

## THE EFFECTS OF CONCEALING ACADEMIC ACHIEVEMENT INFORMATION ON ADOLESCENTS' SELF-CONCEPT

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*Using an experimental design, the effect of concealing academic achievement information on adolescents' self-concept was examined in the current study. Specifically, adolescents with low academic achievement and adolescents with average to high academic achievement ( $N = 129$ ) were randomly assigned to different interview contexts wherein academic-achievement information could be concealed or not. Results showed that participants with low academic achievement in the concealing-achievement-information condition had higher levels of state self-esteem and more self-representation suppression. Their negative self-representation was also activated when they were under high cognitive load. Participants with high academic achievement in the condition in which positive achievement information was concealed had lower state self-esteem and activated the positive self-representation under high cognitive load. Overall, the results showed that concealing academic-achievement*

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*information can cause short-term change of self-concept for adolescents.*

Key words: self-esteem, self-representation, concealing achievement information, adolescents

Adolescence is a critical period of development during the transition from childhood to adulthood. The ages associated with adolescence are commonly considered to be 12 years to 20 years (Spear, 2000). During this period, physical and brain functions undergo dramatic changes, which lead to quicker development of cognitive and social abilities. For example, distinct changes in thinking (Keating, 2004), self-perception (Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991), and motivation (Wigfield et al., 1991) occur during adolescence. These changes may significantly influence a variety of developmental outcomes, including academic achievement, self-concept development, achievement motivation (Wigfield & Wagner, 2005), and prototypes of physical activities (e.g., Keresztes et al., 2009). Most importantly, adolescence is a crucial period for the formation of individuals' self-concept. A large amount of research in psychology and education has revealed that the formation of a stable, positive self-concept is one of the chief developmental challenges for adolescents (e.g., Watkins, Juhasz, Walker, & Janvlaitiene, 1995). Therefore, it is important to study the characteristics and changes of self-concept in the adolescent period.

Adolescents spend more time in school than in any other place outside their homes. School experiences play an important role in shaping their developmental trajectories (Roeser, Eccles, & Strobel, 1998). Academic performance has significant implications for adolescents' self-concept, as it would be taken as the key criterion for assessing a student in societies emphasizing education (e.g., in China). Many studies suggest that self-concept is closely tied to academic achievement in adolescents (e.g., Denissen, Zarrett, & Eccles, 2007; Kobal & Musek, 2001). However, previous studies have paid attention to how positive and negative feedback regarding adolescents' academic achievement influences their self-concept but neglected the possibility that cognitive strategies used by adolescents for dealing with this feedback influence their self-concept, as well. Research in social psychology has shown that individuals are likely to use certain cognitive strategies to shape their own self-concepts. For example, they may withdraw efforts and/or disengage from tasks in less competent domains (Keller & Dauenheimer, 2003), attribute negative feedback to nonpersonal factors (Crocker & Major, 1989), and conceal socially devalued information related to themselves (Barreto, Ellemers, & Banal, 2006). These cognitive strategies can help individuals deal with possible negative feedback and improve their self-esteem. Therefore, it may be useful to study how adolescents integrate negative or positive feedback on academic performance into their lives.

Drawing on previous literature regarding individuals' use of cognitive strategies in dealing with negative feedback, the present study examines the influence of concealing information about adolescents' academic achievement on their self-concept. Specifically, we examined how concealing such information might influence the relationship between academic achievement and state self-esteem, and further explored the possible underlying cognitive mechanisms. We first introduce our theoretical framework, from

which we formed hypotheses regarding the relationship between concealing achievement information and state self-esteem and how concealing achievement information influences changes in self-concept.

### Theoretical Framework

The term *self-concept* has numerous synonyms, and researchers assign different nuances to these terms (e.g., *self-representation*, *self-image*, and *self-esteem*; Brown, 1993). In the current study, *self-esteem* and *self-representation* are used to operationalize the affective component and cognitive component of self-concept, respectively.

### Self-Esteem and Self-Representation

The first dependent variable considered in this study is self-esteem. The nature of self-esteem is very complex. Researchers have suggested that self-esteem has a *trait* component (i.e., personal global self-esteem) and a *state* component (i.e., short-term situation-associated self-esteem; Crocker, Cornwell, & Major, 1993). Many studies have shown that experimental manipulations can affect state self-esteem but not trait self-esteem (Heatherton & Polivy, 1991). That is, in experimental studies, state self-esteem should be measured for detecting momentary self-esteem fluctuations (e.g., Crocker et al., 1993; Heatherton & Polivy, 1991).

The second dependent variable is self-representation, which refers to how the individual perceives him- or herself in regard to a given disposition, style, type of activity, or dimension of ability (Demetriou & Kazi, 2001). It has been viewed as the cognitive aspect of self-concept (e.g., Higgins, Van, & Dorfman, 1988; Posner & Warren, 1972). In studies of self-representation, the modified Stroop (1935) color naming task has often been used to explore the cognitive characteristics of self-concept in different situations (e.g., Mikulincer, Dolev, & Shaver, 2004; Segal, Gemar, Truchon, Guirguis, & Horowitz, 1995). In the present study, we also used a modified Stroop color naming task to examine the change of self-representation under different experimental conditions.

### Concealing Information and Its Influence on Self-Concept

Concealing key or sensitive information regarding one's identity is an identity-management strategy that individuals often use in social interaction (Goffman, 1963). For example, to avoid negative expectations that often cause discrimination and rejection, members with socially devalued identities could choose to escape from negative feedback by concealing their identity-related socially devalued information (Goffman, 1963). Meanwhile, to create more positive impressions, even socially valued group members may also use the concealing strategy to manage their social interactions (e.g., students with high academic achievement could conceal their good test scores to be perceived as modest).

Concealing identity-related information has significant implications for individuals' self-concepts. Many scholars believe that an individual's self-concept may benefit from concealing his or her socially devalued identity. This may enable them to minimize the impact of their devalued identities on others' judgments and to be accepted as "normal" (Goffman,

1963). Moreover, research also has shown that concealing socially devalued information protects members of stigmatized groups from prejudice and discrimination directed at them (e.g., Quinn, Kahng, & Crocker, 2004). That is, they could avoid the threat of negative expectations (Steele & Aronson, 1995) and benefit from positive perceptions by others (Shih, Pittinsky, & Ambady, 1999). Thus, self-concept would improve for individuals who gain a contextually valued identity by concealing socially devalued information. Similarly, the self-concepts of individuals who conceal positive information about their identities may be impaired.

### **Concealing Information and Keeping Secrets**

Concealing information is a form of keeping secrets. Research on secrecy contributes ample evidence for helping us understand the process of concealing information. Lane and Wegner (1995) suggested that when individuals try to keep a secret, they must suppress not only the secret information itself but also related thoughts (Lane & Wegner, 1995). Although suppression can be an effective way of maintaining a secret in the beginning, it can also cause the deep cognitive activation of this information and its related thoughts. Deep cognitive activation is a transition of mental state whereby thoughts are transferred from unconsciousness to consciousness (Wegner & Smart, 1997). This state is unstable in that it represents a combination of the tendency to think about something and the effort expended *not* to think about that very same thing (Wegner et al., 1997). When the efforts to suppress are removed, the target and its related thoughts will activate and become accessible for individuals (Wegner et al., 1997).

Wegner (1994) argued that suppression is an effortful cognitive operation that cannot be used effectively when the cognitive resources are not sufficient. Under the condition that a cognitive load exists to tax these resources, suppressed ideation would resurface (Wegner, 1994). Mikulincer, Birnbaum, Woddis, and Nachmias (2000) asked participants to remember a two-digit number (i.e., low cognitive load) or a seven-digit number (i.e., high cognitive load) before identifying the color of words during a Stroop color naming task and found that when the cognitive load was high, the suppressed thoughts were more likely to become accessible. These findings suggest that additional cognitive load could interfere with thought suppression.

### **Hypothesis Development**

The present study examined the influence of concealing academic achievement on self-concept in academic-related social interactions. An interview paradigm called for school-aged adolescent participants who had either low academic achievement (low achiever, LA) or high academic achievement (high achiever, HA) to play the role of good students or students with low achievement while answering academic-performance-related questions. The HA participants who were assigned to play the role of LA were made to conceal their positive achievement information and have contextually devalued identities. Those LA participants who were assigned to the role of HA were made to conceal their negative achievement information and have contextually valued identities. Based on these experimental manipulations, hypotheses were developed.

### **State Self-Esteem**

It is well known that situational factors can momentarily change one's self-esteem (Heatherton & Polivy, 1991). The extent to which self-esteem can be influenced depends on the psychological significance of the situation to the individual (English & Chen, 2007). Information related to academic achievement has significant implications for adolescent students, as their self-concepts are closely related to their learning status (e.g., Gans, Kenny, & Ghany, 2003). Therefore, in the present study, via an interview in academic-related experimental contexts, we used state self-esteem measures to detect the temporary changes of adolescents' self-concept. Specifically, for LA adolescents, we expected that they could escape from the threat of negative expectations when they could conceal the negative information about their academic status. As a result, they would enjoy more state self-esteem than LA adolescents who were not able to conceal negative academic information. On the other hand, we expected that the HA participants would have a contextually devalued identity when they were required to conceal the positive academic information related to them. As a result, they would enjoy less state self-esteem than HA adolescents who were not required to conceal such information.

### **Hypothesis 1**

The state self-esteem of the LA adolescents who concealed their negative academic information would be more positive and the state self-esteem of the HA adolescents who concealed positive academic information would be more negative than that of their counterparts who were not required to conceal academic information.

### **Accessibility of Self-Representation**

The objective of the first part of the present study is to examine the influence of concealing academic-achievement information on adolescents' state self-esteem. The second part expects to identify the cognitive process of the change in self-concept when adolescents try to conceal academic achievement information, that is, keep such information a secret from their peers. According to Lane et al. (1995), when people keep secrets, they will suppress other, secret-related thoughts (Lane & Wegner, 1995). Thus, adolescents who have concealed their achievement information may try to suppress thoughts related to their dominant self-representations. We designed an item to measure this suppression of the self-representation.

### **Hypothesis 2**

Adolescents who had contextually valued identities (in the present study, these participants were LA adolescents in the HA context) or devalued identities (in the present study, these participants were HA adolescents in the LA context) by concealing academic achievement would show more suppression of their dominant self-representations.

Suppressing secret related thoughts can be an effective way to maintain a secret, but it also can cause deep cognitive activation of the secret and its relevant thoughts (e.g., Wegner & Smart, 1997). In other words, when adolescents try to conceal their identity and suppress their dominant self-concept,

the dominant self-concept and its related thoughts may be in the state of deep activation. To examine this potential deep activation state of self-concept and related thoughts, we used a modified Stroop (1935) color-naming task (Mathews & Macleod, 1985) with imposed cognitive load, which has been widely adopted in previous studies on thought suppression, to assess the implicit activation of participants' self-concept by measuring the extent to which self-representation-related words influence performance on cognitive tasks (e.g., Bargh & Tota, 1988; Wegner & Erber, 1992).

Activation of a specific mental representation increases attention to representation-congruent aspects of stimuli, thus slowing the naming of the color in which the stimuli are presented in a Stroop task (Mathews & Macleod, 1985). That is, interference in color-naming responses in the Stroop task reflects the implicit accessibility of certain concepts or thoughts. To magnify the interference with the suppressing manipulation, we introduced additional cognitive load to the Stroop task. We manipulated the cognitive load by instructing participants to perform the Stroop task with another effortful task (i.e., remembering and repeating one-digit numbers under low cognitive load or six-digit numbers under high cognitive load). Therefore, if adolescents' suppressed self-representation and related thoughts became reactivated, the naming of the colors in which related words were presented would slow down when cognitive load was high.

In the present study, adolescents who concealed negative information would suppress their negative self-representations. Similarly, adolescents who concealed positive information would suppress their positive self-representations. Thus, we expected that the suppressed self-representations would be reactivated under the condition of high cognitive load and expected to observe an interaction effect among participants' characteristics (LA vs. HA adolescents), experimental context (valued vs. devalued identity), cognitive load (low vs. high), and word types (positive, negative, or neutral) on the reaction time to the words related to self-representation in the Stroop color-naming task.

### **Hypothesis 3**

Under high cognitive load, the reaction time to words related to negative self-representation for adolescents who concealed negative information and the reaction time to words related to positive self-representation for adolescents who concealed positive information would become slower.

## **Method**

### **Participants**

The present study used adolescents who were more likely to conceal their academic achievement and have contextual identities different from those of their normal daily lives as participants. These participants were adolescents with low academic achievement and adolescents with high academic achievement.

Tests measuring adolescents' academic achievement in all subjects (including math, Chinese literature, English, physics, and politics) were generally used in China to screen the students with LA. In our study, achievement

test scores below 90% of their classmates' in the last year and average or above-average intelligence with a marked deficit in academic achievement were taken as two key criteria for screening LA participants. The reason we used these criteria to select LA participants was that these students were more likely to suffer from the constant threat of low academic achievement and to conceal their negative academic information during social interactions. We excluded students who demonstrated (a) extreme behavioral difficulties that would impede completion of the study measures, (b) identified neurological deficiencies, and (c) sensory impairments.

Having test scores above the 10th percentile was used as the criterion to select HA adolescents. These participants were more likely to conceal their positive academic achievement information in certain situations.

For each class, we asked teachers to randomly select equal numbers of HA and LA participants, and identify both boys and girls with HA who matched students with LA on age. This resulted in a final sample consisting of 65 LA adolescents (44 boys and 21 girls) and 64 HA adolescents (30 boys and 34 girls) aged 13 to 15 years (LA mean =  $14.28 \pm 0.84$ ; HA mean =  $14.38 \pm 0.80$ ) from a middle school.

## Measures

**Rosenberg Self-Esteem Scale.** The *Rosenberg Self-Esteem Scale* (Rosenberg, 1965) was widely used to measure individuals' trait self-esteem. The scale had relatively high internal consistency ( $\alpha = .80$ ) and test-retest reliability ( $r = .80$ ) (Blascovich & Tomaka, 1991). One sample item is, "Generally, I was very proud of myself." Participants rated the extent to which each item was descriptive of their feelings on a 4-point scale ranging from 1 (*not at all*) to 4 (*very much*). The higher the rating score, the higher the participant's self-esteem.

**State Self-Esteem Scale.** The *State Self-Esteem Scale* (Heatherton & Polivy, 1991) was a developed measure of temporary changes in self-esteem, with high internal consistency (Cronbach's  $\alpha = .92$ ). It had been demonstrated to be sensitive to manipulations designed to temporarily alter self-esteem (Heatherton & Polivy, 1991). The *State Self-Esteem Scale* contains subscales for performance, social, and appearance self-esteem. The task of the present study was to conduct an individual interview with an unfamiliar expert, which was more likely to influence the social aspect of self-esteem and was irrelevant to performance and appearance, so we selected the social self-esteem subscale as the instrument. This scale should be most sensitive to situations in which self-presentational concerns are threatened, and it measures the extent to which people feel self-conscious, foolish, or embarrassed about their public image (Heatherton et al., 1991). The participants rated to what extent they "felt right" according to seven items (e.g., "I am worried about what other people think of me"). Each item was scored on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*).

**Self-Representation Suppression.** The *preoccupation model of secrecy* suggests that the first step of keeping a secret is to suppress secret-related thoughts (Lane & Wegner, 1995). Previous literature based on this model contains items for measuring the suppression of the secret-related thoughts (e.g., Major & Gramzow, 1999; Smart & Wegner, 1999), and, accordingly, we created the item "During the interview, I try to restrain myself from



thinking about what kind of student I am” to measure the suppression of participants’ global self-representation. Participants were asked to rate the degree to which the item conforms to him- or herself from 1 (*complete non-conformity*) to 7 (*complete conformity*).

To validate the item used in the present study, we conducted a panel study in which six experts in developmental and clinical psychology assessed the content validity of this item. We provided the panel members with the definition of self-representation suppression and asked them to make judgments about the content validity of three items. One of these items was the omnibus item we used for measuring the suppression of global self-representation concerning different student types; the other two were filler items measuring other suppression constructs (i.e., “I try to restrain myself from thinking about the thoughts of my learning-relevant things,” and “I try to restrain myself from thinking about the others’ evaluations of me”). Panel members were required to circle the item that they believed fit the operational definition of the self-representation suppression best. All six experts correctly selected the item we used to measure global self-representation suppression, which indicates that the single item used has adequate content validity and discriminant validity.

**Stroop Color Naming Task.** Various modified Stroop (Stroop, 1935) tasks have been used to explore how individuals process information, and we accepted them as useful tools for gauging attentional bias (e.g., Smith, 2009). A modified Stroop task was also used to test the activation of suppressed self-representation in the present study. The measure was administered on a computer, as was done in the studies by Lane and Wegner (1995). During this task, participants sat in front of the computer, while the words with color were displayed in the center of the monitor. Experimental procedures, such as displaying the stimulation and recording the results, were controlled automatically by E-prime software.

At the beginning of the experiment, participants read instructions on the monitor explaining that they were to respond quickly and accurately to a series of words and indicate whether each word was shown in red or blue by pressing one of the keys on the keyboard. Before the stimulus words were presented on the screen, either a one-digit number (low load) or a six-digit number (high load) appeared at the center of the screen. Participants were asked to remember the number while identifying the word color. 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, then the words disappeared. After that, an instruction appeared on the screen, asking participants to orally report the number presented at the beginning of each trial and the experimenter to record the reported number. Then, participants pressed any key to continue. Each participant underwent 10 practice trials and 54 formal trials per task. There were nine stimulus words: three positive self-representation words (e.g., *intelligent*, *diligent*, and *passionate*), three negative self-representation words (e.g., *lazy*, *careless*, and *indifferent*), and three neutral words (e.g., *leaf*, *car*, and *telephone*). Words of negative or positive self-representation were provided by participants in the preparation session from their own descriptions of negative and positive aspects.



## Design

The experiment was set up as a mixed  $2 \times 2 \times 2 \times 3$  (type of students  $\times$  experimental context  $\times$  cognitive load  $\times$  word types) factorial design. The between-participants variables were the type of students (LA vs. HA) and the experimental context (HA context vs. LA context). LA and HA students were randomly assigned into two experimental contexts, which created four between-participants experimental conditions. The HA participants who were assigned to the LA context were required to have their positive achievement information concealed and to have contextually devalued identities. Those LA participants who were assigned to the HA context were required to have their negative achievement information concealed and to have contextually valued identities. HA students in the HA context and LA students in the LA context cannot conceal their academic achievement, and there is no obvious change of their identity, so we took these two conditions as control conditions. There were also two within-participant variables: word type (positive self-representation, negative self-representation, or neutral) and cognitive load (low vs. high).

## Procedure

The study was operated in two stages. The preparation stage was conducted 2 to 3 days before the formal session. The tasks of the preparation stage were as follows: (1) Participants completed the *Rosenberg Self-Esteem Scale* (Rosenberg, 1965), and (2) participants were asked to write down five words that represented their *positive aspects* and five words that represented their *negative aspects*. From those, we selected three positive and three negative words as the stimulation words for each participant in the Stroop task.

In the formal stage, all the participants were interviewed individually in the laboratory. The procedures were as follows:

1. When participants arrived, they were greeted in a waiting room by an experiment assistant, who claimed to be a new teacher.
2. Participants were assigned into one of the two experimental contexts randomly.

In the HA context, the participants were told,

Your interviewer in the laboratory is a respected expert in the field of education who does not know about your academic achievement information. This expert wants to interview some students and give advice on learning strategies. Later, he (she) will interview a *good student*. Now, you know that I am a new teacher here and I cannot find a suitable student for him (her). So I'd like to ask you to role-play a good student and have an interview with that expert. Then, you should follow the expert's instruction and do your best to complete all tasks. I will offer you a wonderful present for completing your tasks successfully.

In the LA context, the same instructions were given, with the substituting phrase "student with low academic achievement" for "good student."

3. The assistant guided a participant to the laboratory and introduced his (her) academic performance (which had been assigned to the participant, real or bogus) to the "expert" (experimenter).

4. The experimenter reinforced the participant's identity (participant's experiment context), and said, "I have heard from the assistant that you are an excellent student (or student with poor academic performance) in your class. Is that right?" The reinforcement has two purposes: to ensure that the participant actually concealed his (her) identity, and to remind the participant of his (her) identity in the interview.
5. In the formal interview, participants were asked to describe themselves and answer some neutral and learning-related questions.
6. Participants were administered a Stroop task.
7. After the Stroop task, participants completed their self-report on state self-esteem and the thought-suppression measure.
8. At the end, participants were debriefed and thanked for their participation.

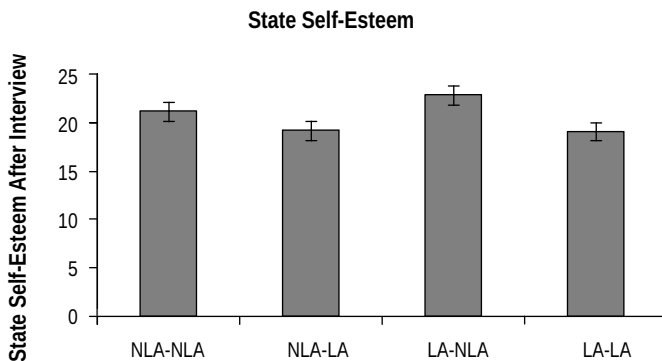
## Results

### Self-Esteem

**Trait Self-Esteem.** A 2 (experimental contexts)  $\times$  2 (student type) ANOVA was conducted to examine the trait self-esteem. In this study, the partial eta squared ( $\eta^2$ ) was reported as an indicator of effect size for each ANOVA. Results showed a significant main effect of student type,  $F(1, 124) = 12.06$ ,  $p < 0.01$ , partial  $\eta^2 = 0.09$ . Using Cohen's (1988) guidelines (i.e., partial  $\eta^2 = .01$  was a small effect size, partial  $\eta^2 = .06$  was a medium effect size, and partial  $\eta^2 = .14$  was a large effect size), the effect size was moderate, revealing that HA participants ( $M = 30.98$ ) had higher levels of trait self-esteem than LA participants ( $M = 28.42$ ). It showed that participants with LA had more negative self-concepts than HA participants without any manipulation, which was consistent with the findings of previous studies on the self-concept of LA students (e.g., Gans, Kenny, & Ghany, 2003). The main effect of experiment context was not significant ( $p > 0.40$ ), which indicated that there was no significant difference in participants' levels of self-esteem in different experimental contexts ( $M = 29.98$  and  $M = 29.38$ , for the HA context and LA context, respectively). The interaction effect between type of student and experimental context was not significant ( $p > 0.50$ ), indicating that the level of self-esteem of the HA students is steadily higher than that of the LA students.

**State Self-Esteem.** We used trait self-esteem as a covariate when examining state self-esteem. The result showed that trait self-esteem was a significant covariate,  $F(1, 123) = 6.99$ ,  $p < 0.01$ , partial  $\eta^2 = 0.05$ . The main effect of student type was not significant ( $p > 0.40$ ), which showed that there was no significant difference in state self-esteem between HA and LA adolescent participants, after controlling for trait self-esteem. There was a significant main effect of the experimental context,  $F(1, 123) = 8.92$ ,  $p < 0.01$ , partial  $\eta^2 = 0.07$ . The level of social self-esteem in the HA context ( $M = 22.05$ ) was significantly higher than that in the LA context ( $M = 19.02$ ). The effect size was moderate (partial  $\eta^2 = 0.07$ ), indicating that the difference between

the two contexts was practically meaningful. The interaction effect between student type and experiment context was not significant ( $p > 0.30$ ). This result showed that the level of state self-esteem of the participants of two types in the HA context was significantly higher than that in the LA context. More specifically, the state self-esteem of LA participants in the HA context ( $M = 22.50$ ) was higher than that of LA participants in the LA context ( $M = 18.61$ ). The state self-esteem of HA participants in the HA context ( $M = 21.59$ ) was higher than that of HA participants in the LA context ( $M = 19.45$ ). These findings provide support for Hypothesis 1, demonstrating that self-esteem would increase for adolescents concealing their negative academic information and would decrease for adolescents concealing their positive academic information. The results of state self-esteem that have been adjusted by general self-esteem are shown in Figure 1.



*Figure 1.* State self-esteem whose values have been adjusted by general self-esteem after interview for participants with or without LA who were in an HA context or LA context. *Note.* HA-HA = HA participants in the HA context; HA-LA = HA participants in the LA context; LA-HA = LA participants in the HA context; LA-LA = LA participants in the LA context.

### Suppression of Self-Representation

Results of an ANOVA showed that the main effect of type of student was not significant ( $p > 0.80$ ). There was no significant difference between LA adolescents ( $M = 3.71$ ) and HA adolescents ( $M = 3.77$ ). In addition, the main effect of experimental context was not significant ( $p > 0.80$ ), either. There was no significant difference between the LA experimental context ( $M = 3.69$ ) and the HA experimental context ( $M = 3.78$ ). The interaction between experiment context and student type was significant,  $F(1, 125) = 9.59$ ,  $p < 0.01$ , with a partial  $\eta^2$  of .07 reflecting a medium effect. The result of simple effect analysis indicated that self-representation suppression of the LA participants in the HA context ( $M = 4.31$ ) was higher than that in the LA context ( $M = 3.12$ ),  $F(1, 63) = 5.71$ ,  $p < 0.05$ , partial  $\eta^2 = 0.08$ . The difference between HA participants in two experimental contexts was also significant,  $F(1, 62) = 3.99$ ,  $p = 0.05$ , partial  $\eta^2 = 0.06$ , and the levels of self-representation suppression for HA participants in the LA context ( $M = 4.28$ ) were higher

than in the HA context ( $M = 3.25$ ). The partial  $\eta^2$ s (0.08 and 0.06) suggested medium effect sizes, indicating that the two observed significant differences were practically meaningful. These results supported Hypothesis 2, that concealing academic information was related to self-representation suppression for adolescent participants.

### Accessibility of Self-Presentation in the Stroop Color-Naming Task

The measure of accessibility following the interview was reaction times (RTs) for correct responses in the Stroop task. To reduce the influence of extreme values, RTs exceeding 3  $SD$  from the mean were identified as outliers. The data of RTs are measured with a mixed-design ANOVA with student type and experimental context as between-participants variables and word type (positive self-representation, negative self-representation, or neutral) and cognitive load (low or high) as within-participant variables. The mean RTs of three types of words for participants under different experimental conditions are shown in Table 1. The results indicated that main effect of word type was significant,  $F(2, 250) = 4.83$ ,  $p < 0.01$ , partial  $\eta^2 = 0.09$ . The effect size was medium, which also indicated that there were practically meaningful differences among different word types. The results of multiple comparisons indicated that the RTs to negative self-representation words ( $M = 801.39$ ) were significantly longer than those to neutral words ( $M = 774.80$ ),  $p < 0.01$ , partial  $\eta^2 = 0.09$ . RTs to positive self-representation words ( $M = 800.33$ ) were significantly longer than to neutral words,  $p < 0.01$ , partial  $\eta^2 = 0.09$ . There was no significant difference between negative words and positive words,  $p > 0.90$ . These results implied that for neutral words, RTs to the words that describe the self-representation are longer, which indicated that participants pay more attention to the words that describe their own positive and negative traits. To some extent, the thoughts that related to self-representation were obtained for all the participants in different experimental contexts.

Table 1  
*RTs for Three Types of Words Under Different Experimental Conditions*

		HA participants		LA participants	
		HA context ( $n = 32$ )	LA context* ( $n = 32$ )	HA context* ( $n = 32$ )	LA context ( $n = 33$ )
Positive	High	786.58(161.94)	834.74(233.79) <sup>a</sup>	837.82(167.07) <sup>g</sup>	792.40(192.75)
	Low	776.16(195.47)	797.05(198.12) <sup>b</sup>	819.11(228.69) <sup>h</sup>	758.76(198.66)
Negative	High	744.35(176.80)	808.46(158.44) <sup>c</sup>	865.90(188.46) <sup>i</sup>	767.82(156.72)
	Low	812.96(220.62)	811.69(203.42) <sup>d</sup>	806.07(198.15) <sup>j</sup>	793.94(222.06)
Neutral	High	773.32(175.31)	773.36(151.01) <sup>e</sup>	796.33(172.95) <sup>k</sup>	776.20(203.82)
	Low	751.17(187.76)	775.50(138.93) <sup>f</sup>	790.74(162.13) <sup>l</sup>	761.40(193.92)

Note. High = high cognitive load; Low = low cognitive load; numbers in brackets are standard deviations.

\* indicates that the means in the column were found to differ significantly from one another. Specifically, under the condition of high cognitive load,  $a > e$ ,  $i > k$ ; no significant differences were found among  $b, d, f, h, j$ , and  $l$ .

The effect of four-way interactions (student types, experimental context, cognitive load, and word types) was significant,  $F(2, 250) = 3.85$ ,  $p < 0.05$ , partial  $\eta^2 = 0.06$ . The results of a planned comparison showed that under high cognitive load, RTs of HA participants in LA experimental contexts to the words among three types were marginally significantly different,  $F(2, 30) = 2.78$ ,  $p < 0.08$ , partial  $\eta^2 = 0.16$ . The results of multiple comparisons indicated that RT to positive words ( $M = 834.74$ ) was significantly longer than to neutral words ( $M = 773.76$ ),  $p < 0.05$ . No significant difference was found between negative words ( $M = 808.46$ ) and neutral words,  $p > 0.20$ , which showed that HA adolescents in LA contexts can more easily activate positive self-representation under high cognitive load; the RTs of LA participants in HA contexts to the three types of words were significantly different,  $F(2, 30) = 6.07$ ,  $p < 0.01$ , partial  $\eta^2 = 0.29$ . The large effect size suggested that there were large differences among the three types of words. The results of multiple comparisons indicated that the RT to negative words ( $M = 865.90$ ) was longer than to neutral words ( $M = 796.33$ ). There was also no significant difference either between positive words ( $M = 837.82$ ) and neutral words,  $p > .10$ , or between negative words and positive words,  $p > .30$ . Under the high cognitive load condition, adolescents who concealed negative learning information and had contextually valued identities (LA adolescents in the HA context) could easily access negative self-representations. These results supported our third hypothesis, that under high cognitive load, the reaction times of words related to self-representation that would be suppressed during the interview would become slower for participants whose academic identities were concealed.

Under low cognitive load, participants' reaction times to the words among three types were not significantly different, which indicated that the speed of recognizing words was not affected by the words' meaning when there were sufficient cognitive resources to suppress self-related thoughts for participants who tried to conceal their academic standing.

## Discussion

There is considerable theoretical and conceptual support for the notion that self-concept can be temporarily altered (e.g., Heatherton et al., 1991). During the period of adolescence, self-concept is particularly vulnerable (Wigfield et al., 1991) and is easily influenced by feedback from the environment. The power of a given context to change one's self-concept is dependent on how pervasively shared it is and on the ways it is recognized (Markus, Mullally, & Kitayama, 1997). Academic achievement is considered a key criterion for evaluating school-aged adolescents in Chinese culture. All adolescents care about feedback on their school performance, which could have an important impact on their self-concept. The present study focused on the relationship between concealing information about feedback on school performance and adolescents' self-concept. The results demonstrated that, compared with those who failed to conceal academic achievement, adolescents who concealed their negative academic information had higher state self-esteem, more self-representation suppression, and obvious activation of negative self-representation under high cognitive load. On the other hand, adolescents who concealed their positive academic information showed lower state self-esteem, a trend of suppressing positive self-representation,

and clear activation of positive self-representations. Such results supported our main hypotheses.

### **The Influence of Concealing Learning Information on Self-Esteem**

Many scholars (e.g., Tesser, 1988) believe that situational factors can lead to momentary changes in self-evaluation. Some events can momentarily alter self-esteem (e.g., comparing self with successful others may cause lower self-esteem; comparing self with low achievers could enhance self-esteem). In laboratory studies, mood-induction procedures, including false personality feedback, bogus performance feedback, and experimentally biased social comparisons, can often influence self-esteem (Wells & Marwell, 1976). Some empirical investigations have studied the extent to which self-esteem fluctuates, and the researchers found that self-esteem fluctuated slightly around a stable baseline of self-concept (e.g., Savin-Williams & Demo, 1983). To further address the nature of self-esteem, Crocker, Cornwell, and Major (1993) obtained two distinct concepts of self-esteem: trait self-esteem, which reflects the nature of the stable baseline of one's self-concept to examine personal global self-esteem, and state self-esteem, which reflects the fluctuation of the self-esteem to assess short-lived changes in self-esteem (Crocker, Cornwell, & Major, 1993). In general, experimental manipulations influence participants' state self-esteem rather than trait self-esteem (Crocker et al., 1993).

In the present study, both trait self-esteem and state self-esteem were measured. The measure of trait self-esteem provided us with participants' global self-esteem in their normal daily lives without any experimental manipulation, which can be taken as the baseline of the change of the self-esteem after the interview. The result of trait self-esteem showed that the global self-esteem of LA participants is more negative than that of HA participants, which is consistent with findings of previous studies that students with LA have more negative self-esteem than HA students (e.g., Gans et al., 2003). To eliminate the possible influence of trait self-esteem on the results of state self-esteem after experimental interview, we included trait self-esteem as a covariate when conducting an ANOVA to examine state self-esteem. The result revealed that the state self-esteem of LA adolescents in the HA context was higher than that of LA participants in the LA context. Meanwhile, state self-esteem of HA adolescents in the LA context was lower than that of HA participants in the HA context. These results indicated that adolescents' self-esteem would be improved from concealing negative academic information and having contextually valued identities, but impaired from the practice of concealing positive academic information and having contextually devalued identities. Such results supported Hypothesis 1, suggesting that LA adolescents in the HA context can escape the threat of negative expectations. They could participate in the interview as valued individuals (HA students), and they experienced more positive feelings about themselves. In contrast, HA participants in the LA context had to confront the threat of negative contextual expectation and experienced more negative feelings about themselves.

The measure of state self-esteem, via self-report, directly examined the explicit effects of concealing academic achievement on adolescents' self-concept. However, previous research has proved that lack of conscious reporting does not entail lack of implicit cognitive activation (Wegner et al.,

1997). Thoughts that are not present at the conscious level can be activated at an unconscious, implicit level (Wegner et al., 1997). Thus, using only a self-report measure may be insufficient for studying the influence of concealing academic information on self-concept. Accordingly, through examining the suppression of self-representation and accessibility of self-representation during a Stroop color-naming task, we would demonstrate the implicit performance of cognitive process of the influence of concealing learning information on the self-concept.

### **Influence of Concealing Academic Standing on Self-Representation**

Our results supported Hypothesis 2, showing that LA adolescents in the HA context showed more suppression of self-representation than LA adolescents in the LA context. In addition, the mean score of self-representation suppression of HA adolescents in the LA context was higher than that of HA participants in the HA context. These results suggest an enhanced trend of self-representation suppression for the adolescents who concealed their academic information. Results of the Stroop color naming task further provided us with powerful evidence that HA participants in the LA context had tried to suppress their positive self-representation.

The Stroop color-naming task was used to examine the accessibility of adolescents' self-representation that had been suppressed. During this task, the RTs of negative self-trait words of the LA participants in the HA context were longer than the neutral words under high cognitive load, indicating that negative self-representations were reactivated and interfered in the identification of the color of the negative self-trait words. It became necessary for the LA participants in the HA context to suppress their negative self-representations in order to keep their learning status a secret. Thought suppression can cause a deep cognitive activation of the right thoughts (Lane & Wegner, 1995; Wegner et al., 1997). Thus, the attempt to suppress negative self-representations caused the deep activation of the LA participants' negative self-representation in the HA context. When the high cognitive load taxed their cognitive resources and the LA adolescents did not have enough resources to perform suppression, negative self-representation would be reactivated in their consciousness and become dominant aspects of the working self-concept. The result of this change caused the color identification of the negative self-trait words to have longer reaction times than neutral words. Similarly, the results of the Stroop color-naming task also showed that RTs of positive self-trait words of HA adolescents in the LA context are longer than those of neutral words under high cognitive load. For the purpose of keeping their real learning status secret during the interview, HA participants in the LA context had to suppress their positive self-representation, which also caused the deep activation of positive self-representations. Under the high cognitive load, HA adolescents did not have enough resources to suppress the positive self-representations, which resulted in reactivated positive self-representations being dominant in their working self-concepts. Consequently, RTs became longer.

In conclusion, the present study examined the influence of concealing academic achievement on participants' self-concept using two research



paradigms: explicit self-report and implicit cognitive interference. The results showed that both adolescents' self-esteem and their self-representation were affected by the attempt to conceal learning-relevant information. Such results also suggested that adolescents' self-concept could be influenced by individual impression management strategies—concealing learning-relevant information. Evidence from the current study indicated that the cognitive process may be one of the mechanisms by which concealing learning-relevant information influences self-concept.

## Implications and Limitations

The present study has important theoretical implications. First, to the authors' knowledge, the current study represents one of the first attempts to explore the phenomenon that self-concept can be influenced by the way in which individuals manage their own behaviors during social interactions. It shows that state self-esteem can be influenced by how a person integrates performance feedback (negative or positive). Previous studies mainly focused on the interaction between environmental feedback and individuals' self-concept (e.g., Healy, Barnes-Holmes, Barnes-Holmes, & Keogh, 2008; Merwin & Wilson, 2005), but few studies have paid attention to the effect of inner feedback of individuals' own behaviors on their self-concept. This study showed that individuals could actively adopt some strategies to influence their own self-concept.

Second, we examined the effect of concealing information and extended the investigation to adolescence research. Researchers who have studied the effect of concealing information, such as that relating to abortion (Major & Gramzow, 1999), eating disorders (Smart et al., 1999), and homosexuality (Ullrich, Lutgendorf, & Stapleton, 2003), were mainly conducted with adult participants. The current study extends this research theme to adolescents and enriched theoretical considerations for studying this type of phenomenon.

Several limitations need to be noted in the current study. First, our study explored only one possible social scenario for concealing learning-relevant information for adolescents—an interview with an unfamiliar authority. Future research should examine such effects in other social contexts, for example, social interactions with peers. One of the most interesting contexts for future study may be personal interactions on the Internet, which could yield completely different results from those in nonvirtual environments. Second, it should be noted that the current samples represent adolescent populations that have academic achievement below 90% or above 10% of their classmates. Therefore, more studies are needed, using creative designs, that examine the effects of concealing learning information on the self-concept of a wider adolescent sample. Third, although adolescents' level of academic achievement is a major focus of the study, there is no measure of academic self-concept. We used a measure of general self-esteem (rather than academic self-concept), because it helps to extend the findings to other social situations. However, it is also likely to contaminate actual academic self-concept. Future studies could further test the change in academic self-concept using the present experimental paradigm.

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