



## Impact of repetitive thought and processing mode on goal striving

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### ABSTRACT

**Background and objectives:** Striving to attain personal goals is important for maintaining well-being. Previous research indicates that repetitive thoughts can influence the affect and cognition associated with personal goal strivings. Repetitive thought in the concrete-experiential processing mode improves affect and cognition after a negative event more than does repetitive thought in the abstract-analytic processing mode. We extend this prior work by examining whether repetitive thought directly influences the maintenance of personal goal strivings through a longitudinal survey.

**Methods:** In Study 1, we examined the daily maintenance effect of repetitive thought on personal goal strivings using a multilevel analysis of 29 participants who reported their thoughts and goal strivings daily for one week. In Study 2, participants ( $N = 131$ ) reported their thoughts and goal strivings over 10 weeks, and we examined the maintenance effect of repetitive thought on personal goal strivings every two weeks.

**Results:** Highly repetitive thought in the abstract-analytic processing mode decreased the maintenance of short-term personal goal strivings in individuals with difficult goals. However, highly repetitive thought in the concrete-experiential processing mode increased the maintenance of long-term personal goal strivings in individuals with difficult goals.

**Limitations:** The study participants were university students; therefore, we cannot generalize the results to clinical populations or other age groups.

**Conclusion:** Interventions that increase repetitive thought in the concrete-experiential processing mode may be effective in facilitating long-term goal strivings in individuals attempting to overcome difficult situations and achieve important personal goals.

### 1. Introduction

Striving toward personal goals appears important for mental health. Indeed, previous research has demonstrated that low personal goal striving is associated with depressive symptoms (Dickson & Moberly, 2013; Dickson, Moberly, O'Dea, & Field, 2016; Monti & Rudolph, 2017) and reduced well-being (Hennecke & Brandstätter, 2017; Steca et al., 2016; Wrosch, Scheier, Miller, Schulz, & Carver, 2003). This is particularly evident when striving for difficult goals because individuals frequently confront failure and are at increased risk of disengaging from their goals (Herrmann & Brandstätter, 2013). Previous research suggests that factors such as negative affect or cognitions (e.g., low confidence or low sense of control) in the context of personal goal strivings thwart the maintenance of such pursuits (Brandstätter, Herrmann, & Schüler, 2013; Hennecke & Brandstätter, 2017). Repetitive thoughts,

such as those in rumination, usually occur after negative events in the context of striving for personal goals (Dickhäuser, Buch, & Dickhäuser, 2011; Martin & Tesser, 1996), and tend to exacerbate negative affect or cognitions after failure. These thoughts can result in excessive fixations on past failures and increase failure-related stagnation (Gorlin & Teachman, 2017; Jones, Papadakis, Orr, & Strauman, 2013; Roberts, Watkins, & Wills, 2013). Moreover, previous research found that increasing or decreasing repetitive thought is related to goal pursuit (Trincas, Schepisi, Leombruni, Di Mauro, & Mancini, 2018); for example, increased rumination is associated with low-level success goals (Moberly & Watkins, 2010). Although there is some evidence for the relationship between repetitive thought and goal pursuit, few studies have examined the effect of repetitive thought on goal strivings in a natural setting. Therefore, we conducted two studies to examine whether naturally occurring repetitive thoughts impact striving for and the

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maintenance of personal goals across two different time periods.

Repetitive thoughts involve “the process of thinking attentively, repetitively, or frequently about one’s self and one’s world” (Segerstrom, Stanton, Alden, & Shortridge, 2003). Repetitive thought is a construct that is included in other constructs of repetitive thought such as rumination and worry (Segerstrom et al., 2003). Although automatic thought is believed to increase depression, this type of thought is too brief and provides only shorthand appraisals (Papageorgiou & Wells, 2004). Repetitive thoughts, however, are recurrent and chaining thoughts (Segerstrom et al., 2003). Thus, the duration of thought is the primary difference between automatic thought and repetitive thought. Watkins (2008) concluded that the adaptive feature of repetitive thought is determined by the flexible use of different processing modes. Processing mode can be divided into abstract-analytic repetitive thought (AAT) and concrete-experiential repetitive thought (CET). The former refers to evaluative thought concerning the causes, meanings, implications, and consequences of one’s life experiences; they are high-level and cross-situational (“why”-type questions). In contrast, CET refers to low-level, specific, and contextual thoughts that relate to actual problem-solving and identifying the context of a problem (“how”-type questions). Previous research shows that AAT is unconstructive repetitive thought that can increase depression. For example, a longitudinal survey showed that rumination—which is involved in AAT in processing mode theory (Watkins, 2008)—increased depression one year after controlling depression at baseline (Nolen-Hoeksema, 2000). Moreover, compared to AAT, CET modulates negative affect from negative events (Ehring, Szeimies, & Schaffrick, 2009; Watkins, Moberly, & Moulds, 2008). Furthermore, several studies have examined the association between AAT and/or CET and maladaptive outcomes in a clinical setting. For example, an experimental study investigating the relationship between repetitive thought and anomalous reality perception found that AAT increased anomalous reality perception in patients with schizophrenia (Ricarte, Del Rey, Ros, Latorre, & Bernal, 2017); however, CET significantly decreased it in university students (Ricarte, Ros, Fernández, Nieto, & Latorre, 2018). Another experimental study investigating social anxiety disorder showed that AAT induction increased subsequent negative thinking (Nilsson, Lundh, & Viborg, 2012). These results imply that the effect of AAT and CET varies according to the clinical setting.

Prior research on repetitive thought suggests that CET may be more effective than AAT in the maintenance and pursuit of personal goals, because CET can modify negative impacts of negative events on affect and cognition (Watkins, 2008). It may be useful to consider the relationship between the processing mode of repetitive thought and goal strivings from the standpoint of Action/Goal Identification (A/GI; Watkins, 2011), which hypothesizes that performance is determined by the interaction between processing mode and goal difficulty. For instance, A/GI predicts that AAT reduces individual performance for challenging goals such as difficult or unfamiliar situations, which often include negative events (e.g., failure), as it reinforces negative biases toward potential failures and reduces confidence associated with goals. Another important theory related to rumination, Self-Regulatory Executive Function (S-REF; Wells & Matthews, 1996), posits that ruminative cognition is associated with focusing automatic attention on negative stimuli. This theory maintains that several distinct types of cyclical processing support rumination (Matthews & Wells, 2004). In particular, this theory suggests that rumination promotes lower level networks to focus on negative stimuli automatically, which increases rumination (Matthews & Wells, 2004). Thus, this theory implies that rumination increases one’s focus on negative stimuli, and this vicious circle may prevent goal pursuit. On the other hand, A/GI hypothesizes that CET enhances individual performance for high difficulty goals because it can facilitate flexible problem-solving and modify feelings of failure. Following A/GI, the present study investigated the interaction effects between processing mode and goal difficulty on goal strivings.

The research aim was to examine how repetitive thoughts such as

AAT or CET influence goal strivings in relation to personal goal difficulty. It would additionally be interesting to consider the duration of goal pursuit. For instance, to compare someone who maintains their goal striving for a day versus someone who maintains their goal striving over an entire month. The goal can include various activities that need to be maintained over a short time span (e.g., win a soccer game this weekend) or a longer time span (e.g., pass an end-of-semester test six months later). Therefore, we also investigated the effect of time on goal striving, considering both a short time span and a long time span.

## 2. Study 1

To examine the maintenance effect of repetitive thoughts on the pursuit of personal goals over a short time span, we collected responses for a week. Participants first identified an important personal goal and then reported the degree of repetitive thought and goal striving every night for one week via a web-based questionnaire. We analyzed the maintenance effects of repetitive thoughts on goal striving the next day with a multilevel analysis and controlled for personal differences, day effects, characteristics, and depression.

### 2.1. Method

#### 2.1.1. Participants

Twenty-nine participants were recruited from a pool of student volunteers in a large city-based university. Their age ranged from 19 to 21 years ( $M_{age} = 20.03$ ,  $SD = 0.73$ ; 9 men, 20 women). Participants were recruited through paper advertisements distributed during a lecture, and those interested contacted the researchers via e-mail.

#### 2.1.2. Personal goal identification task

We conducted a personal goal decision task with each participant before the experiential sampling method. First, participants were requested to think about and record their important personal goals for 3 min. Thereafter, participants scored the importance of their personal goals and decided what their most important personal goals were. Finally, participants rated the difficulty of their personal goals from 1 (*very easy*) to 7 (*very difficult*).

#### 2.1.3. Trait measures

**Depressive symptoms.** We used the Japanese version of the Beck Depression Inventory—Second Edition (BDI; Kojima & Furukawa, 2003) to measure depressive symptoms. The BDI comprises 21 items concerning depressive symptoms that may have occurred within the last two weeks and is rated on a 4-point Likert scale. Total scale scores range from 0 to 63, with a higher score indicating more depressive symptoms.

**Behavioral inhibition and activation.** We used the Japanese version of the Behavioral Inhibition and Behavioral Activation Scales (BIS/BAS) developed by Takahashi et al. (2007) to assess participants’ trait behavioral inhibition and activation in order to control baseline interpersonal differences in temperament that would have allowed them to activate or inhibit personal goals. The scale consists of 20 items and is divided into two parts: the Behavioral Inhibition Systems (BIS), which measures tendencies to avoid punishments using seven items, and the Behavioral Activation Systems (BAS), which measures tendencies to approach rewards using thirteen items. Individuals rate their tendency to activate or inhibit behavior concerning rewards or punishments on a 4-point Likert scale (1 = *do not agree*, 4 = *agree*).

#### 2.1.4. Daily measures

**Processing mode of repetitive thought.** To measure the processing mode of repetitive thought, we used the Japanese version of the Mini-CERTS (CERTS; Kambara, Kira, & Ogata, 2018). This scale measures repetitive thought, beginning with the statement “when thoughts about myself, feelings, situations, or events come to mind ...” and is followed

by the selection of responses on a 4-point scale (1 = *almost never*, 4 = *always*). We modified this scale to measure participants' responses concerning each item daily. The questionnaire assesses two dimensions: AAT (e.g., "my thinking tends to get stuck in a rut, involving only a few themes") and CET (e.g., "I can grasp and respond to changes in the world around me without having to analyze the details"). High scores on the AAT and CET subscales suggest a tendency to engage in each type of thinking. The internal consistency for the CERTS in this study's sample was moderate (AAT:  $\alpha = .73$ ; CET:  $\alpha = 0.69$ ).

**Strivings toward the most important personal goals that the participants had selected.** The five-item questionnaire developed by Low, Overall, Hammond, and Girme (2017) was used to assess participants' goal-directed efforts. We modified the questionnaire items to state "today" instead of "two weeks" (e.g., "I put a lot of effort into achieving this goal today"). Each item measured the degree to which individuals pursued their goal daily and was rated using a 7-point scale (1 = *not at all*, 7 = *very*). The internal consistency for this scale in this study's sample was good ( $\alpha = 0.89$ ).

2.1.5. Procedure

This study had two steps. First, each participant met the experimenter individually and completed a questionnaire assessing his/her depressive symptoms and behavioral inhibition and activation. The participants subsequently engaged in the personal goal identification task to determine the one most important personal goal that they aimed to achieve in one week. Each participant registered his/her e-mail address, which was received via a URL (Uniform Resource Locator) provided in the questionnaire.

Second, every night for one week, participants self-evaluated their AAT, CET, and goal strivings with respect to their personal goal via a web-based questionnaire. Thereafter, participants visited the experimental room and received a book voucher worth 1000 yen (approximately \$8 US) for their participation. The Ethics Committee of the Graduate School of Education in Hiroshima University approved this study.

2.1.6. Statistical analysis

Our primary analyses modeled the lagged effects of AAT or CET on subsequent striving for personal goals. Moreover, our data were constructed such that each occasion was nested in each individual. To do this, we conducted a multilevel analysis based on Low et al. (2017) and examined the lagged effects of thought suppression on personal goal progress. We examined AAT, CET, goal difficulty, and the interaction effects of AAT and/or CET as well as whether goal difficulty at day *t* predicted goal strivings at day *t* + 1 (i.e., the next day), while controlling for depression, behavioral inhibition and activation, and goal strivings at day *t*. Thus, we tested whether repetitive thought could explain the maintenance of goal strivings in the subsequent days by controlling variables, depression, and personal characteristics at day *t*. The equation of the multilevel analysis is as follows.

Level 1: (day level)

$$GS_{(t+1)i} = \beta_{0i} + \beta_{1i}AAT_{it} + \beta_{2i}CET_{it} + \beta_{3i}GS_{it} + r_{it}$$

level 2: (personal level)

$$\beta_{0i} = \gamma_{00} + \gamma_{01}Dif_i + \gamma_{02}BDI_i + \gamma_{03}BIS_i + \gamma_{04}BAS_i + u_{0i}$$

$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21}Dif_i$$

$$\beta_{3i} = \gamma_{30} + \gamma_{31}Dif_i$$

Note. *t* = the number of measuring times; *i* = the number of participants; GS denotes strivings toward the most important personal goals that the participants had selected; Dif denotes goal difficulty.

All predictor variables were grand-mean centered. The multilevel analysis was conducted using R 3.4.3 with the lmerTest package and

**Table 1**  
Descriptive statistics (study 1).

Repetitive Measure	Mean	SD	Trait Measure	Mean	SD
AAT	12.05	3.16	Depression	8.90	7.39
CET	11.40	3.26	Behavioral inhibition	22.10	3.64
Goal strivings	19.55	7.65	Behavioral activation	39.45	4.92
			Goal difficulty	6.24	1.95

Note. AAT = abstract analytical repetitive thought; CET = concrete experiential repetitive thought.

simple slope effects were calculated using Preacher's web site (<http://www.quantpsy.org/interact/hlm2.htm>).

2.2. Results

The demographic variables are shown in Table 1

We sent 203 e-mails and received 171 responses. The participants answered the web-based questionnaire 6.15 times on average, and this was considered a high rate. We classified individual goals based on the categories in Low et al.'s (2017) research on personal goal striving. The identified personal goals focused on academic achievement (34%), fitness and health (24%), a variety of other types of self-improvement (27%), finances (3%), and career/vocational advancement (10%).

Using multilevel analysis, we calculated interclass correlation coefficients and examined their effect on personal variance in goal strivings. The results of the multilevel analysis are shown in Table 2.

The null model indicated that the personal-level variance contributed to the overall variance (interclass correlation = 0.31). Second, we examined the effects of repetitive thought on personal goal strivings (Model 2). We entered repetitive thought (AAT and CET), goal difficulty, and the interaction of AAT × goal difficulty and CET × goal difficulty at day *t* as predictor variables, and goal strivings at day *t* + 1 as an objective variable, while controlling for trait variables (i.e., depressive symptoms and behavioral inhibition and activation). We calculated the adjusted *R* square and found it to be significant in Model 2 (Adj *R*<sup>2</sup> = 0.102, *F* (9, 39) = 2.34, *p* < .05). The results showed that goal strivings at day *t* predicted an increase in goal strivings at day *t* + 1 (*b* = 1.49, *SE* = 0.64, *p* < .05). Furthermore, AAT at day *t* predicted a decrease in goal strivings at day *t* + 1 (*b* = -1.46, *SE* = 0.71, *p* < .05). In line with our hypothesis, the interaction between AAT and goal difficulty was significant (*b* = -1.23, *SE* = 0.61, *p* < .05).

With regard to the simple slope effect of AAT on higher difficulty goals, AAT predicted a decrease in goal strivings at day *t* + 1

**Table 2**  
The lagged effects on goal strings the next day (study 1).

Fixed effects	Model 1 (Null model)	Model 2
	Coefficient (SE)	Coefficient (SE)
Intercept	19.58 (0.96)	19.92 (0.98)
AAT		-1.46 (0.71) *
CET		0.08 (0.76)
Goal difficulty		-0.29 (0.97)
AAT * Goal difficulty		-1.23 (0.61) *
CET * Goal difficulty		0.41 (0.79)
Goal strivings		1.49 (0.64) *
Depression		1.49 (1.17)
Behavioral inhibition		-0.57 (1.19)
Behavioral activation		0.65 (1.03)
Random effects	Variance componet (SE)	Variance component (SE)
Level 1	40.67 (6.37)	37.49 (6.12)
Level 2	18.58 (4.31)	16.56 (4.06)
Interclass correlation	0.31	

Note. AAT = abstract analytical repetitive thought; CET = concrete experiential repetitive thought.

\**p* < .05.

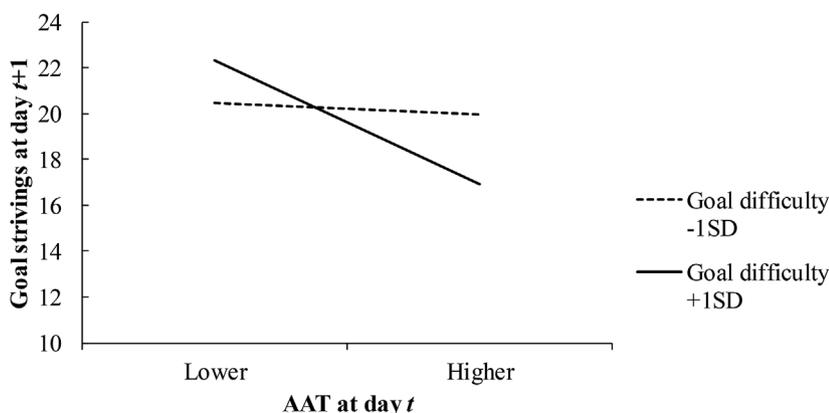


Fig. 1. AAT × goal difficulty predicting goal strivings for the next day (study 1).

( $b = -2.69, SE = 1.07, p < .05$ ; Fig. 1), but did not predict lower goal difficulty goals.

In summary, only AAT predicted goal strivings for the next day when confronted with a difficult personal goal.

### 3. Study 2

To expand our understanding of the long-term maintenance effects of repetitive thought on goal striving, we conducted a longitudinal investigation over two-week spans, for 10 weeks. We assessed participants' repetitive thought (i.e., AAT and CET) and goal strivings every two weeks and analyzed their associations using a multilevel analysis while controlling for personal differences, characteristics, and depression. We also examined goal-related stress and goal progress, which are factors that affect personal goal strivings (Low et al., 2017).

#### 3.1. Method

##### 3.1.1. Participants

A total of 131 participants were recruited from a pool of student volunteers ( $M_{age} = 21.07$  years,  $SD = 0.57$ ; 51 men, 81 women). Participants were recruited through paper advertisements distributed in a lecture. Interested participants answered the first questionnaire on paper and subsequently received an e-mail including the web-based questionnaire's URL. At the end of the survey, participants visited our experimental room and received a debriefing.

##### 3.1.2. Trait measures

**Behavioral inhibition and activation.** This study also required assessing participants' activation or inhibition regarding their personal goals. Therefore, we used the BIS/BAS.

##### 3.1.3. Two-week measures

**Depressive symptoms.** We used the BDI to measure depressive symptoms; however, unlike in Study 1, it was completed every two weeks.

**Processing mode of repetitive thoughts.** We used the CERTS to measure the processing mode of repetitive thoughts and modified it such that each item was assessed at two-week intervals. The internal consistency for the CERTS in this sample was moderate (AAT:  $\alpha = 0.67$ ; CET:  $\alpha = 0.74$ ).

**Strivings toward the most important personal goals that the participants had selected.** Similar to Study 1, we used the five-item questionnaire developed by Low et al. (2017) for assessing participants' goal-directed efforts. The internal consistency for the scale in this sample was good ( $\alpha = 0.88$ ).

**Progress of personal goals.** To consider the effects of goal pursuit on

psychological health, we examined progress toward personal goals and asked participants their actual goal progress and achievement using three items developed by Low et al. (2017), such as "I have made great progress toward this goal in the last 2 weeks." Each item was rated using a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

**Perception of goal stress.** To assess the stress associated with the personal importance of goal pursuit, we used six items developed by Low et al. (2017). We asked participants their negative emotional states and the degree that they felt "stressed," "worried," "anxious," "sad," "hopeless," and "discouraged" about their goal. Each item was rated using a 7-point scale (1 = *not at all*, 7 = *very*).

**Importance of personal goal and goal difficulty.** In Study 2, we asked participants to write down the goal they thought was the most important to pursue. Thereafter, the participants scored their personal goal difficulty from 1 (*very easy*) to 7 (*very difficult*).

#### 3.1.4. Procedure

Participants completed an initial paper questionnaire (T1) and were subsequently emailed links to online questionnaires at two-week intervals over the following two months (T2–T5). These questionnaires assessed the attributes/characteristics of their important personal goals and scored the difficulty of each of these goals; they also assessed the processing mode of repetitive thoughts, depressive symptoms, and goal-related questions. The questionnaire at T1 only included a trait measure. After completing the study, participants visited the experimental room and received a voucher worth 500 to 2000 yen (approximately \$4 to \$16 US). The compensation varied in order to incentivize the number of responses—participants received 2000 yen for completing all of the questionnaires. The Ethics Committee of the Graduate School of Education in Hiroshima University approved this study.

#### 3.1.5. Statistical analysis

The primary analyses were similar to those in Study 1. We conducted multilevel analyses to examine whether processing mode and the interaction effects of processing mode and goal difficulty at time  $t$  predicted goal strivings at time  $t + 1$  (i.e., the next two weeks), while controlling for behavior inhibition and activation, goal difficulty, goal strivings, goal stress, and goal progress at time  $t$ . The equation is as follows.

Level 1: (two weeks level)

$$GS_{(t+1)i} = \beta_{0i} + \beta_{1i}AAT_{ti} + \beta_{2i}CET_{ti} + \beta_{3i}GS_{ti} + \beta_{4i}Dif_{ti} + \beta_{5i}Dif_{ti} * AAT_{ti} + \beta_{6i}Dif_{ti} * CET_{ti} + \beta_{7i}Dep_{ti} + \beta_{8i}Stress_{ti} + \beta_{9i}Progress_{ti} + r_{ti}$$

level 2: (personal level)

$$\beta_{0i} = \gamma_{00} + \gamma_{01}BIS_i + \gamma_{02}BAS_i + u_{0i}$$

$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

$$\beta_{4i} = \gamma_{40}$$

$$\beta_{5i} = \gamma_{50}$$

$$\beta_{6i} = \gamma_{60}$$

$$\beta_{7i} = \gamma_{70}$$

$$\beta_{8i} = \gamma_{80}$$

$$\beta_{9i} = \gamma_{90}$$

Note. *t* = the number of measuring times; *i* = the number of participants; GS denotes strivings toward the most important personal goals that the participants had selected; Dif denotes goal difficulty; Stress denotes the perception of goal stress; Progress denotes the progress of personal goals.

All predictor variables were grand-mean centered.

### 3.2. Results

The demographic variables are shown in Table 3. We obtained 389 responses from the 131 participants, of whom 39 (29%) completed all five questionnaires; 27 (20%), four questionnaires; 10 (7%), three questionnaires; 8 (6%), two questionnaires; and 47 (35%), one questionnaire. We classified the participants' pursued goals as in Study 1: academic achievement (17%), fitness and health (12%), a variety of other types of self-improvement (26%), relationship with others (1%), finances (3%), and career/vocational advancement (38%).

Using multilevel analysis, we calculated interclass correlation coefficients and examined their effect on personal variance in goal strivings. The results of the multilevel analysis are shown in Table 4. The null model indicated that the personal-level variance contributed to the overall variance (interclass correlation = 0.35). Second, we examined the effects of repetitive thought on personal goal strivings (Model 4). We entered repetitive thought, goal difficulty, and the interaction of both at time *t* as predictor variables, and goal strivings at time *t* + 1 as an objective variable while controlling for trait variables, such as behavioral inhibition and activation, and time *t* variables, such as goal strivings, depressive symptoms, goal-related stress, and goal progress. We calculated the adjusted R square and found it to be significant in Model 4 (Adj *R*<sup>2</sup> = 0.369, *F* (11, 124) = 17.40, *p* < .001). The results showed that goal strivings at time *t* predicted an increase in goal strivings at time *t* + 1 (*b* = 2.28, *SE* = 0.5, *p* < .01). Consistent with our hypothesis, the interaction between CET and goal difficulty

**Table 3**  
Descriptive statistics (study 2).

Measure	Week 0		Week 2		Week 4		Week 6		Week 8	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
AAT	15.24	3.36	15.47	3.21	15.64	3.67	14.47	3.80	14.40	3.86
CET	14.97	3.34	15.14	3.01	15.01	3.06	14.76	3.74	14.25	3.52
Goal strivings	19.94	6.73	20.55	5.92	18.68	7.30	19.85	6.79	21.87	6.30
Depression	10.87	8.14	11.19	10.54	10.65	10.67	8.37	9.20	7.67	7.74
Goal related stress	22.48	8.55	22.99	9.36	24.78	7.35	24.73	8.19	23.42	9.03
Goal progress	10.70	4.25	10.77	4.12	10.27	3.83	11.03	4.06	12.00	4.09
Goal difficulty	4.96	1.33	5.08	1.37	5.00	1.37	5.18	1.34	4.98	1.57
Behavioral inhibition	21.73	4.09	-	-	-	-	-	-	-	-
Behavioral activation	39.38	5.49	-	-	-	-	-	-	-	-

Note. AAT = abstract analytical repetitive thought; CET = concrete experiential repetitive thought.

**Table 4**  
The lagged effects on goal strings the next two weeks (study 2).

Fixed effects	Model 3 (Null model)	Model 4
	Coefficient (SE)	
Intercept	20.24 (0.55)	19.16 (1.42)
AAT		0.61 (0.60)
CET		-.05 (0.45)
Goal difficulty		-.69 (0.46)
AAT * Goal difficulty		0.35 (0.41)
CET * Goal difficulty		1.55 (0.48) **
Goal strivings		2.28 (0.50) **
Depression		-.35 (0.44)
Behavioral inhibition		-.39 (0.61)
Behavioral activation		0.56 (0.45)
Goal progress		-.38 (0.55)
Goal stress		0.04 (0.05)
Random effects	Variance componet (SE)	Variance component (SE)
Level 1	28.37 (5.32)	36.02 (6.00)
Level 2	15.86 (3.98)	0.00 (0.00)
Interclass correlation	0.35	

Note. AAT = abstract analytical repetitive thought; CET = concrete experiential repetitive thought.

\*\**p* < .01.

was significant (*b* = 1.55, *SE* = 0.48, *p* < .01).

The simple slope effect of CET on higher difficulty goals showed that CET predicted an increase in goal strivings at time *t* + 1 (*b* = 1.49, *SE* = 0.68, *p* < .05; Fig. 2). On the other hand, for lower difficulty goals, CET predicted a decrease in goal strivings at time *t* + 1 (*b* = -1.61, *SE* = 0.71, *p* < .05; Fig. 2).

In summary, higher CET promoted the maintenance of goal strivings only when the personal goal was difficult.

### 4. Discussion

Our aim was to reveal whether repetitive thought affects goal pursuit in the context of goal difficulty. The results indicated that the interaction effect of repetitive thought and goal difficulty on goal strivings differed between survey intervals. Over short-term intervals, AAT compromised the maintenance of personal goal strivings among individuals with difficult goals (Study 1). Over long-term intervals, CET promoted the maintenance of personal goal strivings among individuals with difficult goals, but reduced it among those with easy goals (Study 2).

Interestingly, this study revealed, for the first time, that repetitive thoughts influenced the maintenance of personal goal strivings for difficult goals, but not for easy goals; these effects were affected by the duration of goal pursuit. Our study demonstrated that high AAT prevented the maintenance of difficult goal strivings only in the short term. Previous research indicates that AAT increases focus on higher order

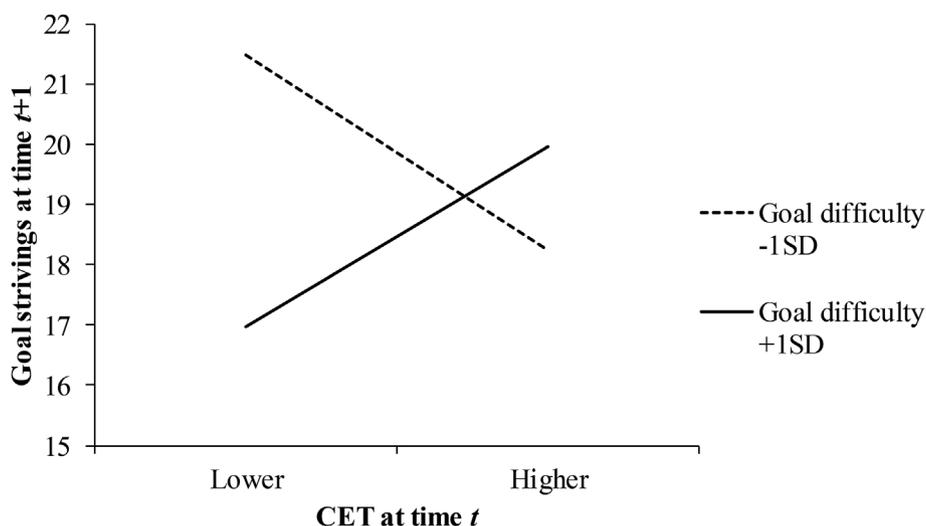


Fig. 2. CET X goal difficulty predicting goal strivings over the next two weeks (study 2).

information that includes past-, future-, and self-related content (Watkins, 2011). Moreover, a recent meta-analysis investigating the association of AAT with cognitive control determined that AAT makes it difficult to discard negative information (Zetsche, Bürkner, & Schulze, 2018). Therefore, AAT may prevent disengagement from negative images, which is caused by difficult goal-related information, and this would decrease concentration during task performance. Furthermore, this result implied that rumination may prevent behavioral activity; thus, interventions for rumination may be effective for behavioral activation. In fact, behavioral activation is included in an intervention module for rumination (Martel, Addis, & Jacobson, 2001). However, we did not find that AAT prevented goal striving over a two-week interval. This implies that interventions for decreasing rumination may not influence behavioral activation in a nonclinical setting. Future research should investigate whether there are differences in the effect of AAT on goal striving for two weeks between clinical and nonclinical settings. Moreover, it should be noted that our finding that AAT did not influence goal striving in the long term is not consistent with A/GI, which argues that AAT enhances the maintenance of higher order goals (Watkins, 2011). This difference may be caused by our research design, in which we asked participants what goals they had, which may have let them focus on their goals too concretely. In fact, most participants stated specific goals such as “pass the test to be a teacher.” Future research should examine the interaction effect between processing mode and goal abstractness on goal strivings.

Additionally, CET contributed to the maintenance of difficult goal strivings in the long term. It is suggested that CET is able to increase the flexibility of decision-making (Watkins, 2011). For instance, previous research has shown that individuals introduced to CET had more enhanced problem-solving compared to those introduced to AAT (Watkins & Moulds, 2005). However, our results indicated that the promotive effect of CET on difficult personal goal striving is only effective in the long term, not the short term. The effect of CET on difficult personal goal striving is consistent with A/GI; however, A/GI does not account for time/time period/time span, and therefore, our result is inconsistent with this previous finding (Watkins & Moulds, 2005). Our research implies that CET may be effective in increasing goal striving only in the long term. In fact, previous research showed that increasing vivid future thinking in depressive patients, which is similar to CET, increased the anticipation of how pleasurable future events would be (Hallford, Sharma, & Austin, 2019). Thus, CET may make speculating about the future more effective and help individuals promote their goal strivings in long-term settings; however, this effect would not occur in the short term.

The present findings have some implications. First, CET may be a key factor in overcoming difficult situations and achieving important goals. An intervention that increases CET may contribute to the reduction and prevention of depression, because increasing CET maintains difficult goal strivings, which is associated with well-being (Dickson et al., 2016; Dickson & Moberly, 2013; Hennecke & Brandstätter, 2017; Monti & Rudolph, 2017; Steca et al., 2016; Wrosch et al., 2003). Moreover, although existing rumination interventions try to decrease rumination, which is included in AAT in processing mode theory, it may be more useful to increase CET in order to decrease depression. Second, there may be differential effects of repetitive thought on personal goal strivings over time. However, most previous research on processing mode examined short-term effects, including how processing mode affected moods or cognition (e.g., Kingston, Watkins, & Nolen-Hoeksema, 2014; Watkins et al., 2008). Moreover, in A/GI, there is little consideration of the differential effects of abstract or concrete processing modes as a function of time (Watkins, 2011). Further research is needed to investigate the interaction effect between processing mode and time interval on goal strivings.

Although our results are encouraging, several limitations should be considered when interpreting them. First, the study samples consisted of only non-clinical participants. Therefore, we cannot indicate whether these findings can be adapted to clinical settings. Second, it should be noted that pursuing only one personal goal is not necessary for promoting well-being. For example, re-engage other significant personal goals may also promote well-being. Finally, we examined the interaction effect of processing mode and goal difficulty on personal goal pursuit in university students; therefore, the findings cannot be generalized to other age groups.

Despite these limitations, the present results are promising and support the idea that the processing mode of repetitive thought affects personal goal strivings. The findings revealed that AAT decreased the maintenance of difficult personal goal strivings in the short term. Conversely, CET increased the maintenance of difficult personal goal strivings in the long term. Interventions that increase CET may improve the goal strivings of individuals who are confronted with significant and challenging personal goals.

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