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EFFECTS OF CONCEALABLE STIGMA FOR LEARNING DISABILITIES

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In this study, cognitive effects relating to concealable stigma of adolescents with learning disabilities (Learning Disabilities, LD) were examined under the condition in which learning-related information was concealed. A total of 158 adolescents (78 LD adolescents, 80 NLD adolescents) participated in the present study. Results showed that: (1) the LD group in the concealed condition exhibited a higher level of suppressing learning-relevant thoughts than did those in the disclosed condition; (2) LD children in both conditions showed increasing accessibility of learning-relevant thoughts than did the NLD (Non-Learning Disabilities) group during the interview.

Keywords: learning disabilities, concealable stigma effects, preoccupation.

Learning disabilities (LD) and the related stigma have profound impacts on people with LD. Yu, Zhang, and Yan (2005) found that children with LD exhibited a lower level of peer acceptance than did NLD (nonlearning disabled) children. In order to escape possible discrimination and rejection, children with learning disabilities often deliberately adopt certain strategies to conceal LD or learning-related information during their social interactions (Barga, 1996). Some research has shown that schools are still not necessarily safe spaces for individuals with LD, who risk being seen as deficient. Because of the normative

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culture of schools, students who are different may find themselves in hostile environments. Some of them will manage to mask their differences (Ferri, Connor, Solis, Valle, & Volpitta, 2005).

Currently, many researchers define *stigma hiding* as *the process of keeping secret the stigma and its related thoughts*. The preoccupation model of secrecy gives an account of the whole mental process of secrecy, and hiding details (Lane & Wegner, 1995; Wegner, Lane, & Dimitri, 1994). This model confirmed that the first step of keeping a secret is to suppress thoughts of the secret topic. However, thought suppression can cause the deep cognitive activation of the secret topic and lead to thought intrusions, namely, rebound effect. Thought suppression and thought intrusion occur cyclically in response to each other. Smart and Wegner (1999) also suggested that when one has a concealable stigma and tries to hide it, this secret could become highly accessible.

In the present study, we aimed to explore the cognitive effects of LD in a middle school under the condition that learning-relevant information can be concealed. We hypothesized that (1) preoccupation with learning-related thoughts would be more likely to occur among LD children than NLD children; and (2) accessibility of the learning-relevant thoughts would be increased among LD children.

METHOD

Participants

The sample consisted of 78 LD children (49 boys and 29 girls) and 80 Non-LD children (37 boys and 43 girls) aged 13-15 from one middle school in China.

One of the key issues in the study was to differentiate children with learning disabilities from those with no known learning deficits. The present criteria of LD have been acknowledged and widely used in China. Children with learning disabilities were identified as those whose academic achievement level was significantly lower than would be predicted by their IQ. The criteria used in this study to identify children with learning disabilities were as follows (Clarizio & Phillips, 1989; Yu et al., 2005):

1. In light of former studies, the results of the most recent final exams for Chinese literature and Mathematics courses were used as a replacement. The raw scores of the two tests were changed into standardized Z scores, and their difference was calculated using the following formula to identify children with a learning disability:

$$Z_{diff} = (Z_x - Z_y) / \sqrt{(1 - r_{xx}) + (1 - r_{yy})}$$

In this formula, Z_x and Z_y refer to the standardized scores on the intelligence and academic achievement tests respectively; r_{xx} and r_{yy} stand for the tests' reliability. If the value of Z_{diff} was more than $Z_{0.10} = 1.28$, the child was put into the LD group.

2. Teacher assessment – LD participants were identified by their teachers on the study skills and behavioral characteristics that students had shown in daily life in the school.

3. Intellectually retarded (IQ < 70) and gifted children (IQ >130) as well as those with physical deformities and mental health disorders were excluded from the sample.

The NLD group consisted of average-achieving students from the same age group. For each of these classes, we asked teachers to identify both boys and girls who matched students with LD on age, who evidenced average grades, and who did not reveal any specific or consistent learning or behavioral problems. Of the children who were recommended by teachers, a sample was randomly selected to compose the control group in the current study.

Instruments

Learning-related thought suppression In terms of thought suppression, we administered two items (Smart & Wegner, 1999), including "How often did you feel like you were pushing thoughts of learning-relevant things out of your mind?" Participants indicated their responses on a 7-point scale ranging from 1 (*not at all*) to 7 (*very often*).

Learning-related thought intrusion To assess the amount of thought intrusion experienced in the interview, we designed two items, based on consultation with some scholars specializing in the measure of thought intrusion (Major & Gramzow, 1999). One sample from the items is, "During the interview, thoughts about my academic performance always pop into my mind". Participants indicated their response on a scale ranging from 1 (*not at all*) to 7 (*very often*).

Learning-related thought accessibility To measure the conscious accessibility of learning-relevant thoughts during the interview, we administered three word-completion tasks that were modeled on the accessibility measure devised by Greenberg, Pyszczynski, Solomon, Simon, and Brews (1994; see also, Smart & Wegner, 1999). The three word-completion tasks were operated respectively before, during, and after the interview. For each of these tasks, there were three different word fragments. The fragments were selected so that they could form at least three words, in which a learning-relevant word was included. The target word was a learning-relevant word. For example, the word fragment of _li_ could be completed with fragment qi (liqi, means "power"), zhong (zhongli, means "gravity"), nu (nuli, means "studying hard"), with nu creating the target word (nuli). The order of the three word-completion tasks was counterbalanced across participants.

To examine the unconscious accessibility of the learning-relevant thoughts, a stroop color-naming task was used in the present study. The task was administered on a computer, as was done in the studies by Wegner and colleagues (Lane &

Wegner, 1995; Smart & Wegner, 1999). The computer used in the experiment was an IBM notebook PC with a standard 14-inch true color, 1024×768 resolution factor monitor. The refresh rate was 60 Hz. Stimulus presentations and the results were run and enregistered by the E-prime software and the precision of reaction time was 1 millisecond. There were nine stimulus words, which include four learning-relevant words (learning, homework, exam, score), two cognition-relevant words (reaction, memory) and three neutral words (phone, car, fruit). Each word was presented six times in a random order. During the experiment, color and cognitive load were counterbalanced with the different type of words.

Experiment Design

The experiment was a randomized block design; the two blocks were set as students with LD and students without LD. The two experimental situations were LD situation and NLD situation. LD and NLD students were randomly assigned into the two experimental situations. The LD participants who were assigned to the NLD situation were intended to have their learning information concealed, namely, *concealed condition*. The LD participants who were assigned to the LD situation were intended to have their learning information conspicuous, namely, *disclosed condition*. Different genders were counterbalanced in the four experimental conditions.

In the NLD situation, the participants were told, "a respected expert in education wants to interview an excellent student and give some advice on learning strategies. I find that you are good at expressing your own thoughts. I would like to recommend you to the expert as an excellent student. I am sure you are competent in learning these strategies and sharing them with others."

In the LD situation, the same instructions were given, with "LD student" instead of "excellent student". An additional sentence was as follows, "I have not found the right student (LD)". In both situations, any participant who was open about their true identity should be encouraged to play the role assigned to him/her for the learning strategies.

Procedure

Each of the participants was interviewed individually in the laboratory. The procedure was as follows:

(1) Upon arrival, participants were greeted by an experiment assistant in a waiting room.

(2) Participants were assigned into one of the two experimental situations randomly.

(3) The assistant guided a participant to the laboratory and introduced his/her learning performance.

(4) A formal interview followed.

(5) Three word-completion measures were performed, one at the beginning, one at the middle, and one at the end of the interview.
(6) Participants were instructed to complete the Stroop task on the computer after the third word-completion task. Participants were told that words in different colors (red or blue) would be presented on the computer monitor and that their task was to correctly and quickly identify the color. Before the presentation of the words, a one-digit number (low load) or a six-digit number (high load) would appear on the center of the screen. Participants were asked to remember the number while they were identifying the color of the word. After each number appeared, the screen would be blank for 1 second and then show a fix point "+" for 2 seconds. After the fix point disappeared, the blue or red words appeared. The participants were asked to press the keyboard to judge the color of the words (F key for red words, J key for blue words). Then the words disappeared (if the participant was unresponsive, the word would disappear after 5 seconds). After that, an instruction appeared on the screen. The participants were asked to recall the number presented at the beginning of each trial. Then participants reported the number and pressed any key to continue. For each participant, there were 10 practice trials and 54 trials performed for the task.
(7) Participants completed their self-report on thought intrusion and thought suppression.
(8) Participants were debriefed and thanked for their participation.

RESULTS

Preoccupation of LD Participants in Different Conditions

Thought Suppression A list of participants' preoccupation in the different experiment conditions is provided in Table 1. A 2 (experimental situation) × 2 (student type) ANOVA was conducted to examine the effects on thought suppression. Results showed a main effect of student type, $F(1,154 = 4.14, p = 0.04)$, and LD participants reported more suppression of learning-relevant thoughts ($M = 7.73$) than did NLD participants ($M = 6.68$); the interaction of experimental situation and student type was significant, $F(1,154 = 4.15, p = 0.04)$. Further analysis showed that LD participants reported more thought suppression when they were in the NLD situation than in the LD situation (concealed condition), $F(1,76 = 4.37, p = 0.04$; see Table 1. Therefore the LD participants exhibited more thought suppression in the condition where learning-related information could be concealed.

Thought Intrusion An analysis of variance on the total score of thought intrusion showed a significant main effect of the experimental situation, $F(1,154) = 5.52$, $p = 0.02$. Participants in the LD situation had more intrusiveness of learning-relevant thoughts ($M = 9.06$) than did participants in the NLD situation ($M =$

7.73). However, the main effect of student type was not significant, $F(1,154) = 0.43$, $p = 0.51$. There was no significant experimental situation × student type interaction, $F(1,154) = 2.94$, $p = 0.09$.

TABLE 1
PREOCCUPATION MEASURES IN DIFFERENT CONDITIONS

Preoccupation	NLD situation		LD situation	
	NLD	LD	NLD	LD
Thought suppression	6.38 (3.04)	8.49 (3.73)	6.98 (3.58)	6.97 (2.56)
Thought intrusion	7.43 (3.70)	8.03 (3.38)	9.73 (3.84)	8.38 (3.27)

Note: Numbers in parentheses indicate the standard deviation.

LEARNING-RELEVANT THOUGHTS ACCESSIBILITY

Word-Completion – Conscious Accessibility For each fragment, it was possible to make three words. The accessibility of learning-relevant thoughts could be measured by calculating the serial position of the target word. An accessibility score of 4 was assigned when the target was in the first position, 3 when it was in second position, 2 when it was in the third position, and 1 if it was not mentioned, and the overall accessibility for that set of completions was the total score (Smart & Wegner, 1999).

The word-completion score revealed a significant main effect for student type, $F(1, 153) = 5.91$, $p = 0.02$. The total score of learning-relevant words for LD students ($M = 16.49$) was significant higher than that of NLD students ($M = 14.97$), which means that LD participants are more likely to access the learning-relevant words. However, no significant main effect was found for experimental situation, $F(1, 153) = 0.99$, $p = 0.32$. The interaction of experimental situation and student type was significant, $F(1, 153) = 3.91$, $p = 0.05$. A further analysis revealed that LD participants in the LD situation (disclosed condition) ($M = 17.41$) showed a higher learning-relevant word accessibility than did those LD participants in the NLD situation (concealed condition) ($M = 15.56$), $F(1,76) = 9.37$, $p = 0.056$ (marginal significance). Therefore, learning-relevant thoughts were more accessible for the LD participants in the disclosed condition than in the concealed condition.

Stroop-type Measure – Unconscious Accessibility A mixed design ANOVA was run with student type and experiment situation as between-participant variables and word type (learning-relevant, cognitive, or neutral) and cognitive load (low or high) as within-participant variables. Significant main effects were found for cognitive load, $F(1, 151) = 14.98$, $p = 0.00$. Mean response times (RTs) were slower for all types of words under high cognitive load ($M = 765.38$s) than under low cognitive load ($M = 741.65$s). There was also a reliable interaction between cognitive load and type of words, $F(1, 150) = 4.97$, $p = 0.01$. A further analysis

showed that the mean response times for cognition-related and learning-related words under high cognitive load were separately lower than the RTs for these words under low cognitive load ($F(1, 154) = 4.18$, $p = 0.04$ and $F(1, 156) = 13.60$, $p = 0.00$ separately). These data indicated that all participants under high load showed increased accessibility of learning-relevant and cognition-related thoughts.

The effect of four-way interactions (student type, experimental situation, cognitive load, and word types) could not be significantly identified, $F(2, 302) = 1.24$, $p = 0.29$. However, further analysis indicated that the simple main effect was significant of the word types under high load, $F(2, 76) = 6.58$, $p = 0.00$. Under high load, LD participants in the NLD situation had a slower RT to the learning-relevant words ($M = 812.67$s) than they did to the neutral words ($M = 748.92$s) and cognitive words ($M = 747.03$s). The comparison of cognitive-relevant and neutral words was not significant, $p > .01$. Moreover, this difference was not observed in any other conditions (all p values were greater than 0.01).

DISCUSSION

In line with the preoccupation model of secrecy (Lane & Wegner, 1995), we predicted that LD participants would experience more learning-relevant thought suppression and more thought intrusion under a condition where learning-relevant information could be concealed. But data from this study provided only partial evidence for this prediction. The self-report of learning-relevant thought suppression showed that LD participants in the concealed condition showed more thought suppression than did those participants in the other experiment conditions. However, the LD participants in the concealed condition reported no more learning-relevant intrusion than did those in the other experiment conditions. It is often the case that children with LD are more likely to be rejected and neglected by their parents, teachers, and peers. In order to prevent possible discrimination and rejection, children with LD often adopt effective suppression strategies to conceal LD or learning-related information during their social interactions. Perhaps along with long-term practice of suppression, they have mastered expert suppression strategies. Therefore, in the present study, LD participant in the concealed condition could suppress their learning-relevant thoughts successfully and prevented cognitive rebound effect.

The next step in the cycle of keeping an LD secret is an increase in thought accessibility. Two types of learning-relevant thought accessibility were administered in this study. One is conscious accessibility that was tested by a word-completion task, and another is unconscious accessibility tested by the Stroop color-naming task. The results of the word-completion task showed that the mean score of the learning-relevant words was highest for LD participants

in the LD situation, indicating that they were much more at ease accessing learning-relevant thoughts under the disclosed condition. However, an increase in learning-relevant thoughts was not observed for LD participants in the concealed condition, which was inconsistent with the findings of a previous study of concealing eating disorder stigma (Smart & Wegner, 1999). Wegner and Smart (1997) suggested that there were four types of cognitive activation: surface activation, deep activation, full activation, and no activation. During the interview, because of the leading questions, the LD participants in the disclosed condition would be forced to think about their learning status continuously, which might have encouraged the surface activation of conscious learning-relevant thoughts which, in turn, led to easy access of the target words.

On the other hand, in order to keep their identity secret, the LD participants in the NLD situation would suppress learning-relevant thoughts, which leads to the deep activation of the learning-relevant thoughts. These thoughts are unconscious and cannot be tested on the word-completion task, especially when there are enough cognitive resources for the suppressing operation. Such a notion was backed up by the data of the Stroop color-naming task.

Existing research details claim that the latency of naming colors of target-related words under cognitive load is taken as a measure of the accessibility or deep activation of the target (Bargh & Pratto, 1986; Wegner & Erber, 1992). In our research, we also used the Stroop task to test whether the accessibility of the learning-relevant thoughts of LD participants increased under the concealed condition. As described before, LD participants would suppress their learning-relevant thoughts deliberately in the concealed condition, which would give rise to deep activation of these thoughts. This mental state is characterized by the increased accessibility of the thoughts that one wants to suppress unconsciously. Under a high cognitive load, the cognitive resource was taxed and the effort of thought suppression couldn't work effectively, and the learning-related thoughts would emerge to a conscious level. Because of the interference of the increased accessibility, RTs of the target words under the high cognitive load were slower than that of the low cognitive load for the LD participants in the NLD situation. However, these results were not found in the three other experiment conditions.

Two conclusions can be drawn from this study. First, LD participants in the concealed condition reported more suppression of learning-relevant thoughts; however, they did not report more thought intrusion than the participants in the other conditions. Second, the LD participants in the concealed condition have an increased unconscious accessibility of the learning-relevant thoughts, while LD participants in the disclosed condition have an increased conscious accessibility of learning-relevant thoughts.

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