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Assessing Attention Control in Goal Pursuit: A Component of Dispositional Self-Regulation

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Abstract

We examined the psychometric properties of the Self-Regulation Scale (SRS; Schwarzer, Diehl, & Schmitz, 1999), a measure of attention control in goal pursuit, in 2 independent studies. Study 1 included young adults ($N = 443$), whereas Study 2 included young, middle-aged, and older adults ($N = 330$). In both studies, the SRS showed good internal consistency. In Study 1, the SRS also showed satisfactory test–retest reliability over a 6-week period. We found support for the criterion validity of the SRS in terms of positive correlations with measures of general and domain-specific self-efficacy, proactive coping, and positive affect and in terms of negative correlations with depressive symptoms and negative affect. Hierarchical regression analyses showed that attention control accounted for unique portions of variance in relevant outcome variables above and beyond measures of self-efficacy and proactive coping.

Individuals' ability to regulate their thoughts, feelings, and overt actions contributes to psychological health and well-being (Carver & Scheier, 1999). Self-regulatory behavior is complex and involves both dispositional as well as situational components (Carver, 2004). The research we present here focused on a measure to assess one component of dispositional self-regulation, namely, attention control in goal-directed behavior. *Attention control* is defined as a person's ability to focus his or her attention on a given task, to control and regulate external and internal distractions, and to work toward a desired goal or outcome. As such, attention control is the opposite of impulsive behavior and represents a personality variable that is an integral part of most complex actions and a dispositional component of self-regulation.

THEORETICAL BACKGROUND

Traditionally there have been two major theoretical approaches to the study of self-regulatory behavior. The process approach emphasizes that self-regulatory actions are processes that extend over time and are linked to individuals' goals. Karoly (1993) described this approach when he proposed the following definition:

Self-regulation refers to those processes, internal and/or transactional, that enable an individual to guide his/her goal-directed activities over time and across changing circumstances (contexts). Regulation implies modulation of thought, affect, behavior, or attention via deliberate or automated use of specific mechanisms and supportive metaskills. (p. 25)

Inherent in process approaches is the notion that self-regulatory behavior is sequential in nature and includes subcomponents such as planning, directing and maintaining attention, evaluation of actions, correction of behavior, and termination of actions (Baumeister & Heatherton, 1996; Carver & Scheier, 1999; Karoly, 1993; Schwarzer, 2001).

The other major theoretical approach is rooted in the tradition of personality psychology and conceptualizes self-regulation as an individual difference variable. Advocates of this approach point out that self-regulation is different from self-awareness or self-monitoring in that it includes a person's knowledge about the behavior that is required to achieve a target behavior or goal (Koestner, Bernieri, & Zuckerman, 1992; Zimmerman, 1995). Because individuals draw on their prior experiences in goal pursuit and are, due to inherent temperamental characteristics (Kopp, 1982; Rothbart & Bates, 1998), predisposed to act and react in certain ways, some authors have suggested that self-regulatory behavior represents a relatively stable personality variable (e.g., Karoly, 1993). Adoption of such an individual difference perspective does not mean that individuals' self-regulatory actions are necessarily one unified behavior. Rather, it means that the component behaviors, such as attention regulation, emotion regulation, or self-efficacy beliefs, are conceptualized as relatively stable and enduring behaviors with which individuals respond to a broad spectrum of situations (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Luszczynska, Diehl, Gutiérrez-Doña, Kuusinen, & Schwarzer, 2004).

Taking an individual difference perspective has several implications. First, advocates of such an approach focus primarily on the person and his or her dispositions and skill repertoire rather than on situational characteristics when they conceptualize self-regulatory behavior (Karoly, 1993). Second, the focus on the individual as the origin of self-regulatory behavior also has major implications for the development of assessment instruments. For example, the individual difference approach implies that individuals have knowledge about their specific ways of regulating their attentional focus, emotions, and related behaviors. Thus, from an assessment perspective, it is reasonable to draw on this knowledge and to measure individuals' different self-regulatory dispositions via self-report methods. In this research, we adopted this approach and examined the psychometric properties of a self-report questionnaire, the Self-Regulation Scale (SRS; Schwarzer, Diehl, & Schmitz, 1999).

In this article, we present findings from two independent studies. In Study 1, we used a sample of mostly young adults to examine the psychometric properties of the English version of the SRS, a self-report questionnaire originally developed in Germany to assess attention control in goal pursuit. In Study 2, we extended this work by (a) examining the scale's psychometric properties in a more age-heterogeneous sample, (b) gathering additional evidence for the measure's criterion validity, and (c) assessing the unique predictive validity of the SRS with regard to adults' personal goals.

OBJECTIVES OF STUDY 1

Study 1 was the first study that used the English version of the SRS, and hence, our primary objective was to examine the reliability and validity of the measure. With regard to reliability, we focused on the internal consistency and the test-retest reliability (stability) of the questionnaire. In terms of validity, we were primarily concerned with the criterion validity of the scale. For this purpose, we reviewed the literature on attention control and self-regulation and selected a number of measures that, based on conceptual reasoning, should be either positively or negatively related to participants' ability to control their attention in goal pursuit as assessed by the SRS.

Among the measures that we expected to be positively correlated with participants' SRS scores was a scale of proactive coping (Greenglass, 2002), a scale of general self-efficacy (Schwarzer

& Jerusalem, 1995), and a scale of academic self-efficacy (Maurer & Pierce, 1998; Wood & Locke, 1987). We expected a positive association with proactive coping because measures that assess coping behavior tend to focus on individuals' abilities to direct and regulate their behavior so that a desirable outcome will be achieved in response to a stressful situation (Greenglass, 2002; Greenglass, Schwarzer, & Taubert, 1999; Lazarus & Folkman, 1984). We expected a positive association with general self-efficacy because individuals who have strong self-efficacy beliefs tend to be more focused, more organized, and more persistent in their course of action (Bandura, 1997). This kind of behavior also tends to be reflected in individuals' greater ability to self-regulate the focus of their attention in academic settings (Multon, Brown, & Lent, 1991; Wood & Locke, 1987) and when pursuing personal goals (Bandura, 1997).

In terms of negative associations, we expected participants' SRS scores to be inversely related to measures of negative affect such as feelings of anxiety, emotional instability, or depressive mood. This reasoning draws on a large literature that has shown that individuals who are more anxious and more prone to experiencing negative affect also tend to show problems with focusing their attention on a task at hand (American Psychiatric Association, 1994; Carver, 2004; Eisenberg et al., 2000). Thus, we included a measure of depression (Shaver & Brennan, 1991) to assess a possible negative association with one area of negative affect.

Lastly, for a subsample in Study 1, we were able to examine additional aspects of criterion and predictive validity by relating their SRS scores to measures of academic performance (Maurer & Pierce, 1998; Wood & Locke, 1987). The main rationale for this objective was to demonstrate that participants' self-reported ability to regulate their attention was predictive of an actual behavioral outcome such as a student's final grade in a class. We performed two types of analyses. First, we examined the criterion validity of the SRS by calculating its correlations with self-report measures of in-class concentration and concentration on exams (Maurer & Pierce, 1998). Second, we examined the validity of the SRS for predicting participants' academic performance as assessed by their final class grade. The rationale for the latter analysis was that the unique predictive validity of the SRS needed to be determined after controlling for the effects of other potential explanatory variables. Conducting such an analysis was important because measures that, in the past, have been touted as making a novel contribution, have later been shown to correlate so strongly with one or more other explanatory variable so that their unique contribution has been cast in doubt (Funk & Houston, 1987).

OBJECTIVES OF STUDY 2

In Study 2, we focused on personal goals across the adult life span, and we had three major objectives. First, because in Study 1, we examined the psychometric properties of the SRS in a sample of college students, our main objective of Study 2 was to examine whether the psychometric properties generalized to other age groups, in particular middle-aged and older adults. Specifically, in this study, we also examined whether the patterns of associations with criterion variables and mean levels of attention control were the same across age groups. Because the existing literature on self-regulation and attention control has not focused on age differences across the adult life span, we had no explicit hypotheses and considered this part of Study 2 to serve mostly descriptive purposes.

The second objective was to gather further evidence for the criterion validity of the SRS. Because theorists have emphasized the role of attention regulation in the context of goal-directed behavior (Forgas & Vargas, 1999; Karoly, 1993), we examined the relations of individuals' SRS scores with their ratings on six goal-related variables such as determination, willingness to invest time and energy as well as the urgency to achieve the goal. Overall, we expected that individuals with higher SRS scores would tend to be more determined to pursue their goals, more willing to invest time and energy in goal pursuit, and would perceive the

achievement of their goals more under their own control. Similarly, we expected that they would perceive greater urgency in pursuing their goals, greater support from others, and greater opportunity for the realization of their goals.

Finally, we examined the predictive validity of the SRS with regard to participants' overall goal commitment and goal attainability. The rationale for this analysis was that we wanted to determine the predictive relevance of attentional self-regulation vis-à-vis other possible predictors such as self-efficacy beliefs or coping behavior. We expected participants' SRS scores to uniquely contribute to the prediction of adults' ratings of goal commitment and goal attainability.

STUDY 1

Method

Participants—The study sample consisted of 443 adults (355 women, 88 men) with a mean age of 22.90 years ($SD = 6.80$, range = 17 to 65 years). Participants were undergraduate students at a state university in the Rocky Mountain area, and the majority (96%) were young adults (age 18 to 39 years). On average, participants had 13.8 years of education ($SD = 1.62$) and a mean annual family income of \$51,000. The majority of participants (75.6%) rated their health as *good* to *very good* (23.5% *very good*, 52.1% *good*) compared to other individuals their age. The majority of participants (86.9%) also reported being quite satisfied with their lives (4.7% *extremely happy*, 51.9% *very happy*, 33.9% *somewhat happy*).

We retested a subsample of 293 participants (66.1 % of the total sample) after 6 weeks to examine the test–retest reliability (stability) of the SRS. The test–retest subsample did not differ significantly from the test-only sample on key sociodemographic variables such as age, income, years of education, marital status, health status, and life satisfaction or on measures of emotional adjustment.

For a subsample of 382 participants (86.2% of the total samples), we were able to obtain the final course grade as an indicator of their academic performance. Participants for whom we did and participants for whom we did not obtain the course score did not differ significantly on key variables such as age, income, years of education, marital status, health status, life satisfaction, or frequency of depressive symptoms.

Procedure—The majority of participants self-administered the test battery outside the regular class time (i.e., students took the testing packet home) and followed the detailed written instructions provided to them. To examine whether self-administration influenced participants' answers in a systematic way, a subsample of participants ($n = 45$; 10.2% of the sample) was randomly chosen to complete the test battery in small groups conducted by a trained research assistant. We conducted group testing in a designated room on campus. There were no significant differences in the responses between participants who self-administered the test battery and those who completed the battery in a group setting. The order in which the test battery was administered was the same for all participants.

Measures

The focal measure of the test battery was the SRS. In addition, we administered a personal data form and measures of general self-efficacy, academic self-efficacy, proactive coping, and depressive symptoms. As an indicator of academic performance, we obtained students' final grade for the course in which they filled out the questionnaires.

Personal Background—Participants responded to a detailed personal data questionnaire designed to assess key demographic variables such as age, gender, income, education, marital status, health status, and life satisfaction. This questionnaire has been extensively used in research with adults of all ages (Willis, Jay, Diehl, & Marsiske, 1992).

Attention Control in Goal Pursuit—We used the SRS (Schwarzer et al., 1999) to assess participants' attention control in goal pursuit. The SRS is the English version of a measure developed in Germany. Originally, the SRS was designed as a short measure for use in health psychology research (R. Schwarzer, personal communication, September 25, 2004). In terms of scale development, members of the Health Psychology Group at the Free University of Berlin and other experts reviewed the self-regulation literature and generated a set of 16 items. These 16 items covered emotional and attention aspects of self-regulation and were randomly mixed with items for different concepts and administered to 83 German psychology undergraduates. Based on item analyses (i.e., item-total correlations, internal reliability), 4 items were eliminated and the remaining 12 items were given to 285 German teachers who took part in a school innovation project. After additional item analyses and a confirmatory factor analysis, 2 additional items were deleted, resulting in the final version of the scale. This final version was subsequently given to two other groups of teachers to obtain further data on the instrument's reliability (R. Schwarzer, personal communication, September 25, 2004). The English version is based on the final set of 10 items.

The SRS assesses a person's ability to maintain his or her focus of attention when pursuing a goal and facing difficulties in achieving the goal. Schwarzer et al. (1999) stated that such a maintenance situation requires an individual to focus attention on the task at hand and to keep a favorable emotional balance. Thus, the items of the SRS were designed to reflect dispositional attention control and regulation. Each item is rated on a 4-point scale ranging from 1 (*not at all true*) to 4 (*completely true*), and responses are summed into a total score, with higher scores indicating greater ability to control and maintain one's attention. The German version of the SRS has yielded an internal consistency (Cronbach's α) of .82 in two samples of 285 and 275 teachers, respectively. In another sample of 306 teachers, the scale had an internal consistency of .81 (R. Schwarzer, personal communication, September 25, 2004). Cross-cultural research with the SRS yielded coefficients of internal consistency of .75, .74, and .73 in Costa Rica, Finland, and Poland, respectively (Luszczynska et al., 2004). The complete scale is shown in the Appendix.

Two bilingual PhD-level psychologists translated the German items into English, and the English items were then back translated into German to assure that their original meaning had been retained (Schwarzer et al., 1999). In those cases where the item content was modified, it was adjusted for colloquial terms to maintain fluency of the wording.

Measures of Related Constructs

General self-efficacy: We assessed participants' general sense of self-efficacy using the Generalized Self-Efficacy Scale (GSES; Schwarzer & Jerusalem, 1995). The GSES is a 10-item scale (e.g., "I can always manage to solve difficult problems if I try hard enough") designed to assess participants' generalized beliefs about their ability to effectively cope with different problem situations. The items of the GSES are rated on a 4-point scale ranging from 1 (*not at all true*) to 4 (*completely true*). The GSES has been widely used, and its psychometric properties were well established (Scholz, Gutiérrez-Doña, Sud, & Schwarzer, 2002). Cronbach's α in this study was .83.

Academic self-efficacy: We used two scales from the Academic Self-Evaluation Scale (Wood & Locke, 1987) to assess class concentration and exam concentration. Class concentration

assesses the proportion of time for which a student feels that he or she can concentrate and stay fully focused on the materials presented by the instructor (e.g., “I can concentrate for 60% or more of the class period.”). Similarly, exam concentration assesses the proportion of time during an exam for which the student feels that he or she can focus exclusively on understanding and answering questions and avoid breaks in his or her concentration. Each scale has five items with each item corresponding to one specific level of performance (e.g., concentrate 60%, 70%, 80%, 90%, or 100% of the class period). Participants rated each item on a 5-point scale (Maurer & Pierce, 1998) ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), resulting in a possible maximum score of 25 for each scale. The coefficients of internal consistency for class concentration and exam concentration were .91 and .90, respectively. Because the two scales were highly correlated ($r = .84, p < .001$), we created a composite score of academic self-efficacy by summing the scores from both scales (range of scores 10 to 50).

Proactive coping: We used the Proactive Coping scale (PCS), a subscale of the Proactive Coping Inventory (Greenglass, 2002; Greenglass et al., 1999), to examine participants’ beliefs with regard to their ability to change in ways that result in improvement of their own self and/or their environment (e.g., “I always try to find a way to work around obstacles; nothing really stops me”). A person who scores high on the PCS is proactive in the sense that he or she initiates a constructive path of action and creates opportunities for personal growth (Greenglass, 2002).

The PCS is one of six subscales (i.e., Reflective Coping, Strategic Planning, Preventive Coping, Instrumental Support Seeking, and Emotional Support Seeking) and consists of 14 items, which are rated on a 4-point scale ranging from 1 (*not at all true*) to 4 (*completely true*). The psychometric properties of the PCS have been examined in a Canadian student sample ($N = 248$), a Polish-Canadian immigrant sample ($N = 144$), and in an adult Canadian sample ($N = 178$; Greenglass, 2002). Coefficients of internal consistency ranged from .80 to .85. Moreover, the PCS has been examined in terms of criterion validity. Greenglass (2002) provided a detailed description of the development of the PCS, its psychometric properties, and the scoring instructions. Cronbach’s α in this study was .83.

Depressive symptoms: We assessed the frequency of participants’ depressive symptoms using the Center for Epidemiological Studies Depression Scale (CES–D; Radloff, 1977; Shaver & Brennan, 1991). Unlike more clinically oriented depression scales, the 20 items of the CES–D focus on milder depressive symptoms with an emphasis on depressed affect or mood. Individuals are asked to indicate how frequently they experienced the listed symptoms within the past week on a scale ranging from 1 (*rarely or none of the time*) to 4 (*most or all of the time*). Respondents’ answers are summed into a total score, with higher scores indicating a higher frequency of depressive symptoms. The CES–D has been specifically recommended for use in nonclinical, community-based samples, and its psychometric properties have been well established (Radloff, 1977; Shaver & Brennan, 1991). The coefficient of internal consistency in this study was .89.

Academic performance: At the end of the semester during which the test administration took place, the instructors for the courses provided the final scores for as many students as possible. Final scores were not available for the 45 students who were tested in groups and for 16 students who dropped out of the classes before the end of the term. Thus, final scores were available for 382 study participants. Because different instructors used different point scales to assign the final grade, a percentage score was calculated to establish a common metric across classes. The grade distributions of the sample resembled the grade distributions of psychology majors.

Results

Descriptive Statistics—Because the sample was unbalanced with regard to the representation of men and women and because problems with attention control tend to be more prevalent in men compared to women, we performed a multivariate analysis of variance (MANOVA) to examine gender differences in attention control, proactive coping, general and academic self-efficacy, and depressive symptoms. We performed a MANOVA rather than individual univariate tests because MANOVA controls for an inflated Type 1 error rate and takes into account the correlations among the dependent variables (Stevens, 2002). The multivariate effect of gender was not statistically significant, Wilks's $\lambda = .98$, $F(5, 437) = 2.36$, $p > .05$, partial $\eta^2 = .029$. Thus, men and women did not differ significantly in terms of their mean scores for attention control, proactive coping, general self-efficacy, academic self-efficacy, and depressive symptoms.

Reliability—We assessed the reliability of the SRS in terms of internal consistency and test–retest reliability. Item-total correlations ranged from .31 to .61 (all $ps < .05$), indicating that each item correlated substantially with the scale score. The coefficient of internal consistency (Cronbach's α) was .76. To assess the test–retest reliability of the SRS, 239 participants responded to the questionnaire again 6 weeks later. The test–retest correlation was .62, $p < .001$.

Criterion Validity—To assess the criterion validity of the SRS, we calculated Pearson product–moment correlations with several criterion measures. As can be seen in Table 1, the SRS showed significant positive correlations with the PCS, the GSES, and the academic self-efficacy score. As hypothesized, participants' SRS scores were negatively correlated with their scores on the measure of depressive symptoms.

Unique Predictive Validity—The zero order correlation between individuals' SRS score and their final course score (i.e., percentage score) was $r(382) = .19$, $p < .001$. We performed a hierarchical regression analysis to examine the unique predictive (incremental) validity of the SRS. The criterion variable in this analysis was participants' academic performance as assessed in terms of their final course score. The hierarchical regression analysis proceeded in the following way. In Step 1, we entered participants' scores for academic self-efficacy, general self-efficacy, and proactive coping into the equation. We entered these variables first into the regression equation because we expected that they would show a significant positive association with academic performance. In Step 2, we entered participants' CES–D score into the equation because we expected that students who reported more depressive symptoms would show poorer academic performance. In Step 3, we added participants' SRS scores to the regression equation to examine whether attention control accounted for additional variance in academic performance above and beyond the variables included in Step 1 and Step 2.

As can be seen in Table 2, academic self-efficacy was a significant positive predictor of participants' academic performance, whereas general self-efficacy and proactive coping failed to reach the .05 level of statistical significance. Although depressive symptoms showed a significant negative relationship with academic performance, this effect failed to reach the .05 level of statistical significance when attention control was entered into the equation. Attention control was a significant predictor of academic performance beyond academic self-efficacy. Together, these variables accounted for 14.5% of the variance in academic performance, with attention control accounting uniquely for 4.1% of the variance.

In summary, this study provided evidence in support of the reliability of the SRS for assessing attention control in goal pursuit in young adults. The SRS also showed positive relations with measures of self-efficacy and proactive coping and negative relations with a measure of

depressive symptoms. Most important, attention control was a significant predictor of participants' academic performance above and beyond self-efficacy, proactive coping, and affective functioning.

STUDY 2

In this study, we had three objectives. First, we examined the psychometric properties of the SRS in a more age-heterogeneous sample. Second, we gathered additional evidence for the criterion validity of the SRS. Third, we assessed the unique predictive validity of the SRS in the context of goal pursuit.

Method

Participants—The study sample consisted of 330 adults ranging in age from 19 to 87 years. We divided the sample into three age groups: young adults ($n = 110$, M age = 22.06 years, $SD = 2.49$, range = 19 to 39 years), middle-aged adults ($n = 109$, M age = 49.19 years, $SD = 5.95$, range = 40 to 59 years), and older adults ($n = 111$, M age = 74.81 years, $SD = 6.17$, range = 60 to 87 years). Men and women were equally represented in each age group. We recruited younger participants primarily from classes at the University of Florida, and we offered the choice of extra credit or monetary compensation (\$20.00) for their participation. We recruited middle-aged and older participants from a mid-sized community in North Central Florida through flyers and announcements at local civic organizations. Middle-aged and older adults received \$20.00 for their participation.

Age groups were comparable in terms of life satisfaction, self-rated health, and annual family income. The three age groups differed significantly with regard to years of education, $F(2, 328) = 22.57$, $p < .001$. Younger adults had fewer years of education ($M = 14.98$, $SD = 1.46$) than middle-aged ($M = 17.35$, $SD = 2.50$) and older adults ($M = 16.50$, $SD = 3.55$).

Procedure—Participants completed the test battery in small groups with a maximum of 8 participants per group. Testing sessions were conducted by trained research assistants in the laboratory of the Adult Development and Aging Project (ADAPT) at the University of Florida. All participants answered the measures in the same order.

Measures—For reasons of cross-validation, the test battery contained the same measures as Study 1. In addition, in Study 2, we assessed participants' goal pursuit strategies with regard to 10 self-generated personal goals, and we included a measure of positive and negative affect.

Personal goal variables: We asked participants to describe up to 10 personal goals. After participants had generated the list of personal goals, they rated each goal separately with regard to six variables (i.e., determination, urgency, willingness, opportunity, control, and support) that have been used in a variety of studies on personal goals and personal strivings (Emmons, 1986; Little, 1989; McGregor & Little, 1998). We chose the six goal variables because earlier research has shown (Emmons, 1986; Little, 1989) that they are indicative of (a) an individual's commitment to pursuing personal goals (determination, urgency, and willingness), and (b) a person's evaluation of goal attainability (opportunity, control, and support). That is, the variables determination, urgency, and willingness indicate how much energy individuals are willing to invest in pursuit of a specific goal and how determined they are in achieving a particular goal. In contrast, the variables control, support, and opportunity indicate the extent to which individuals perceive having control over achieving a goal, whether others are supportive of their goal pursuit, and to what extent opportunities exist in everyday life for achieving their personal goals.

Participants rated each goal with regard to each goal variable using two items per variable and 6-point scales ranging from 1 (*strongly agree*) to 6 (*strongly disagree*). Example items for determination, urgency, and willingness are “No matter what happens, I will not give up this goal”; “I have the urgent feeling to immediately start working on this goal”; and “Even if it means a lot of effort, I will do everything necessary to accomplish this goal,” respectively. Example items for opportunity, control, and support are “I have many opportunities in my everyday life to work on this goal”; “It depends totally on me whether this goal is fulfilled or not”; and “Concerning this goal, I can definitely rely on the support of those close to me,” respectively. Coefficients of internal consistency were .80, .81, .82, .87, .81, and .90 for determination, urgency, willingness, opportunity, control, and support, respectively.

Brunstein (1993) documented via principal components analysis that the three dimensions of determination, urgency, and willingness loaded on a factor of Goal Commitment. In contrast, the three dimensions of opportunity, control, and support loaded on a factor of Goal Attainability. To cross-validate this two-factor structure, we subjected the correlation matrix to a confirmatory factor analysis using LISREL 8.5 (Jöreskog & Sörbom, 1996). The results from this analysis support the two-factor structure of the six goal dimensions. The goodness of fit of the two-factor model was satisfactory $\chi^2(8, N = 330) = 37.33, p < .001$; goodness-of-fit index = .95, normed fit index = .96, comparative fit index = .97, root mean square residual = .03, and root mean square error of approximation = .06. The loadings of the Goal Commitment factor were .92, .85, and .96 for determination, urgency, and willingness, respectively. The loadings of the Goal Attainability factor were .79, .73, and .74 for opportunity, control, and support, respectively. The two factors had an intercorrelation of .66. We calculated factor scores for each factor using the method of unit weighting. We used both individual scale scores and factor scores in the analyses.

Positive affect and negative affect: We used the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) to assess two primary dimensions of affect experience. Positive Affect (PA) reflects the extent to which a person feels enthusiastic, active, and alert. High PA is indicative of a high energy level, full concentration, and pleasurable engagement, whereas low PA is indicative of sadness and lethargy. In contrast, Negative Affect (NA) is a general dimension of aversive mood states such as anger, contempt, guilt, fear, and nervousness, with low NA being a state of calmness and serenity.

The PANAS has a total of 20 items, with 10 items for each subscale. Respondents rated each item on a 5-point scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*), which indicated to what extent they felt this way during the past week. The psychometric properties of the PANAS were examined with regard to internal consistency and test–retest reliability and in terms of construct validity (Watson et al., 1988). The coefficients of internal consistency in this study were .86 and .84 for PA and NA, respectively.

Results

Descriptive Statistics—Table 3 shows the means and standard deviations of the key variables by age group. Because the sample in Study 2 covered a much wider age range than the sample in Study 1, we performed a MANOVA to examine age and gender differences in the key variables. Like in Study 1, the MANOVA included attention control, proactive coping, general self-efficacy, positive and negative affect, and depressive symptoms as dependent variables.

This analysis yielded significant multivariate effects of age group, Wilks’s $\lambda = .71, F(12, 638) = 9.76, p < .001$, partial $\eta^2 = .16$ and gender, Wilks’s $\lambda = .93, F(6, 319) = 4.04, p < .01$, partial $\eta^2 = .07$. The multivariate Age Group $\times$ Gender interaction did not reach the .05 level of significance. The multivariate effect of age group was due to significant univariate effects for

attention control, $F(2, 324) = 9.01$, partial $\eta^2 = .05$; negative affect, $F(2, 324) = 25.03$, partial $\eta^2 = .13$; and depressive symptoms, $F(2, 324) = 10.48$, partial $\eta^2 = .06$, all $ps < .001$. Follow-up tests using Tukey's honestly significant difference method showed that young adults had significantly lower mean scores on attention control compared to middle-aged adults, $t(217) = -3.52$, $p < .001$, Cohen's $d = -.48$ and older adults, $t(218) = -3.69$, $p < .001$, Cohen's $d = -.50$ (see Table 3). With regard to negative affect, follow-up tests yielded that older adults had significantly lower scores than middle-aged adults, $t(219) = 3.39$, $p < .001$, Cohen's $d = .46$ and young adults, $t(218) = 7.53$, $p < .001$, Cohen's $d = 1.02$. Middle-aged adults also scored significantly lower on negative affect than young adults, $t(217) = 3.49$, $p < .001$, Cohen's $d = .47$. In terms of depressive symptoms, both middle-aged adults, $t(217) = 2.75$, $p < .01$, Cohen's $d = .37$ and older adults, $t(218) = 4.73$, $p < .001$, Cohen's $d = .64$, had significantly lower scores than young adults.

The multivariate effect of gender was due to a significant univariate effect for positive affect, $F(1, 324) = 3.99$, $p < .05$. Women scored significantly higher on positive affect than men, $t(328) = -2.00$, $p < .05$, Cohen's $d = -.22$.

Reliability and Validity—The coefficient of internal consistency of the SRS was .84. We calculated bivariate correlations to examine the criterion validity of the SRS. Table 4 shows the resulting correlations by age group. As can be seen in Table 4, the SRS showed significant positive correlations (all $ps < .001$) with the PCS, the GSES, and positive affect across all age groups. Conversely, the SRS correlated negatively with negative affect and with depressive mood across all age groups. The size of the correlations was fairly similar across age groups. Indeed, testing for differences in the magnitude of the correlations using Fisher's r -to- z transformation (Howell, 2002) showed that only two pairs of correlations were significantly ($p < .05$) different from each other. Specifically, in the young adult age group, the correlation of attention control with depressive symptoms was significantly larger than in the older adult age group ($z = -2.07$, $p < .05$). Similarly, the correlation of attention control with depressive symptoms was significantly larger for middle-aged adults compared to older adults ($z = -1.78$, $p < .05$).

Associations With Goal Variables—To examine the associations between participants' SRS scores and goal-directed behaviors, we calculated the bivariate correlations with the six goal variables separately for each age group. As Table 5 shows, the correlations of attention control with dimensions of goal pursuit differed across age groups. Specifically, young adults' attention control scores showed significant positive correlations with the dimensions of determination, urgency, willingness, and opportunity. In contrast, middle-aged and older adults' attention control scores showed only significant correlations with the dimensions of determination and willingness. For middle-aged and older adults, none of the goal attainability scales showed significant correlations with attention control. Fisher's r -to- z transformation showed that only the association of attention control with the goal variable opportunity was significantly stronger in young adults compared to older adults ($z = 2.22$, $p < .05$).

Unique Predictive Validity—We performed hierarchical regression analyses to examine the incremental validity of the SRS for predicting goal-related variables. For reasons of parsimony, in these analyses, we used the factor scores for goal commitment and goal attainability rather than the individual dimension scores as the criterion variables.

Table 6 displays the findings from these analyses. As Table 6 shows, four variables had a significant effect on goal commitment. Positive affect and attention control were significant positive predictors, whereas negative affect and depressive symptoms were significant negative predictors. Together, these variables accounted for 17.1% of the variance in goal commitment, with attention control accounting uniquely for 1.6% of the variance.

Table 6 also shows the findings for goal attainability. Positive affect had a significant positive effect on goal attainability, whereas depressive symptoms had a significant negative effect. Attention control failed to have a significant effect on participants' perceptions of goal attainability. Together, these variables accounted for 9.2% of the variance in goal attainability.

DISCUSSION

A person's ability to regulate distractions to attentional processes is an indicator of developmental maturity and effective behavior regulation (Carver & Scheier, 1999; Eisenberg et al., 2000). Individual differences in self-regulatory skills and efforts, such as focusing on a specific goal or redirecting one's attention to a task at hand, are observable already early in life. Moreover, there has been increasing longitudinal evidence that such individual differences persist into adulthood and result in individual differences in the general self-regulation of behavior (Caspi & Silva, 1995; Robins, John, Caspi, Moffit, & Stouthamer-Loeber, 1996; Rothbart & Bates, 1998). Thus, although most theories conceptualize the skills and stages involved in the self-regulation of behavior as being dynamic, sequential, and recursive (Baumeister & Heatherton, 1996; Carver & Scheier, 1999; Karoly, 1993), there has been a good deal of evidence for viewing self-regulatory abilities in terms of relatively stable personality variables (see Eisenberg et al., 2000).

The purpose of the research we presented here was to examine the psychometric properties of the English version of the SRS (Schwarzer et al., 1999). The SRS was designed to assess attention control in goal pursuit, a key component of dispositional self-regulation. Findings from two independent studies, one with a mostly young adult sample and one with a more age heterogeneous sample, suggest that the SRS has good internal consistency and acceptable test-retest reliability (stability) over a 6-week interval. These findings regarding the psychometric properties of the English version of the SRS are corroborated by results from cross-cultural research including large samples of adults in Costa Rica, Finland, Germany, and Poland (Luszczynska et al., 2004).

The results of both studies also supported the criterion validity of the SRS. Specifically, the SRS had sizeable positive correlations with criterion variables such as general and domain-specific self-efficacy, proactive coping, and positive affect. The size of these correlations suggests that although there is a certain amount of shared variance (ranging from 4% to 34% in Study 1 and from 8% to 52% in Study 2) among these measures, the attention control variable as measured by the SRS was sufficiently distinct from these criterion measures. Findings from Study 2 also show that the associations with criterion variables was not limited to young adults but extended to other age groups covering the whole adult life span.

In both studies, the SRS correlated negatively with measures of negative affect. These correlations supported the assumption that individuals who are more anxious and more prone to experiencing negative affect also tend to show problems with focusing their attention on a task at hand (Carver, 2004; Eisenberg et al., 2000). Interestingly, the magnitude of the correlations was very similar across age groups (see Study 2), which suggests that the association of attention control with measures of negative affect remained fairly invariant across the adult life span.

In Study 1, we were able to examine the predictive validity of the attention control variable with regard to a specific real-life outcome, namely, students' final grade. The rationale for this analysis was that a student's performance in class and on exams should be related to his or her ability to focus attention on a required academic task (e.g., following a lecture, answering the questions on an exam, etc.). Findings show that besides academic self-efficacy, attention control was the only other significant predictor of the final grade earned. Although the amount

of variance in final grade accounted for by attention control was modest, the effect was significant after the effects of other relevant variables had already been taken into account. Thus, this finding lends support to the notion that attention control, as assessed by the SRS, may be predictive of real-world outcomes. We suggest that future research may build on this finding and may examine whether it generalizes to other behavioral outcomes. For example, in the area of health psychology, the ability to self-regulate one's attentional focus and one's motivation may be crucial in the context of health promotion and rehabilitation programs (e.g., exercise programs, rehabilitation after heart surgery, etc.). Similarly, the inclusion of an index of attention control seems to be relevant for behavioral training programs with adolescents and young adults with attention deficit disorders and for cognitive intervention programs with older adults.

Although the findings from Study 1 are promising, the study also had some limitations. Most notably, we did not assess attention control in the context of goal pursuit. Thus, we addressed this issue in Study 2 with a more age heterogeneous sample. In particular, in Study 2, we studied adults' attention control in the context of personal goals, and we were able to relate their attention control score to several goal variables. These analyses showed that attention control was significantly related to goal variables indicative of a person's commitment to a goal. That is, individuals who scored high on attention control also tended to (a) be more determined to pursue their goals, (b) perceive greater urgency in pursuing their goals, and (c) be more willing to invest time and effort in pursuing their goal. In contrast, attention control was not significantly related to goal variables indicative of adults' perceptions of goal attainability. These relationships were also reflected in the findings of two hierarchical regression analyses. Specifically, attention control was a significant predictor of goal commitment after the effects of general self-efficacy, proactive coping, and positive and negative affect variables had been taken into account. Again, the amount of variance accounted for by attention control was modest but statistically significant.

In contrast, attention control failed to be a significant predictor of adults' perceptions of goal attainability. As can be seen in Table 5, with one exception, none of the zero order correlations of attention control with the attainability variables (i.e., opportunity, control, support) were statistically significant. One explanation for this finding may be that adults perceive the attainability of their personal goals more related to external factors and not primarily related to their ability to focus their attention on a specific goal. An alternative explanation may be that we did not assess the role of attention control separately for each personal goal and therefore may have missed goal-specific relationships with attention control. Thus, the overall measure may not have been sufficiently sensitive to assess how the role of attention control varies depending on the nature of a personal goal.

Despite the mostly positive findings provided by both studies, we need to acknowledge several limitations. First, we need to note that the SRS was not conceived as an assessment of all aspects of behavioral self-regulation. Rather, it was designed as a brief measure of one key component of self-regulation, namely, attention control. As such, we believe that the 10 items of the final scale perform reasonably well and provide an acceptable saturation of the content domain. Although from a purely psychometric perspective, more items would be desirable and would provide better saturation of the content domain, the pragmatics and constraints of clinical and health-related research most of the time do not permit the use of lengthy assessment instruments.

A second limitation of these studies is that we were not able to include any neuropsychological measures to assess the convergent validity of the SRS with more clinically relevant measures. Moreover, at this point in time, the SRS has also not been used with a clinically established criterion group (e.g., adolescents or young adults with a diagnosis of attention deficit disorder).

Inclusion of such a clinical criterion group in future research is particularly important for establishing the usefulness of the SRS for applied research and for establishing clinically meaningful cutoff scores that can guide the decision making of health care providers and researchers who study populations with attention deficit problems.

Third, in the context of these studies, we were only able to determine the test–retest reliability of the SRS over a relatively short period of time. Although the stability coefficient was respectable, it was not as large as the stability coefficients of other trait-like personality measures (Costa & McCrae, 1992). Thus, this test–retest reliability should be interpreted with caution, and future research needs to examine the questionnaire’s stability over longer periods of time.

In summary, the findings from these studies provide reasonable evidence for the utility of the SRS and suggest it may be a brief assessment of attention control in goal pursuit with promising psychometric characteristics. Although the instrument has not been extensively used in clinical research, we believe that the SRS may be useful in a variety of areas such as health-change intervention studies (e.g., exercise programs, weight loss programs, etc.) or rehabilitation research with adults (Schwarzer, 2001). In personality research, the SRS may serve as a valuable screening instrument when individuals need to be preselected based on a specific set of self-regulatory abilities or when researchers are interested in explicating the relations between dispositional variables and more state-like processes (see Hooker & McAdams, 2003).

Appendix

Self-Regulation Scale^a

1. I can concentrate on one activity for a long time, if necessary.

1	2	3	4
Not at all true	Barely true	Somewhat true	Completely true

2. If I am distracted from an activity, I don’t have any problem coming back to the topic quickly.
3. If an activity arouses my feelings too much, I can calm myself down so that I can continue with the activity soon.
4. If an activity requires a problem-oriented attitude, I can control my feelings.
5. It is difficult for me to suppress thoughts that interfere with what I need to do. (–)
6. I can control my thoughts from distracting me from the task at hand.
7. When I worry about something, I cannot concentrate on an activity. (–)
8. After an interruption, I don’t have any problem resuming my concentrated style of working.
9. I usually have a whole bunch of thoughts and feelings that interfere with my ability to work in a focused way. (–)
10. I stay focused on my goal and don’t allow anything to distract me from my plan of action.

Note. Items marked with a en dash (–) need to be reversed before the total score is calculated.

^aSchwarzer, Diehl, and Schmitz (1999).

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TABLE 1
Study 1: Correlations of the Self-Regulation Scale With Criterion Measures

Variable	1	2	3	4	5
1. Attention control (SRS)	—				
2. Proactive coping (PCS)	.55	—			
3. General self-efficacy (GSES)	.58	.73	—		
4. Academic self-efficacy (ASES)	.21	.22	.23	—	
5. Depressive symptoms (CES-D)	-.42	-.37	-.36	-.12	—

Note. $N = 443$. All correlations are significant at $p < .01$ or less. SRS = Self-Regulation Scale; PCS = Proactive Coping Scale; GSES = General and Self-Efficacy Scale; ASES = Academic Self-Efficacy Scale; CES-D = Center for Epidemiology Studies Depression Scale.

TABLE 2

Standardized Regression Weights of Hierarchical Multiple Regression Predicting Academic Performance

Effects	Step		
	1	2	3
Step 1			
Academic self-efficacy	0.29 ***	0.29 ***	0.27 ***
General self-efficacy	0.08	0.09	0.15
Proactive coping	0.04	0.01	0.06
Step 2			
Depressive symptoms		-0.15 **	-0.11
Step 3			
Attention control			0.25 ***
R^2	0.083	0.104	0.145
ΔR^2	0.083 ***	0.021 *	0.041 ***
F	8.52	8.15	9.47
df	3,378	4,377	5,376
ΔF	8.52 ***	6.54 *	13.32 ***

Note. $N = 382$.*
 $p < .05$.**
 $p < .01$.***
 $p < .001$.

TABLE 3

Study 2: Descriptive Statistics of Key Variables

Variable	Young Adults ^a		Middle-Aged Adults ^b		Older Adults ^c		Total Sample	
	M	SD	M	SD	M	SD	M	SD
Attention control (SRS)	28.98, ^{ab}	4.79	31.15 ^a	4.34	31.27 ^b	4.42	30.48	4.63
Proactive coping (PCS)	45.67	5.24	44.73	5.85	43.86	5.53	44.75	5.58
General self-efficacy (GSES)	32.73	3.88	32.56	4.02	31.86	4.31	32.38	4.08
Positive affect (PANAS)	34.70	7.11	34.44	6.52	34.48	6.89	34.54	6.82
Negative affect (PANAS)	19.09 ^a	5.98	16.30, ^{ab}	5.85	14.08, ^{ab}	3.63	16.48	5.63
Depressive symptoms (CES-D)	31.70, ^{ab}	8.70	28.45 ^a	8.79	26.72 ^b	6.82	28.94	8.39

Note. N = 330. Means with the same subscript differ significantly at $p < .05$ or less. SRS = Self-Regulation Scale; PCS = Proactive Coping scale; GSES = General and Self-Efficacy Scale; PANAS = Positive Affect and Negative Affect Scale; CES-D = Center for Epidemiology Studies Depression Scale.

^a n = 109.
^b n = 110.
^c n = 111.

TABLE 4

Study 2: Correlations of the Self-Regulation Scale With Criterion Measures by Age Group

Variable	Young Adults ^a	Middle-Aged Adults ^b	Older Adults ^c	Total Sample
Proactive coping (PCS)	.58**	.65**	.67**	.58**
General self-efficacy (GSES)	.71**	.72**	.62**	.64**
Positive affect (PANAS)	.45**	.33**	.40**	.38**
Negative affect (PANAS)	-.34**	-.39**	-.28*	-.38**
Depressive symptoms (CES-D)	-.54**	-.51**	-.31*	-.49**

Note. $N = 330$. PCS = Proactive Coping scale; GSES = General and Self-Efficacy Scale; PANAS = Positive Affect and Negative Affect Scale; CES-D = Center for Epidemiology Studies Depression Scale.

^a
 $n = 109$.

^b
 $n = 110$.

^c
 $n = 111$.

*
 $p < .01$.

**
 $p < .001$.

TABLE 5

Study 2: Correlations of the Self-Regulation Scale With Goal Variables by Age Group

Variable	Young Adults ^a	Middle-Aged Adults ^b	Older Adults ^c	Total Sample
Determination	.31 **	.27 **	.26 **	.28 ***
Urgency	.26 **	.15	.14	.23 ***
Willingness	.35 ***	.30 **	.22 *	.28 ***
Opportunity	.33 **	.14	.04	.20 ***
Control	.12	.14	.11	.08
Support	.09	.11	.10	.10

Note. $N = 330$.^a $n = 109$.^b $n = 110$.^c $n = 111$.* $p < .05$.** $p < .01$.*** $p < .001$.

TABLE 6
Standardized Regression Weights of Hierarchical Multiple Regression Predicting Goal Commitment and Goal Attainability

Effects	Goal Commitment			Goal Attainability		
	Step			Step		
	1	2	3	1	2	3
Step 1						
General self-efficacy	0.01	0.04	0.11	0.04	0.01	0.01
Proactive coping	0.19*	0.19*	0.17	0.02	0.02	0.02
Positive affect	0.20**	0.25***	.24***	0.21**	0.17*	0.17*
Step 2						
Negative affect		-0.24***	-0.22**		0.02	0.02
Depressive symptoms		-0.13	-0.16*		-0.21*	-0.21*
Step 3						
Attention control			0.18*			0.09
R^2	0.121***	0.155**	0.171*	0.059***	0.091**	0.092
ΔR^2	0.121***	0.034*	0.016*	0.059***	0.032**	0.001
F	15.00	11.92	11.10	6.85	6.47	5.27
df	3, 326	5, 324	6, 323	3, 326	5, 324	6, 323
ΔF	15.00***	6.52**	6.09*	6.85***	5.62**	1.15

Note. $N = 330$.

*

$p < .05$.

**

$p < .01$.

$p < .001$.