present and the future in procrastinators and the punctual. *European Journal of Personality*, **16**, 469–489.

- Dieffendorf, J. M., Hall, R. J., Lord, R. G., & Streat, M. L. (2000). Action-state orientation: Construct validity of a revised measure and its relationship to work-related variables. *Journal of Applied Psychology*, **85**, 250–263.
- Fuhrmann, A., & Kuhl, J. (1998). Maintaining a healthy diet: Effects of personality and self-reward versus self-punishment on commitment to and enactment of self-chosen and assigned goals. *Psychology and Health*, **13**, 651–686.
- Heise, E., Zachowski, K.-P., Gerjets, P., Kuhl, J., & Rothenberger, A. (2003). *Interference control deficits with motivationally relevant distracters in ADHD*. Manuscript submitted for publication. University of Göttingen, Germany.
- Koole, S., & Jostmann, N. (2004). Getting a grip on your feelings: Effects of action orientation and external demands on intuitive affect regulation. *Journal of Personality and Social Psychology*, **87**, 924–990.
- Kuhl, J. (1982). Handlungskontrolle als metakognitiver Vermittler zwischen Intention und Handeln: Freizeitaktivitäten bei Hauptschülern [Action control as a metacognitive mediator between intention and action: Free time activities of high school students]. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie*, **14**, 141–148.
- Kuhl, J. (1994). Action versus state orientation: Psychometric properties of the Action Control Scale (ACS-90). In J. Kuhl & J. Beckmann (Eds.), *Volition and personality: Action versus state orientation* (pp. 47–59). Göttingen, Germany: Hogrefe.
- Kuhl, J. (2000). The volitional basis of personality systems interaction theory: Applications in learning and treatment contexts. *International Journal of Educational Research*, **33**, 665–703.
- Kuhl, J. (2001). *Motivation und Persönlichkeit* [Motivation and personality]. Göttingen, Germany: Hogrefe.
- Kuhl, J., & Beckmann, J. (1994a). Alienation: Ignoring one's preferences. In J. Kuhl & J. Beckmann (Eds.), *Volition and personality: Action versus state orientation* (pp. 375–390). Göttingen: Hogrefe.
- Kuhl, J., & Beckmann, J. (1994b). *Volition and personality: Action versus state orientation*. Göttingen, Germany: Hogrefe.
- Kuhl, J., & Christ, E. (1993). *Der Selbstregulations-Strategien-Test für Kinder (SRST-K)* [The metamotivational knowledge test for children]. Göttingen, Germany: Hogrefe.
- Kuhl, J., & Fuhrmann, A. (1998). Decomposing self-regulation and self-control: The volitional components checklist. In J. Heckhausen & C. Dweck (Eds.), *Life span perspectives on motivation and control* (pp. 15–49). Mahwah, NJ: Erlbaum.
- Kuhl, J., & Goschke, T. (1994). State orientation and the activation and retrieval of intentions in memory. In J. Kuhl & J. Beckmann (Eds.), *Volition and personality: Action versus state orientation* (pp. 127–153). Göttingen: Hogrefe.
- Kuhl, J., & Kazén, M. (1994). Self-discrimination and memory: State orientation and false self-ascription of assigned activities. *Journal of Personality and Social Psychology*, **66**, 1103–1115.
- Kuhl, J., & Kraska, K. (1989). Self-regulation and metamotivation: Computational mechanisms, development, and assessment. In R. Kanfer, P. L. Ackermann, & R. Cudek (Eds.), *Learning and individual differences: Abilities, motivation and methodology* (pp. 343–374). Hillsdale, NJ: Erlbaum.

- Kuhl, J., & Kraska, K. (1992, 1994). *Selbstregulations- und Konzentrationstest für Kinder (SRKT-K)* [Self-regulation test for children (SRTC)]. Göttingen, Germany: Hogrefe.
- Kuhl, J., & Kraska, K. (1993). Self-regulation: Psychometric properties of a computer-aided instrument. *The German Journal of Psychology*, **17**, 11–24.
- Linville, P. W. (1987). Self-complexity as a cognitive buffer against stress-related illness and depression. *Journal of Personality and Social Psychology*, **52**, 663–676.
- Palafai, T. P. (2002). Action-state orientation and the self-regulation of eating behavior. *Eating Behaviors*, **3**, 249–259.
- Ryan, R. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, **43**, 736–750.
- Ryan, R., Koestner, R., & Deci, E. (1991). Ego-involved persistence: When free-choice behavior is not intrinsically motivated. *Motivation and Emotion*, **15**, 185–205.
- Sheldon, K. M., & Elliot, A. J. (1998). Not all personal goals are personal: Comparing autonomous and controlled reasons for goals as predictors of effort and attainment. *Personality and Social Psychology Bulletin*, **24**, 546–557.
- Sheldon, K. M., & Kasser, T. (1995). Coherence and congruence: Two aspects of personality integration. *Journal of Personality and Social Psychology*, **68**, 531–543.
- Showers, C. J., & Kling, K. C. (1996). Organization of self-knowledge: Implications for recovery from sad mood. *Journal of Personality and Social Psychology*, **70**, 578–590.
- Silverman, I. W. (2003). Gender differences in resistance to temptation: Theories and evidence. *Developmental Review*, **23**, 219–259.
- Wilde, O. (1892, 1974). *Lady Windermérés Fan*. Harmondsworth, Middlesex, UK: Penguin Books.