

The Influence of an Abstract vs. Concrete Thinking Style on Thinking in Verbal Thoughts, Imagery, State Repetitive Negative Thinking, and Resilience

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Abstract

Research suggests that repetitive negative thinking (RNT) is characterized by abstract thinking (AT) which predominantly involves verbal thoughts in order to avoid more emotional imagery. As opposed to AT, concrete thinking (CT) appears to be more constructive in terms of long-term beneficial effects. Whereas RNT is considered a risk factor for various disorders, resilience appears to be a protective factor. In the current study, the effects of AT vs. CT on verbal thoughts, imagery, state RNT and resilience were examined by means of a training in either AT or CT and a subsequent stress induction. Based on previous research, it was hypothesized that the participants in the AT-condition would report more verbal thoughts, less imagery, more state RNT, and less resilience compared to the participants in the CT-condition. Although randomization succeeded, it is questionable whether manipulation was successful. Therefore, the results should be interpreted with great caution. Results of ANCOVAs showed only a significant effect of condition on verbal thoughts after the stress induction subsequent to the training, with a higher score in the AT-condition than in the CT-condition, as expected. No effects of condition were found on imagery, state RNT, and resilience. These unexpected results are mainly due to the shortened format of the training, which showed not to be effective in inducing AT and CT. Further research is necessary in order to clarify the effects of thinking styles on verbal thoughts, imagery, state RNT, and resilience (using the full training format) in nonclinical samples from a prevention perspective.

Keywords: Abstract thinking, Concrete thinking, Verbal thoughts, Imagery, Repetitive negative thinking, Resilience

The Influence of an Abstract vs. Concrete Thinking Style on Thinking in Verbal Thoughts, Imagery, State Repetitive Negative Thinking, and Resilience

Repetitive negative thinking (RNT) appears to be present amongst a wide variety of disorders (Ehring & Watkins, 2008; Harvey et al., 2004). Ehring and Watkins (2008) describe the process of RNT as “excessive and repetitive thinking about current concerns, problems, past experiences, and concerns about the future” (p. 192). The most researched types of RNT are rumination and worry. Rumination is defined as “behaviors and thoughts that repetitively focus one’s attention on one’s depressive symptoms and on the implications of these symptoms” (Nolen-Hoeksema, 1991, p. 569). Rumination plays a role in the onset and maintenance of depression and is also related to the development of anxiety (see review Nolen-Hoeksema et al., 2008). Worry, on the other hand, is defined as “a chain of thoughts and images, negatively affect-laden, and relatively uncontrollable. The worry process represents an attempt to engage in mental problem-solving on an issue whose outcome is uncertain, but contains the possibility of one or more negative outcomes” (Borkovec et al., 1983, p. 10). Worry also plays a role in the development of anxiety disorders and depression (see review Topper et al., 2010). Several studies support the idea that worry and rumination share the same process in that they’re repetitive, difficult to control, and are focused on negative content. The only characteristic that has been consistently found to distinguish worry and rumination is orientation in time. Whereas worry is focused on future events, rumination focusses on past events (see review Ehring & Watkins, 2008). Because worry and rumination show more similarities than differences across various disorders, RNT can be considered a transdiagnostic process (Ehring & Watkins, 2008; Harvey et al., 2004; McEvoy et al., 2013). Therefore, it is argued that research should focus on one common underlying thinking process rather than distinct types. It is implicated that measuring RNT as a transdiagnostic process is more efficient than separate measures for each disorder because it

applies to a variety of diagnoses. Moreover, if the process of RNT is found across different diagnoses, successful interventions for one disorder may be applicable to other diagnoses as well (McEvoy et al., 2010).

The process of RNT can have several consequences (see review Watkins, 2008). In his review, Watkins makes a distinction between constructive and unconstructive consequences of RNT. One of the properties that accounts for the distinct consequences is the level of construal, which refers to an abstract or concrete thinking style. Research suggests that RNT is characterized by abstract thinking (AT) (Borkovec et al., 1998; Stöber & Borkovec, 2002; Watkins et al., 2008; Watkins & Moulds, 2005). AT includes thoughts about general causes, meanings, and consequences of the symptoms and events, and is defined as “indistinct, cross-situational, equivocal, unclear, aggregated” (Stöber & Borkovec, 2002, p. 92). According to Borkovec and colleagues (1998), AT predominantly involves verbal thoughts, functions as a type of cognitive avoidance, and might serve as a distraction (in terms of avoidance) from even more distressing emotional material. They propose that AT is less closely connected to physiological systems than imagery. Several studies showed that imagery yields greater emotional responses compared to verbal thoughts (see review Holmes & Mathews, 2010). Borkovec and Hu (1990) examined the physiological responses during imagery by comparing the heart rate of participants who were either instructed to apply AT, or to perform a relaxation exercise before the subsequent imagery exercise. They observed lower average heart rates in the AT-condition than in the relaxation condition. Foa and Kozak (1986) stated that for emotional processing to be successful, activation of physiological responses is required. Therefore, in the avoidance theory of worry, Borkovec and colleagues (1998) propose that AT serves as a mechanism to avoid imagery and thereby physiological and emotional responses, which in turn inhibits emotional processing of stressful experiences.

As opposed to AT, concrete thinking (CT) contains more detailed, situation-specific and image-based representations of particular experiences (Watkins et al., 2008; Watkins & Moulds, 2005). CT is defined as “distinct, situationally specific, unequivocal, clear, singular” (Stöber & Borkovec, 2002, p. 92). Watkins (2008) reviewed several experimental studies that induced CT, whereby participants were asked to focus on subordinate, contextual, specific, and incidental details of events and actions. He concluded that CT has more constructive consequences than AT, such as improved problem-solving, reduced overgeneral autobiographical memory recall, and reduced negative global self-evaluations. This implicates that therapy for mental disorders in which RNT plays a role (e.g., depression and anxiety), should focus on changing the thinking style from AT to CT. For that purpose, Watkins and colleagues (2009) developed the Concreteness Training, with a minimum duration of six weeks and daily practicing (Watkins et al., 2011).

In sum, research has demonstrated that RNT plays an important role in the onset and maintenance of depression and anxiety. RNT is characterized by AT, which is responsible for the unconstructive consequences. Evidence suggests that changing AT to CT through Concreteness Training is effective in reducing RNT and level of depression (Watkins et al., 2011).

Thus far, apart from the beneficial effects of CT, no studies have investigated the effect of thinking styles on protective factors for depression, while these could contribute to broadening the perspective on the effects on well-being in general from a prevention perspective, instead of focusing on the effects of thinking processes on psychopathology alone. Whereas RNT appears to be a risk factor for depression, resilience appears to be a protective factor (Hoorelbeke et al., 2016). Resilience is described as the process of adapting well in the face of adversity, trauma, tragedy, and threats of significant sources of stress. It means “bouncing back” from difficult experiences (American Psychological Association,

2011). Evidence suggests that those who have a higher tendency to RNT, are less resilient when they have to deal with aversive events (Min et al., 2013). However, the correlational study design did not allow to draw conclusions regarding the causal effect of RNT on resilience. Therefore, additional experimental research is necessary in order to investigate the causal relationship.

The current experimental study will examine to what extent a brief training in thinking styles influences thinking in verbal thoughts vs. imagery, state RNT, and the level of resilience. One group will receive training in AT, whilst the other group receives training in CT. After the training phase, both conditions will be asked to think about a hypothetical stressor to see whether the induced thinking style will be applied. Both the direct effects of the training in AT and CT and the effects of the training after thinking about a hypothetical stressor will be examined.

First, based on the avoidance theory of worry of Borkovec and colleagues (1998), it is hypothesized that the AT-condition will report more verbal thoughts than the CT-condition, whereas the CT-condition will report more imagery than the AT-condition after the training and after the following stress induction. Second, based on Watkins and colleagues (2011), it is hypothesized that participants in the CT-condition will report lower state RNT compared to the AT-condition after both the training and the subsequent stress induction. Third, it is hypothesized that after the training as well as the following stress induction, resilience will be higher scored in the CT-condition than in the AT-condition, given the evidence that a higher tendency to RNT is associated with less resilience (Min et al., 2013), while CT (in the form of mindfulness) is associated with increased resilience to stress (Bajaj & Pande, 2016). It is hypothesized that there will be significant differences after the training phase, but that these differences are possibly stronger when the induced thinking style is applied to a hypothetical stressor (Watkins et al., 2008).

The effects of AT and CT on verbal thoughts vs. imagery and resilience have never been examined thus far. Since resilience appears to be a protective factor for depression and is associated with advantageous treatment outcomes, increased CT, and thereby resilience, it might be an important target in management, recovery, and relapse prevention (Min et al., 2013).

Methods

Participants

A total number of 72 participants started the experiment. Participants with a current diagnosis of a mental illness were excluded from the study ($N = 1$). Another 27 participants were excluded from analyses because the experiment was not completed. The final sample consisted of 44 Dutch speaking participants, of which 19 were male (43.2%) and 25 were female (56.8%). Age categories ranged from 18 to 29 with a mean age falling in the 24-25 years old category. Except for MAVO/VMBO, all levels of education were represented: HAVO (13.6%), VWO (11.4%), MBO (11.4%), HBO/HTS (15.9%), and University (47.7%).

Design

The study has a mixed-subjects design with two experimental conditions consisting of an AT-condition ($N = 20$) and a CT-condition ($N = 24$). Repeated measures of level of verbal thoughts, imagery, and state RNT took place at four times. Resilience was measured at three moments, since no differences between T1 and T2-resilience were expected. The baseline measures of level of verbal thoughts (T1-verbal thoughts), imagery (T1-imagery), state RNT (T1-RNT), and resilience (T1-resilience) were collected at the start of the experiment. The second measurement (T2) of all outcomes (except for resilience) took place after participants were instructed to think about a hypothetical stressor. Hereafter the training phase started, which was followed by the third measurement (T3) of all variables. Subsequent to the

training phase, participants were instructed to think about a hypothetical stressor again, after which the fourth measures (T4) of all outcome variables were gathered.

Procedure

Participants were recruited by means of the Social and Behavioral Sciences research participation system (SONA) from Utrecht University and by spreading an anonymous link to acquaintances. The entire experiment was programmed in Qualtrics for easy accessibility. When the participants started the experiment by clicking on the anonymous link, they received a written explanation of the procedure without telling the purpose of the study. Then participants were asked to give informed consent, by pressing the “yes” button on the screen. Hereafter, participants were asked if they have a current diagnosis of a mental illness with exception of AD(H)D. If so, they could not participate in the study for ethical reasons. Before starting the experiment, baseline measures (T1) of level of verbal thoughts, imagery, and state RNT (see “Measurements”) were collected by means of visual analogue scales (VAS), and resilience was measured by the Brief Resilience Scale (BRS; Smith et al., 2008). Then, participants were instructed to think about a hypothetical stressor for one minute (i.e. “You’re cycling on a country road whereby the nearest town is a few kilometers away. It’s raining hard and you try to get home as soon as possible. While cycling, you hear a loud bang and notice that your front tire is flat. You can’t cycle any further and have to walk a few kilometers through the rain to get home.”), without any specific instructions. Subsequently, the second measurement (T2) of all T1 variables (except for resilience) took place.

Then the training phase (based on Watkins et al., 2008) started in which participants were either trained in AT or in CT, depending on condition (randomly assigned by Qualtrics). During the training, four positive and four negative scenarios were presented. Following every scenario, participants had one minute to think about the scenario as instructed. An example of a positive scenario is: “Today you celebrated your birthday. Your best friend

surprises you by arranging and preparing a surprise dinner for your close friends. You are touched by their effort in going to so much trouble on your behalf, and feel that they must truly value your friendship”. An example of a negative scenario is: “You have arranged a weekend away with a group of four old school friends, and have been looking forward to it for several months. The day before you are due to leave, two of the friends suddenly cancel on you without giving a clear reason. On hearing this, the remaining friend then also tells you that she would prefer not to come along”. Participants in the AT-condition received the following condition-specific instruction: “I would now like you to spend a minute concentrating on this event. Specifically, I would like you to think about why it happened, and to analyze the causes, meanings and implications of this event”. The condition-specific instructions that participants received in the CT-condition were as follows: “I would now like you to spend a minute concentrating on this event. Specifically, I would like you to focus on how it happened, and to imagine in your mind as vividly and concretely as possible a ‘movie’ of how this event unfolded”. In the last part of the training phase, a qualitative manipulation check was included (see “Measurements”). Thereafter, the third measurement (T3) of all T1 variables took place. Following the third measurement, participants were instructed to think about another hypothetical stressor for one minute (i.e. “You're moving your stuff from your old house to your new house. Some of your friends took some time off to come and help. While you bring your things to the car, the front door falls into the lock and you realize that the house keys are still inside. You don't have a spare key and the locksmith won't be able to come by for another 2 hours. You can't continue moving until the situation is solved.”), without condition-specific instructions. As a final part of the experiment, the fourth measures (T4) of all T1 variables were collected.

After the experiment was finished, participants were thanked and rewarded for their participation with 0,5 PPU.

Measurements

Verbal thoughts and imagery (VAS)

Level of thinking in verbal thoughts was measured by means of VAS by asking “When you are thinking about a stressor, how much do you think in *words*, thus that your thoughts consist of sentences and words (as if you’re talking to yourself?)” on a scale from 0% to 100%. Level of imagery was also measured by VAS on a scale of 0% to 100% through asking the following question: “When you are thinking about a stressor, how much do you think in *images* (as if you see before you what you think)?”.

State RNT (VAS)

State RNT was measured by means of VAS using a horizontal line on a scale of 0% to 100% by asking: “How much are you worrying at the moment?”.

Resilience

The BRS (Smith et al., 2008) aims to assess the ability to bounce back or recover from stress. It consists of six items of which three are positively worded (e.g. “I tend to bounce back quickly after hard times”) and three are negatively worded (e.g. “I have a hard time making it through stressful events”), which are scored in reverse. The instructions regarding the items are as follows: “Please indicate the extent to which you agree with each of the following statements” by using the following scale: *strongly disagree* (1), *disagree* (2), *neutral* (3), *agree* (4), *strongly agree* (5). The BRS demonstrated good internal consistency, test-retest reliability, and construct validity (Smith et al, 2008; Windle et al., 2011).

Manipulation check (Observer-rated VAS)

To check whether manipulation was successful, a qualitative manipulation check was included within the last two scenarios of the training phase. Participants were asked to think about a positive and a negative scenario (according to the condition-specific instructions) and to describe in three to four sentences what exact thoughts went through their minds. The

written answers were rated on abstractness and concreteness by two independent observers by means of VAS with the following instructions: “Indicate the degree of abstractness of the content of the thoughts” and “Indicate the degree of concreteness of the content of the thoughts” on a scale from 0% to 100%. The observers were also asked to give a forced judgement whether they thought the overall content of thought was abstract or concrete.

Data analyses

In order to test the four hypotheses that after the training (T3) and after the stress induction (T4) participants will report fewer verbal thoughts and more imagery, less state RNT, and more resilience in the CT-condition than the AT-condition, ANCOVAs were conducted. To examine the direct effect of the training, group differences on T3 variables (i.e., verbal thoughts, imagery, state RNT, and resilience) were analyzed while correcting for the levels of these variables on T1 and T2 (in separate ANCOVAs per variable). To test whether the training condition has an effect on thinking about a hypothetical stressor (T4), ANCOVAs were conducted, with condition as independent variable and with the outcome variables (i.e., verbal thoughts, imagery, state RNT, and resilience) measured at T4 as the dependent variable while correcting for T1 and T2 measurements of that variable. In order to examine whether the effects of the training (i.e., significant differences between conditions) differ on T3 and T4 in strength (i.e., whether effects are stronger after applying the thinking style to a stressor compared to directly after the training), Cohen’s *d*’s effect sizes were compared.

In order to examine pre-existing group differences, chi-square tests were performed on the categorical variables age category, gender, and level of education, with condition as independent variable. To examine whether there were group differences on the T1 variables, multiple t-tests were performed with condition as independent variable.

To check whether the training was successful in both conditions (i.e., manipulation check), t-tests were performed on the degree of abstractness and concreteness of the participants' answers on their content of thought, judged by two independent observers. Inter-rater reliability was examined by means of intraclass correlation coefficients. Differences between conditions on the forced judgements were examined by performing chi-square tests, whereby inter-rater reliability was analyzed by means of Cohen's kappa.

Results

Randomization check

Chi-square tests revealed no significant differences between the AT-condition and CT-condition on gender, $X^2(1) = .05, p = .824$, age category, $X^2(5) = 5.40, p = .369$, and level of education, $X^2(4) = 5.68, p = .224$ (see "Participants" for descriptives). Furthermore, t-tests showed no significant differences between the conditions on the baseline measures (T1) of verbal thoughts, imagery, state RNT, and resilience (see Table 1). These results taken together show that randomization was successful.

Manipulation check

The results of the first part of the manipulation check are represented in Table 2, whereby two independent observers rated the degree of abstractness and the degree of concreteness of the content of thoughts of the participants on a positive and a negative scenario. Because there were no significant differences between the positive and the negative scenario on the rated degree of abstractness, $t(42) = -.99, p = .330$, and the rated degree of concreteness, $t(42) = .99, p = .330$, the average rated degrees are displayed. With respect to the inter-rater reliability, the intraclass correlation coefficients indicate a poor reliability between the observers, as the ICC approaches zero.

The second part of the manipulation check consisted of a forced judgement whether the overall content of thought was abstract or concrete. Because the positive scenario and the

Table 1*Group differences on verbal thoughts, imagery, state RNT, and resilience*

Variable	α	Condition		$df = 1,42$	
		Abstract ($N = 20$)	Concrete ($N = 24$)	t	p
		$M (SD)$	$M (SD)$		
T1 Verbal thoughts	N/a	62.05 (23.61)	69.21 (21.40)	-1.05	.303
T2 Verbal thoughts	N/a	41.65 (26.10)	48.13 (23.35)	-.87	.390
T3 Verbal thoughts	N/a	61.20 (23.31)	53.29 (27.81)	1.01	.319
T4 Verbal thoughts	N/a	52.70 (21.28)	45.17 (27.45)	1.00	.322
T1 Imagery	N/a	57.30 (28.22)	54.08 (22.88)	.42	.678
T2 Imagery	N/a	68.20 (20.50)	65.63 (23.74)	.38	.705
T3 Imagery	N/a	60.30 (28.57)	68.46 (18.01)	-1.11	.277
T4 Imagery	N/a	62.85 (23.73)	66.75 (22.02)	-.57	.575
T1 State RNT	N/a	39.70 (26.07)	46.25 (30.63)	-.76	.455
T2 State RNT	N/a	22.10 (20.29)	24.04 (21.68)	-.30	.762
T3 State RNT	N/a	22.00 (19.67)	25.67 (23.93)	-.55	.587
T4 State RNT	N/a	21.55 (18.38)	28.29 (26.06)	-.97	.337
T1 Resilience	.81	18.95 (4.48)	18.29 (4.64)	.48	.636
T3 Resilience	.73	19.30 (4.08)	18.54 (4.10)	.61	.543
T4 Resilience	.74	19.50 (4.21)	18.50 (3.89)	.82	.418

Note. Descriptives and test statistics are reported. Imagery = thinking in images; verbal thoughts = thinking in words; state RNT = worrying; resilience = Brief Resilience Scale, T1 = baseline; T2 = post-first stress induction/pre-manipulation; T3 = post-manipulation/pre-second stress induction; T4 = post-second stress induction

negative scenario were rated separately on a nominal level, the results are displayed per scenario. Analysis showed there was a poor to slight agreement between the observers on the positive scenario, $\kappa = .09$ (95% CI, -.17 to .35), $p = .495$, and the negative scenario, $\kappa = .01$ (95% CI, -.27 to .29), $p = .941$ (see “Appendix” for descriptives). However, as for the agreement between the observers independently and the actual (assigned) condition, chi-square tests revealed no significant differences between the actual conditions and the

Table 2*Group differences on observer-rated content of thoughts*

Variable	Condition		t	p	ICC
	Abstract	Concrete			
	$M (SD)$	$M (SD)$			
Abstractness	50.13 (18.66)	46.45 (19.98)	.61	.547	-.09
Concreteness	49.88 (18.66)	53.44 (19.98)	-.61	.547	-.09

Note. Test statistics and intraclass correlation coefficients are reported. Abstractness = average degree of rated abstractness from two independent observers; Concreteness = average degree of rated concreteness from two independent observers

classification of conditions of the first observer on the positive scenario, $X^2(1) = 1.00$, $p = .317$, and the negative scenario, $X^2(1) = .09$, $p = .759$, and the ratings of the second observer on the positive scenario, $X^2(1) = .17$, $p = .679$, and the negative scenario, $X^2(1) = .42$, $p = .515$. This indicates that the observers, although they did not agree, did classify the conditions well to a certain degree.

Nevertheless, the intraclass correlation coefficients and the Cohen's kappa coefficients show an overall inadequate inter-rater reliability and therefore it is questionable whether manipulations were successful. Because the data has already been collected, the results will be reported below, but should be interpreted with great caution.

Main analyses

Multiple ANCOVAs were used to compare the outcomes of the T3 and T4 variables (i.e. verbal thoughts, imagery, state RNT, and resilience) with condition as independent variable. T1 and T2 of the dependent variable were included as covariates to partial out the effects of individual differences before participants received the training.

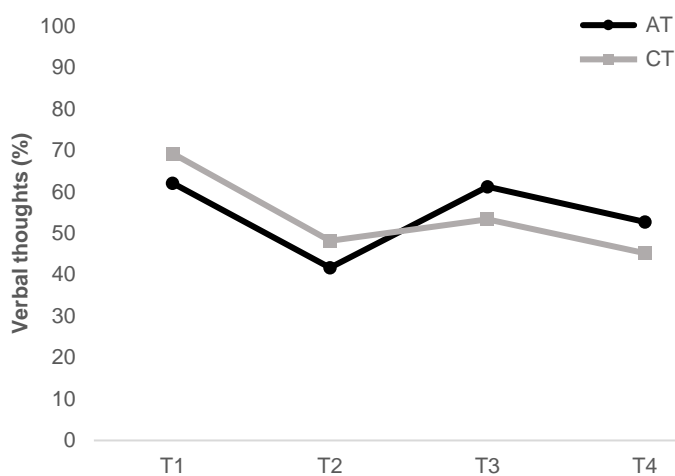
Before conducting the ANCOVAs, assumptions were tested for all outcome variables. Examination of boxplots and linear regressions showed no extreme outliers (i.e. no standardized residuals above 3.29; Field, 2013). All dependent variables showed skewness and kurtosis values between -1.96 and 1.96, indicating that the assumption of normality was supported (Allen & Bennett, 2012). Scatterplots indicated that the relationships between the dependent variables and covariates were linear. Next, the assumption of homogeneity of regression slopes was supported by the absence of significant interactions between the covariates and the independent variable. Finally, Levene's tests were non-significant for all variables, which supports the assumption of homogeneity of variance.

The first ANCOVA showed no significant effect of condition on T3-verbal thoughts, $F(1, 40) = 3.40$, $p = .073$, $d = .31$ (after controlling for T1- and T2-verbal thoughts).

However, in line with the hypothesis, there was a statistically significant effect of condition on T4-verbal thoughts, $F(1, 40) = 4.83, p = .034, d = .30$ (after controlling for T1- and T2-verbal thoughts). Cohen's d indicates a moderate effect size with participants in the AT-condition reporting significantly more verbal thoughts than participants in the CT-condition after thinking about the stressor subsequent to the training (see Table 1 for group means). Although not statistically significant, Cohen's d also indicates a moderate effect size of differences between conditions on T3 (see Figure 1). The following ANCOVAs showed no significant effect of condition on T3-imagery, $F(1, 40) = 2.05, p = .160, d = -.35$, and T4-imagery, $F(1, 40) = .90, p = .349, d = -.17$ (after controlling for T1- and T2-imagery). Furthermore, analysis showed that there was no significant effect of condition on T3-RNT, $F(1, 40) = .06, p = .808, d = -.17$, and T4-RNT, $F(1, 40) = .65, p = .424, d = -.29$ (after controlling for T1- and T2-RNT). Finally, no significant effects of condition on T3-resilience, $F(1,40) = .16, p = .690, d = .19$, as well as on T4-resilience, $F(1, 40) = .55, p = .461, d = .25$ (after controlling for T1- and T2-resilience) were found.

Figure 1

Mean course of verbal thoughts for the AT and CT-condition



Note. T1 = baseline; T2 = post-first stress induction/pre-manipulation; T3 = post-manipulation/pre-second stress induction; T4 = post-second stress induction.

Discussion

The aim of this experimental study was to examine the differences in verbal thoughts, imagery, state RNT, and resilience after a training in either AT or CT, and after a subsequent hypothetical stressor. Randomization was successful. As mentioned before, the results should be interpreted with great caution due to the results of the manipulation check, which will be discussed later on.

Firstly, it was hypothesized that the AT-condition would report more verbal thoughts than the CT-condition after both the training and the subsequent stress induction. The results show a moderate but non-significant effect of condition on verbal thoughts right after the training, with more verbal thoughts in the AT-condition than in the CT-condition. After the stress induction subsequent to the training, the AT-condition reported significantly more verbal thoughts than the CT-condition, which is in line with the hypothesis based on the avoidance theory of worry of Borkovec and colleagues (1998), which proposes that AT predominantly involves verbal thoughts in order to avoid more confronting imagery. Furthermore, it was hypothesized that the CT-condition would report more imagery than the AT-condition after the training as well as the following stress induction. Unexpectedly, no differences between the conditions were found on the degree of imagery, which is inconsistent with the avoidance theory of worry of Borkovec and colleagues (1998). There might be several explanations for this finding.

Borkovec and colleagues (1998) state that worry predominantly involves verbal thoughts. However, research has demonstrated that verbal thoughts and imagery are always processed integratively, but that the vividness of imagery depends on the concreteness of words and sentences (Paivio, 1986). Stöber (1998) argued that imagery would not be totally suppressed when words and sentences are relatively more abstract than concrete, but would be less vivid and therefore harder to detect. Although the participants in the CT-condition are

instructed to imagine the scenarios as vivid as possible, they are still presented as written sentences. The selection of scenarios within the current study was based on which scenarios our study sample would identify most with, and not on the concreteness of words and sentences. However, Watkins and colleagues (2008) rated the scenarios beforehand, so the scenarios ultimately used were matched for intensity of valence and vividness. Therefore, the set of scenarios used in the current study might not have been vivid enough in order to elicit and/or detect the desired degree of imagery.

Furthermore, it is possible that the hypothetical stressor before the training already elicited imagery, which appears to be the initial tendency in nonclinical individuals. Although individuals suffering from depression or anxiety have a natural tendency to think in verbal thoughts, the majority of (nonclinical) individuals have a natural tendency to think in images (Watkins, 2008; Borkovec & Inz, 1990). Therefore, the shortened version of the training may not have been able to overwrite this initial tendency.

Another factor that might have been of influence is the use of hypothetical stressors during stress induction (“flat tire” and “moving without keys”) instead of a personal stressor. Although hypothetical stressors facilitate experimental control in terms of standardization, they possibly elicit less emotion (and thus less vivid imagery) than a personal stressor, which, as mentioned earlier, makes imagery harder to detect (Stöber, 1998). Also, observer-rated concreteness of thoughts was around 50 in both conditions, which supports the possible lack of response to the training in CT (aimed at eliciting more vivid imagery).

As mentioned above, the duration or intensity of the training was potentially not sufficient in producing a higher level of imagery in the CT-condition compared to the AT-condition. Whereas the Concreteness Training of Watkins and colleagues (2011) consists of a 1,5-hour 30-scenarios training session and a 15-30 minutes daily practice for at least six weeks, the training in this study consisted of only one training moment using eight scenarios.

A training in CT this brief may not have produced the expected differential effects between conditions. This consequently leads to an explanation of the following results regarding state RNT and resilience.

It was hypothesized that the AT-condition would report more state RNT and less resilience than the CT-condition after the training and after the subsequent stress induction. The results showed no differences in state RNT between the conditions, which is inconsistent with Watkins and colleagues (2011), who did find that CT reduces RNT. Since Min and colleagues (2013) found that RNT is associated with less resilience, it was expected that a training in CT would therefore increase resilience, but this was not supported. Watkins and colleagues (2011) suggest that in order for Concreteness Training to actually work and have beneficial outcomes (e.g. reduced RNT and increased resilience), the pre-existing habit of AT should be replaced by CT, which becomes habitual through repeated practicing. Therefore, the brief training in CT in the current study was probably inadequate in terms of CT becoming habitual and thereby replacing the tendency to AT. Maybe, the effects of the short training on a dispositional variable such as resilience was too ambitious. It would be interesting to examine the effects of CT on positive factors such as resilience in the full training format.

Apart from the previously described explanations, this study has a great limitation regarding the questionable manipulation check. In order to attain objectivity, a qualitative observer-rated manipulation check was included. As Watkins (2008) argued, experimental research requires observer-rated measures to reduce the risk of biased self-reports. Although the observers did not agree on their ratings, they independently appeared to classify the conditions relatively well. The ratings showed no differences between conditions on the degrees of abstractness and concreteness of thoughts, which were rated around 50 for both conditions. There are two explanations for the at least partly failed manipulation check. First,

although the observers received the same instructions, the instructions might not have been specific enough in order to obtain a good inter-rater reliability, and proper training might be necessary. Second, however, it is more likely that the training was too brief in order to effectively induce either AT or CT, since most of the results in the current study are not in line with results of previous studies that used longer training phases.

In sum, findings revealed only an effect of the training in terms of the AT-condition reporting more verbal thoughts after stress induction than the CT-condition. Nevertheless, the results should be interpreted in the light of several limitations, mainly regarding the shortened training format which was not effective enough in sufficiently inducing AT and CT.

Although the current study does not allow to provide any clinical implications, it is valuable as a pilot study for future research. Future research should pay attention to the number of scenarios (and their concreteness of words and sentences) used in the training phase.

Furthermore, the observer-rated manipulation check should be tested in order to obtain a good inter-rater reliability, and a quantitative self-report measure should be included for control purposes. It might also be useful to include a personal stressor in order to elicit more personally relevant emotions (and thus more vivid imagery). To conclude, further research is necessary in order to clarify the effects of thinking styles on verbal thoughts, imagery, state RNT, and resilience (using the full training format) in nonclinical samples from a prevention perspective.

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Appendix

Cross tables of the forced judgments on whether the overall content of thought of the participants was abstract or concrete, rated by two independent observers

Table A1

Independent observer-rated content of thought for the positive scenario

		Independent observer 1		Total
		Abstract	Concrete	
Independent observer 2	Abstract	9	16	25
	Concrete	5	14	19
	Total	14	30	44

Note. Abstract = “Indicate the degree of abstractness of the content of the thought”; Concrete = “Indicate the degree of concreteness of the content of the thoughts”

Table A2

Independent observer-rated content of thought for the negative scenario

		Independent observer 1		Total
		Abstract	Concrete	
Independent observer 2	Abstract	11	15	26
	Concrete	7	10	17
	Total	18	25	43

Note. Abstract = “Indicate the degree of abstractness of the content of the thought”; Concrete = “Indicate the degree of concreteness of the content of the thoughts”