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We Talk, Therefore We Think? A Cultural Analysis of the Effect of Talking on Thinking

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The Western assumption that talking is connected to thinking is not shared in the East. The research examines how the actual psychology of individuals reflects these different cultural assumptions. In Study 1, Asian Americans and European Americans thought aloud while solving reasoning problems. Talking impaired Asian Americans' performance but not that of European Americans. Study 2 showed that participants' beliefs about talking and thinking are correlated with how talking affects performance, and suggested that cultural difference in modes of thinking can explain the difference in the effect of talking. Study 3 showed that talking impaired Asian Americans' performance because they tend to use internal speech less than European Americans. Results illuminate the importance of cultural understanding of psychology for a multicultural society.

A professor . . . encourages his Asian students to speak up in class by making it part of the class grade. He makes speaking in front of the class mandatory for some assignments. "Once they understand this is the norm you expect, they'll get used to it," he says. "But you have to make it clear." (Lubman, 1998, p. A12)

As reported in the *San Jose Mercury News* (Lubman, 1998), many colleges in the United States with a large population of Asian and Asian American students are concerned about the students' silence in class. The silence of Asian students is a concern for universities who want their students to be "independent thinkers." Motivating this concern is the notion that getting students to talk is a way to make them "better" thinkers. In discussing this issue, the news article details the concern of many educators who are trying to make silent students more vocal, and at the same time, reveals a number of educational assumptions about the relationship between talking and thinking.

One assumption is that talking is a positive act, and there are at least two reasons for this. First, talking is a positive act because it is an expression of the individual (Bellah, Madsen, Sullivan, Swidler, & Tipton, 1985). Talking is a basic means through which individuals express their ideas, points of view, and individuality—the core value of American culture. Therefore, the effort to encourage verbal expression of thoughts is a good and justifiable act.

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Second, talking is a positive act because it is closely connected with thinking. Language and its verbal expression in talking can create, change, and signify thinking, and hence, one can generally equate talking and thinking. Thus, talking is often taken to mean that the speaker is engaged in thinking, obviously an important act. Underpinning the assumption that talking is a positive act is the assumption of psychic unity (Bruner, 1996; Shweder, 1995), that is, it is assumed that the close relationship between talking and thinking is true for everyone, and the same positive meaning of talking should be shared by everyone.

These assumptions are commonly held in Western cultural contexts. Indeed, the Western assumption about near equivalence of talking and thinking is still very pervasive and fundamental to the study of the mind, despite the abundant research to show that the positive meaning of talking is culturally specific rather than universal (e.g., Azuma, 1986; Gudykunst, Gao, & Franklyn-Stokes, 1996; Kim & Markus, 2002; Marsella, 1993; Minami, 1994; Smith & Bond, 1999; Tobin, Wu, & Davidson, 1989). The potential influence of cultural meanings and practices on the assumption of closeness of talking and thinking is usually overlooked, and the equivalence is thought to be "the nature of human nature" (Bruner, 1996, p. 16). The present research addresses this question of whether the assumption of equivalence of talking and thinking is a product of particular Western sociocultural experiences that may not necessarily generalize to other cultural contexts. More specifically, in three studies participants from different cultural contexts (i.e., East Asia and America) engaged in cognitive problem solving while talking, showing the different effects of talking on performance (i.e., facilitating, interfering, or no effect) and the underlying process that contributes to this difference.

Cultural Differences in the Assumptions About Talking and Thinking

The assumption that talking and language are closely related to human thinking can be easily found in the Western intellectual tradition throughout history from the ancient philosophers (Barnes, 1965) to contemporary linguists and psychologists (e.g., Ericsson

& Simon, 1980, 1993; Whorf, 1956; Wierzbicka, 1992). In the Western intellectual tradition, thinking and talking have been thought to be interdependent since ancient Greek civilization. For example, Homer considered one of the most important skills for a man to have to be that of the debater (Nisbett, Peng, Choi, & Norenzayan, 2001). Sophists commonly emphasized the eristic methods that are skills of disputation (Barnes, 1965). Also, Socrates viewed knowledge as existing within people and needing only to be recovered through verbal reasoning, as reflected in his dialectic method (Barnes, 1965; M. Hunt, 1993), and Plato believed that thought is "the soul's discourse with itself (as shown in Miller, 1981)." In Judeo-Christian and Islamic beliefs, the "Word" is considered sacred because of its divine power to create (Armstrong, 1993). In the Bible, for example, the word is equated with God and with the divine tool of creation (Metzger & Coogan, 1993).

This assumption about the connectedness of thinking and talking persists and has been incorporated into many psychological models of thinking. Language is both a central topic in the study of human cognition as well as an important tool to study how people think. For example, J. B. Watson (1924) viewed thinking as consisting of primarily subvocal speech. Also, the well-known Whorfian hypothesis (Whorf, 1956) asserts that thoughts are molded by the syntax and vocabulary of one's native language. Although the strict Whorfian view that thought is entirely determined by language is no longer accepted, variations of this view are still widely discussed (e.g., E. Hunt & Agnoli, 1991; Markman & Hutchinson, 1984; Slobin, 1996). Certainly, many psychologists have also pointed out that talking can often be at odds with thinking because people do not often have conscious access to their thought processes or because some thought processes are not easily verbalizable (e.g., Fallshore & Schooler, 1995; Nisbett & Wilson, 1977; Schooler & Engstler-Schooler, 1990; Schooler, Ohlsson, & Brooks, 1993; Wilson & Schooler, 1991). Nevertheless, verbal reports of thinking processes (e.g., thinking aloud) continue to be used as valid data for analysis of many cognitive processes (for reviews, see Ericsson & Simon, 1980, 1993). These examples suggest that language occupies an important position in the Western study of the human mind.

The assumptions about language and talking are different in the East Asian cultural tradition (Kim & Markus, 2002). Since ancient Chinese civilization, East Asians did not assume the connectedness between talking and thinking. Not only are philosophical and religious discussions on language and thought and a tradition of debate largely absent, but also, East Asians believe that states of silence and introspection are considered beneficial for high levels of thinking, such as the pursuit of the truth. This assumption is well expressed in Buddhist and Taoist practices, such as meditation (Gard, 1962; Rinpoche, 1987; Robinet, 1993; Stein, 1979). According to Buddhist teaching, one can reach the power of living without getting stained by impurities through the stillness in meditation (Rinpoche, 1987). Moreover, Taoist teaching emphasizes the practices of silence, internal visualization, concentration, and regulation of breathing to reach the "Supreme Truth" (Robinet, 1993).

This overview of how talking has been conceived in these cultural contexts is, of course, a summary of idealized modes of thinking in each cultural tradition, rather than how these ideals are used in everyday life. In everyday situations, both sets of seem-

ingly contradictory assumptions can be found in both cultural contexts. Also, there is an overlap of these assumptions across cultures as well as diversity in the assumptions within a cultural context reflecting the complex nature of human life. Nevertheless, there are differences in the emphasis placed on each set of assumptions and in the prevalence and dominance of the assumptions in different cultural contexts. The cultural difference in the dominance of the assumptions on the relationship between talking and thinking is significant as these dominant assumptions can influence and reflect the modal cultural institutions and practices, and consequently how individuals engage in thinking itself.

Talking as a Cultural Practice

Cultural assumptions are often "conventionalized" in cultural ways of doing things in which these assumptions are reflected, and individual psychology may be influenced by these cultural ways of doing things (Bruner, 1996). When there are large differences in practices and interactions in different cultural contexts, there might be different psychological tendencies related to the practices and interactions. Therefore, the examination of cultural differences in how people are engaged in talking practices along with the examination of beliefs should provide valuable information on the contexts in which the psychological phenomenon of the effect of talking on thinking takes place.

Cultural assumptions are often manifested in processes of socialization (Bruner, 1996; Minami, 1994; Segall, Dasen, Berry, & Poortinga, 1999). For example, how people raise and teach their children is influenced by the cultural ideals of how a child should be. Indeed, the cultural differences found in interactions and practices regarding the act of talking are largely consistent with cultural differences in the assumptions about talking and thinking.

According to Caudill and Weinstein (1969), Japanese middle-class mothers speak much less frequently to their young children than do their American counterparts. Moreover, Chinese preschool teachers see quietness as a means of control, rather than passivity, and appreciate silence more than American teachers (Tobin et al., 1989). Consequently, East Asian children tend to be not as verbal as their European American counterparts. Japanese children produce significantly fewer utterances per turn than North American children (Minami, 1994), and they use verbal expression to communicate emotions less frequently than do American children (Caudill & Schooler, 1973). Also, Chinese infants at 7 months of age and older generally vocalize less than European American infants in response to laboratory events (Kagan, Kearsley, & Zelazo, 1977). This cultural difference in the relative importance of verbal communication demonstrated at a very early age holds for adults as well.

In East Asian cultural contexts, indirect and nonverbal communication of meanings in conversations are more strongly assumed than in European American cultural contexts (Azuma, 1986; Clancy, 1986; Gudykunst et al., 1996; Gudykunst, Ting-Toomey, & Chua, 1988; Hall, 1976; Minami, 1994; Markus, Kitayama & Heiman, 1996; Smith & Bond, 1999). Thus, in a Stroop task in which words are presented in a vocal tone with contradictory emotional meanings (e.g., hearing *enjoy* in an angry tone), Japanese participants' judgment was more influenced by nonverbal cues than was American participants' judgment (Kitayama & Ishii, 2002). These results suggest the relatively greater importance of

nonverbal aspects of communications in East Asian cultural contexts than in European American cultural contexts. Cultural practices are often shaped to promote and foster certain psychological tendencies desired by a particular cultural worldview (Bruner, 1996). Thus, psychological tendencies of talking and thinking might differ across cultures as much as cultural practices of talking differ across cultures.

Cultural Modes of Thinking and Their Psychological Effects

Understanding the cultural influence on the relationship between talking and thinking also requires the examination of the modes of thinking that are common and idealized in different cultural contexts because how talking affects thinking should depend on the nature of thinking as well as the nature of talking. Cultural analyses on cognition have suggested that the particular cultural meanings and practices tend to foster particular modes of thinking that are idealized in the given cultural context (Bruner, 1996; Greenfield, 1997). It has been well documented that there are reliable differences in the modes of thinking between people from the East and people from the West (e.g., Fiske, Kitayama, Markus, & Nisbett, 1998; Lin, 1935; Nakamura, 1964; Needham, 1962; Nisbett et al., 2001). People from East Asian cultural contexts tend to adopt a holistic style of reasoning in which many elements are held at the same time in thought in order to grasp the gestalt of the parts. In contrast, people from Western cultural contexts tend to adopt an analytic style of reasoning in which objects are broken up into their component elements (Fiske et al., 1998; Lin, 1935; Nakamura, 1964; Needham, 1962; Nisbett et al., 2001; Peng & Nisbett, 1999).

One of the corollaries of these differences might be the importance of language in cognitive processes. Research has shown that the nature of the effect of verbalization largely depends on the type of task (for reviews, see Ericsson & Simon, 1993; Wilson, 1994). Thinking processes involved with analytical cognitive tasks are found to be easily verbalizable, and hence, performance tends not to be impaired by verbalization (Ericsson & Simon, 1993; Schooler et al., 1993). However, thought processes involved with insight problem solving (Schooler et al., 1993), affective judgment (Wilson & Schooler, 1991), or holistic tasks (Penney, 1975) are not easy to verbalize, and performance tends to be hurt by verbalization because people do not necessarily have conscious access to their thought processes. Putting together these findings on the effect of verbalization on different types of cognitive tasks and cultural difference in the mode of thinking (i.e., holistic vs. analytical), it is reasonable to hypothesize that East Asians who tend to use holistic thinking would be negatively affected by talking, but European Americans who tend to adopt analytical thinking would not be negatively affected by talking. The present research provides a direct examination of the cultural differences in the effect of talking and thinking, and investigates the mechanism through which these differences emerge.

Overview

The purpose of the present research is to examine the effect of talking on thinking (i.e., cognitive problem solving) in relation to the cultural assumptions about talking and thinking in East Asian

and European American cultural contexts. Three studies were conducted to show that cultural assumptions about the relationship between talking and thinking are indeed consistent with the psychological realities in respective cultural contexts. In all three studies, thinking was operationalized as performance on a standardized reasoning test, and therefore, better performance means "good thinking."

Study 1 was designed as an initial demonstration of the cultural differences between East Asian Americans and European Americans in the actual effect of talking on thinking and illustrates that the actual effect of talking on thinking is consistent with the cultural assumptions regarding the relationship between talking and thinking. Using the *thinking-aloud* method, the study tested how verbalization of the problem-solving process influences performance on a reasoning test depending on whether participants were from an East Asian American or European American cultural context.

Study 2 was conducted to examine the relationship between the effect of talking on thinking and cultural assumptions that are expressed in the forms of individual beliefs on talking and thinking, and socialization practices regarding talking and thinking. Study 2 replicated the basic findings from Study 1 and also included measures of explicit beliefs on talking and thinking, parental practices, and modes of thinking to better understand the role of cultural beliefs and socialization practices in the shaping of psychological processes.

Study 3 was designed to examine the cross-cultural differences in the underlying cognitive mechanism that might give rise to the phenomenon demonstrated in Study 1 and builds on the findings on the modes of thinking in Study 2. More specifically, Study 3 tested the hypothesis that the diverging effect of talking on thinking across cultures can be explained by a different level of dependency on language in the process of problem solving adopted by people from different cultural contexts.

Study 1

Study 1 tested the idea that the different cultural assumptions on the relationship between talking and thinking would be reflected in a difference in the actual effect of talking on cognitive problem-solving performance of people from different cultural contexts. It was hypothesized that European Americans from a cultural tradition in which talking is thought to be closely related to thinking would not be hindered in their performance on a reasoning test by talking, as previously demonstrated by other researchers (for a review, see Ericsson & Simon, 1980). It was also hypothesized that East Asian Americans from a cultural tradition where talking is thought to interfere with thinking would perform worse when they are talking than when they are silent.

Method

Participants. Thirty-four East Asian American (24 women and 10 men) and 41 European American (28 women and 13 men) undergraduates at Stanford University participated in the study in return for credit in an introductory psychology course. All the participants indicated that their native and dominant language was English. All European American participants were third- or older-generation Americans (i.e., both of their parents were also born and raised in the United States), whereas all East

Asian Americans were second-generation Americans (i.e., both of their parents were immigrants from East Asian countries).¹

Materials. Participants completed Advanced Raven's Progressive Matrices Set II (Raven, 1941). Raven's Progressive Matrices were used in the study because the task has been found to be closely linked to general intelligence (see Snow, Kyllonen, & Marshalek, 1984), and to measure "domain-free reasoning processes" (Carpenter, Just, & Shell, 1990). Moreover, the task is supposed to require analytical thinking, and previous research with participants from Western cultural contexts showed that although the matrices themselves are nonverbal in nature, the participants tend to work on more challenging matrices in a verbal way (Sokolov, 1972).

Advanced Raven's Progressive Matrices Set II consist of a series of items, each including various abstract figures that are arranged in nine cells in a 3×3 matrix. The lower right cell is always blank. The contents of the eight filled cells are determined by various rules that must be figured out by the participant and then applied to generate the correct contents of the empty cell. Eight possible options for the empty cell are given under the matrix, and the participant is expected to choose one of the eight options that best fit the empty cell.

Raven's Progressive Matrices are devised to begin with a relatively easy item and become progressively more difficult as the item number goes up. Among the total of 36 Advanced Matrices Set II, only items 17–36—the more difficult items—were used in the study. The order of items in the presentation was randomized to avoid the progressive nature of the test, hence making the test more difficult. Once the items were selected, the test was computerized using PsyScope (Cohen, MacWhinney, Flatt, & Provost, 1993).

Procedure. When the participant arrived at the lab, an experimenter, who was unaware of the hypothesis, explained that the purpose of the study was to examine the cognitive processes of problem solving. The participant was randomly assigned to one of two conditions: *control* condition or *thinking-aloud* condition. In the control condition, the participant did not receive any additional instructions apart from the basic instructions on how to solve the problems. In the thinking-aloud condition, the experimenter instructed the participant to talk aloud his or her thought process while working on the problems. Then, the experimenter set up a tape recorder and informed the participant that his or her vocalization of thinking process would be recorded for future analysis. Once the participant understood the task, the experimenter left the room, and the participant worked on the task alone.

During most thinking-aloud experiments, the experimenter is present in the same room as a participant (Ericsson & Simon, 1993). However, participants in the present studies were kept in a room alone to minimize any evaluation apprehension (Cottrell, Wack, Sekerak, & Rittle, 1968). It is possible that East Asian American participants might feel more self-conscious than European American participants might, because people from the East Asian cultural contexts tend to care more about others' view of themselves (Lim, 1994). Thus, privacy was ensured in the present studies to minimize this potential confound.

The task and instructions were presented on a computer. First, the participant was instructed to solve one practice item. When the answer for the item was typed, the correct answer was given to ensure that the participant understood the instructions for the test. Then, the real test began and 20 matrices were presented on the computer screen. The participant was instructed to type the number of the correct answer using the keyboard. There was no time limit for the test, and the participant was allowed to work on the task at his or her own pace. The session in the thinking-aloud condition was recorded to ensure that participants would follow instructions by thinking aloud. Participants' performance—both accuracy (number correct) and time spent to complete the test—was automatically measured by the computer.

After participants finished the task, they were instructed to fill out a questionnaire that contained a subset of the Positive and Negative Affect

Schedule (PANAS; D. Watson, Clark, & Tellegen, 1988) that is relevant to evaluation apprehension, such as *afraid*, *ashamed*, *distressed*, *nervous*, and *scared*. The mood questionnaire was included to measure the level of nervousness experienced by participants to make sure that the manipulation did not induce different levels of evaluation apprehension for the different cultural groups. Finally, once participants completed the experiment, they were debriefed, thanked, and excused.

Results

The results supported the hypothesis that European Americans' performance would not be impaired by talking, whereas East Asian Americans' performance would be impaired by talking. Participants' gender did not have any effect, and thus, will not be mentioned further. The primary dependent variable was the number of items answered correctly. The numbers of items answered correctly was subjected to a 2 (culture: European American vs. East Asian American) \times 2 (condition: control vs. thinking aloud) analysis of variance (ANOVA). The test revealed that there was no main effects of culture, $F(1, 74) = 2.50$, *ns*, or of condition, $F(1, 74) = 2.39$, *ns*, on how many items were answered correctly. However, there was the predicted interaction between condition and culture, $F(1, 74) = 5.23$, $p < .05$. Planned comparisons with independent samples *t* tests revealed that East Asian American participants' performance was worse when they had to think aloud ($M = 9.24$, $SD = 4.04$, $n = 17$) than when they were not thinking aloud ($M = 12.35$, $SD = 2.62$, $n = 17$), $t(32) = 2.67$, $p < .05$. European American participants' performance, however, did not differ whether they were thinking aloud ($M = 9.76$, $SD = 3.48$, $n = 21$) or not ($M = 9.35$, $SD = 3.01$, $n = 20$), $t(39) = 0.40$, *ns* (see Figure 1).

Next, I subjected the length of time (in minutes) taken to complete the task to a 2 (culture: European American vs. East Asian American) \times 2 (condition: control vs. thinking aloud) ANOVA. The length of time was not significantly affected by the condition, $F(1, 74) = 1.66$, *ns*, nor by the culture, $F(1, 74) = 0.59$, *ns*. There was also no significant interaction between culture and condition, $F(1, 74) = 0.04$, *ns*. These results show that the length of time spent to complete the task was not a confounding factor. In other words, the interaction of culture and condition in performance was not due to the different length of time participants spent on the task in different conditions.

Finally, the mood measured by the PANAS to assess the level of evaluation apprehension due to talking was also subjected to a 2 (culture: European American vs. East Asian American) \times 2 (condition: control vs. thinking-aloud) ANOVA. There was no significant main effect or interaction on any of the mood measures. The analysis revealed that East Asian American participants did not experience any more evaluation apprehension in the thinking-aloud condition.

Discussion

The results support the hypothesis that talking would not interfere with European American participants' cognitive performance

¹ These East Asian American participants were preselected because their parental upbringing is more likely to reflect East Asian parenting styles, yet their English proficiency would be as good as their European American counterparts.

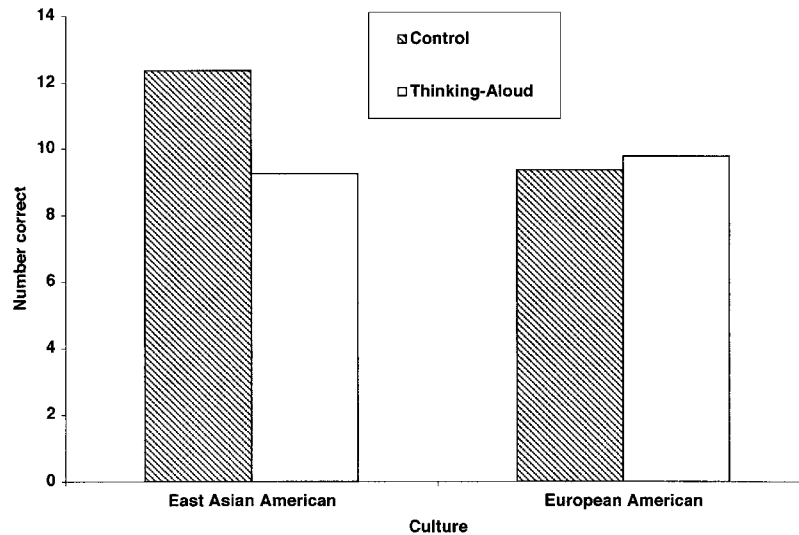


Figure 1. Mean number correct as a function of talking and culture in Study 1.

whereas talking would interfere with East Asian American participants' performance. When the prevailing cultural assumption is that talking is closely related to thinking, talking can indeed be closely related to thinking. At the same time, when the prevailing cultural assumption is that talking is a disturbance to thinking, talking can interfere with the thinking process.

These results provide initial support for cultural differences in how talking affects thinking, and that this difference would be consistent with the cultural assumptions on the relationship between talking and thinking. However, the study alone does not examine how the cultural differences in shared assumptions can explain the cultural differences in how talking affects thinking. In Study 2, I address how the psychological differences demonstrated in Study 1 are connected to culture, more specifically to the beliefs and practices shared within a culture.

Study 2

The present research argues that cultural assumptions regarding the relationship between talking and thinking vary across cultures, and these differences in cultural assumptions can lead to the actual psychological phenomenon of how talking affects thinking. Thus, Study 2 was conducted to understand the connectedness between cultural assumptions and the effect of talking on thinking, focusing on the role of cultural beliefs and practices as potential carriers of cultural assumptions through which psychology is shaped.

There were a few specific questions asked in Study 2. The first question was whether East Asian Americans and European Americans would differ in their explicit beliefs about talking and thinking. The second question was whether there are differences in cultural practices between East Asian Americans and European Americans, more specifically parenting style regarding talking, and whether these cultural practices reflect the respective cultural assumptions. The third question was whether East Asian Americans and European Americans differ in their self-perceptions of how much they rely on language in their thinking when solving problems. This question was addressed in the study because cul-

tural differences in how people think might be a potential underlying mechanism for the demonstrated phenomenon. Research suggests that there are cultural differences in modes of thinking (Nisbett et al., 2001) in which East Asians tend to be more holistic whereas Westerners tend to be more analytic in their cognitive processes. These cultural differences in modes of thinking might be related to how much a thinker relies on internal speech that, in turn, might lead to cultural differences in the effect of talking on thinking. Finally, the fourth question was how these explicit and implicit representations of cultural assumptions are related to the actual effect of talking on thinking.

In Study 2, a few procedural changes were made from Study 1. First, the participants in the control condition were explicitly told not to talk in Study 2, thus the condition will be referred to as the *Silence* condition. This change was made to ensure that participants would work on the task in silence because some participants might naturally think aloud in the control condition in which there is no specific instructions to be silent. Second, comparisons between the silence condition and the talking condition were made using a within-subject design in Study 2, unlike the between-subjects design in Study 1. Thus, participants' performance in the silence condition provides a within-subject baseline comparison. Third, the whole session, including the silence condition, was recorded to ensure that participants closely followed the experimental instructions either to talk or not to talk.

The hypothesis was that there would be cultural differences in beliefs, practices, and modes of thinking, and that these beliefs, practices, and modes of thinking would be correlated with the actual effect of talking on thinking.

Method

Participants. Twenty-two East Asian American (8 women and 14 men) and 23 European American (12 women and 11 men) undergraduates at the University of California, Los Angeles participated in the study in return for credit in an introductory psychology course. As in Study 1, all the participants indicated that their native language is English.

Material. The same items of Advanced Raven's Progressive Matrices Set II as in Study 1 were used in Study 2. The 20 items were divided into two within-subject sections (i.e., silence condition and talking condition) so that each section presented 10 items.²

Questionnaires. Three sets of questions were used in the study. The first set of questions was created to measure individuals' explicit beliefs regarding the relationship between talking and thinking. The questions asked participants how much they agree with statements such as "talking clarifies thinking" or "only in silence, can one have clear thoughts and ideas."

The second set of questions was created to measure differences in the cultural practices (i.e., parenting style). The questionnaire asked participants how verbal their interactions with their parents have been, and how much they were encouraged to articulate their point of view throughout the course of their relationships.

The third set of questions examined participants' perception of their own mode of thinking. More specifically, it asked participants to indicate how much they relied on language when they work on Raven's Progressive Matrices. All three questionnaires used 8-point scales and can be found in the Appendix.

Procedure. When a participant arrived at the lab, an experimenter, who was unaware of the hypotheses of the study, explained that the purpose of the study was to examine the cognitive processes of problem solving. At the beginning of the study, participants received the talking-belief questionnaire and the talking-practice questionnaire presented on the computer. Then, the participant was asked to solve a set of 20 problems selected from Raven's Progressive Matrices according to specific instructions shown on the computer screen. The experimenter set up a tape recorder for the participant, pushed the record button, and left the room where the participant worked on the problems alone, and subsequent instructions were given by the computer.

There were two parts in the experiment. In each part, participants were asked to solve 10 problems. In the first part of the experiment, every participant was instructed to solve a set of 10 problems in silence. After participants completed the first part, but before they began the second part, they received the mode-of-thinking questionnaire. The timing of this questionnaire was chosen for participants to reflect on their mode of thinking with the specific task (i.e., Raven's Progressive Matrices) but not to be influenced by their performance in the second part of the experiment. Finally, in the second part of the experiment, every participant was instructed to think aloud. In other words, the study had a 2 (culture: European American vs. East Asian American) \times 2 (talking: silence vs. thinking aloud) design in which talking was a within-subject variable.

Once participants completed the experiment, they were debriefed, thanked, and excused. Participants' responses to the questionnaires and performance in terms of both accuracy (number correct) and time to complete each session was measured by the computer.

Results

The effect of talking on performance. The results replicated the basic pattern of interaction of culture and thinking aloud as only East Asian American participants' performance was impaired by thinking aloud, but not European American participants' performance. The number of items answered correctly was subjected to a 2 (culture: European American vs. East Asian American) \times 2 (talking: silence vs. thinking aloud) multivariate analysis of variance (MANOVA). Overall, there was no main effect of culture, $F(1, 43) = 3.30$, *ns*, or talking, $F(1, 43) = 0.01$, *ns*. However, there was the expected two-way interaction between culture and talking, $F(1, 43) = 9.99$, $p < .01$.

To examine specifically how thinking aloud affected performance of participants from different cultural contexts, the number

correct was subjected to planned comparisons with paired *t* tests. The analyses showed that East Asian American participants' performance was negatively affected by thinking aloud (silence condition: $M = 5.27$, $SD = 2.07$; thinking-aloud condition: $M = 4.45$, $SD = 2.13$), $t(22) = 2.25$, $p < .05$, whereas European American participants' performance was enhanced by thinking-aloud (silence condition: $M = 3.30$, $SD = 2.32$; thinking-aloud condition: $M = 4.17$, $SD = 2.48$), $t(23) = 2.23$, $p < .05$ (see Figure 2).

The effect of talking on the length of time (in minutes) taken to complete the task was also subjected to a 2 (culture: European American vs. East Asian American) \times 2 (talking: silence vs. thinking aloud) MANOVA. Overall, there was no main effect of culture, $F(1, 43) = 3.01$, *ns*, or interaction that involves culture, $F(1, 43) = 0.12$, *ns*. Again, these results show that the interaction effect of culture and talking on performance was not due to the different length of time participants spent on the task in different conditions.

Beliefs, practices, and modes of thinking. Participants' responses to the three questionnaires were examined. First, responses to the three sets of questions (i.e., talking belief, talking practice, mode of thinking) were reverse-coded with necessary items, and averaged for each set of questions so that higher numbers indicate greater importance of talking in thinking, and these numbers were used for further analyses. Talking-practice questions and mode-of-thinking questions were highly intercorrelated (Cronbach's $\alpha = .78$ for practice and $.89$ for mode of thinking). Talking-beliefs questions were weakly intercorrelated (Cronbach's $\alpha = .24$).³

As predicted, significant cultural differences emerged on the measures of beliefs, practices, and modes of thinking (see Table 1). With the talking-belief questionnaire, European American participants ($M = 5.14$, $SD = 0.97$) agreed more with statements in which talking is connected with good thinking than East Asian American participants did ($M = 4.54$, $SD = 0.90$), $t(42) = 2.14$, $p < .05$. This result suggests that cultural assumptions on talking and thinking in East Asian and European American cultures are shared by individuals from their respective cultural contexts in spite of the fact that East Asian American participants in the present study were born and raised in the United States.

Moreover, there was a large cultural difference in participants' responses to the talking-practice questionnaire. European American participants were more likely to report that they have more verbal interaction with their parents ($M = 5.89$, $SD = 1.01$) than were East Asian American participants ($M = 4.51$, $SD = 1.23$), $t(42) = 4.08$, $p < .001$. This large difference between two cultural groups supports the idea that cultural assumptions are reflected in parental practices.

Also, significant cultural difference was found with the questionnaire on mode of thinking. European American participants

² The level of difficulty in these two parts was the same according to participants' performance in Study 1.

³ The intercorrelation of talking belief questions was probably low because the questions include multiple factors (i.e., "talking is a sign of intelligence" and "talking clarifies thinking"). Development of a scale with a more extended version of the questionnaire is currently underway. Meanwhile, the combined responses on talking beliefs were used for analysis in the present study.

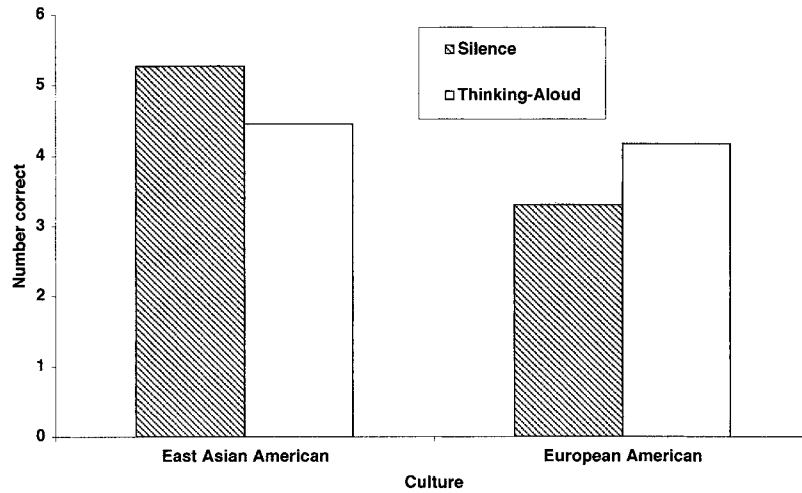


Figure 2. Mean number correct as a function of talking and culture in Study 2.

reported that they rely on language more in their thinking ($M = 4.02$, $SD = 1.89$) than East Asian American participants did ($M = 2.86$, $SD = 1.68$), $t(42) = 2.15$, $p < .05$. Thus, these results provide initial support for the cultural difference in the modes of thinking as a potential underlying mechanism for the cultural difference in the effect of talking on thinking.

In addition, correlational analyses were also conducted and these analyses suggested that the effect of thinking aloud on performance is related to various measures of representations of cultural assumptions. First, to examine the effect of talking on performance, the talking effect score was calculated by subtracting participants' performance in the silence condition from the thinking-aloud condition. Hence, positive numbers of the talking effect score indicate enhancement due to talking, and negative numbers indicate interference from talking. These talking effect scores were then examined in relation to other measures in which a greater number also indicates greater importance of talking.

Correlational analyses showed that the talking beliefs, $r(44) = .39$, $p < .05$, and the mode of thinking, $r(44) = .31$, $p < .05$, were significantly correlated with the talking effect score (see Table 2). In other words, participants who believed that talking and thinking are closely related tend to perform better with talking, and participants who reported that they rely on language in their thinking also tend to perform better with talking.

Table 1
Beliefs, Practices, and Modes of Thinking as a Function of Culture

Talking/thinking representations	European Americans		East Asian Americans	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Talking beliefs	5.14	0.97	4.54	0.90*
Talking practices	5.89	1.01	4.51	1.23***
Modes of thinking	4.02	1.89	2.86	1.68*

* $p < .05$. *** $p < .001$.

The analyses showed that the talking practice was not significantly correlated with the talking effect score, $r(44) = .15$, *ns*. Thus, the nature of parental practices did not seem to be directly related to the way in which talking affected performance. However, further analyses revealed that the talking practice was significantly correlated with the talking beliefs, $r(44) = .39$, $p < .01$, and also with the mode of thinking, $r(44) = .38$, $p < .05$ (see Table 2). That is, participants who have more verbal interactions with their parents are more likely to both believe that talking and thinking are closely related and report that they rely on language when they think. Given that both the talking beliefs and the mode of thinking are significantly correlated with performance, parental practices might have an indirect effect on performance.

Discussion

Results from Study 2 showed the cultural nature of the effect of talking on thinking. First of all, East Asian American participants differ from European American participants in all representations of cultural assumption. That is, European American participants are more likely to believe that talking is good for thinking, more likely to interact in verbal manners with their parents, and more likely to rely on language in their thinking than East Asian American participants are.

Table 2
Correlations Among Beliefs, Practices, Modes of Thinking, and the Effect of Talking on Thinking

Talking/thinking representations	1	2	3	4
1. Practices	—			
2. Beliefs	.39**	—		
3. Modes of thinking	.38*	.17	—	
4. Effect of talking on thinking	.15	.39*	.31*	—

* $p < .05$. ** $p < .01$.

Moreover, correlational analyses support the cultural nature of the effect of talking on thinking. Although the talking practice was not shown to be significantly correlated with the effect of talking, it was related both with the talking belief and the mode of thinking that are, in turn, significantly related with the effect of talking on thinking. Thus, people who were engaged in practices that emphasize talking tend to share the belief that talking and thinking are closely related, and also report that language is important in their thinking. Those who believed that talking is closely related to thinking, and also those who claimed that talking is important in their thinking, tend to indeed think better while talking than those who did not. These results show a link between parental practices and individual beliefs, and the way in which talking affects thinking. These results are correlational and obviously cannot show any causal relationships. However, these clearly provide support for the idea that the effect of talking on thinking is connected to cultural assumptions through various cultural representations, such as practices and beliefs.

In addition, these results suggest a potential underlying mechanism through which the cultural difference in the effect of talking can be explained, and that is the role of the mode of thinking. Results indicated that there is not only a cultural difference in how important language is in thinking, but also a significant relationship between the importance of language in thinking and the effect of talking on thinking. In other words, it is plausible that people from a cultural context where talking is considered to be important and beneficial for thinking might be more likely to process their thoughts through language, whereas people from a cultural context where talking is considered to be less important and harmful to thinking might be less likely to process their thoughts through language. On the basis of the cultural differences in the self-perceptions of how much people rely on language in their thinking, I hypothesized that cultural assumptions on talking and thinking influence the actual effect of talking on thinking through the mode of thinking that reflects the idealized mode of thinking within each cultural context. I conducted Study 3 to examine the idea further.

Study 3

Study 3 tested a possible underlying mechanism that can explain the demonstrated cultural difference in Studies 1 and 2. The hypothesis examined in Study 3 is based on the research findings on the effect of verbalization on different types of tasks. When thinking is more verbal in nature, thinking aloud does not seem to affect thinking much, but when thinking is not verbal, thinking aloud appears to interfere with thinking (Schooler et al., 1993). Because people from different cultural contexts tend to adopt different thinking styles (i.e., analytical vs. holistic), their thinking processes might differ in the degree in which they are verbalizable.

Research suggests that East Asians are relatively weak in verbal compared with nonverbal abilities, as measured by standardized tests (Ho, 1994; Vernon, 1982). Also, in a study on the ability to visualize objects from an unusual visual perspective from the Torrance Tests of Creative Thinking, participants from Eastern cultures demonstrated a significantly greater frequency of internal visualizations than did participants from Western cultures (Ball & Torrance, 1978). Although to date there is only limited and indirect empirical support for this hypothesized cultural difference in verbal thinking, the difference in verbal thinking of people from

different cultural contexts may explain the demonstrated cultural difference in how talking affects cognitive performance.

To test this idea, Study 3 modified and adopted the procedure used by Merz (1969). The procedure was devised to examine how participants process problem solving by comparing the effect of thinking aloud and articulatory suppression on their performance. The rationale for the procedure is as follows: The articulatory suppression task (e.g., saying the alphabet out loud) is designed to interfere with the activation of covert articulation by preoccupying the articulating mechanism with irrelevant overt vocal activity. Thus, if a person is engaged in more verbal thinking, the task of thinking aloud should not affect the performance on problem solving very much, because his or her thoughts are ready to be vocalized as words. However, the articulatory-suppression task should strongly impair the performance of a person who is thinking verbally, because the task directly distracts the verbal problem-solving process.

In contrast, if a person is not engaged in verbal thinking, the thinking-aloud task should impair performance, because the person would need to work on an extra task of converting his or her thoughts into words on top of the main problem-solving task. However, articulatory suppression should not distract the problem solving as much because the task does not directly interfere with the person's nonverbal cognitive process that is required for the main task. In other words, for a nonverbal thinker, only thinking aloud, but not articulatory suppression, should significantly impair performance.

Thus, it was hypothesized that European American participants' problem-solving performance would not be impaired by thinking aloud, but that it would be impaired by articulatory suppression. In contrast, it was hypothesized that East Asian American participants' performance would be impaired by thinking aloud, but that their performance would not be affected by articulatory suppression.

Method

Participants. Forty-four East Asian American (29 women and 15 men) and 42 European American (21 women and 21 men) undergraduates at Stanford University participated in the study in return for credit in an introductory psychology course. As in Study 1, all the participants indicated that their native and dominant language was English. Again, all European American participants were third- or older-generation Americans, whereas all East Asian Americans were second-generation Americans.

Material. The same items of Advanced Raven's Progressive Matrices Set II from Studies 1 and 2 were used in the study. The 20 items were divided into two within-subject sections (i.e., silence condition and talking condition) so that each section presented 10 items, as in Study 2.

Procedure. When a participant arrived at the lab, the experimenter, who was unaware of condition assignment, explained that the purpose of the study was to examine the cognitive processes of problem solving. The participant was then instructed to solve a set of 20 problems selected from Raven's Progressive Matrices as presented on the computer screen according to specific instructions shown on the computer screen. The experimenter informed the participant that in a part of the experiment, the participant would be asked to talk aloud. The experimenter set up a tape recorder for the participant, pushed the record button, and left the room where the participant worked on the problem solving alone, and subsequent instructions were given on the computer.

As in Study 2, there were two parts in the experiment. In each part, the participant was asked to solve 10 problems. In the first part of the

experiment, the participant in every condition was instructed to solve a set of 10 problems in silence. In the second part of the experiment, the participant in every condition was instructed to talk aloud, but the participant was randomly assigned to one of two conditions of talking aloud: thinking-aloud condition and articulatory-suppression condition. In the thinking-aloud condition, the participant was instructed to talk aloud through their thought processes while working on the problems. In the articulatory-suppression condition, the participant was instructed to repeat the alphabet from A to Z aloud while he or she was working on the test. Once participants completed the experiment, they were debriefed, thanked, and excused. Participants' performance—both accuracy (number correct) and time to complete each session—was measured by the computer.

Results

The results supported the hypothesis that the cultural difference in the effect of talking on thinking could be explained by the fact that European Americans tend to process cognitive information more verbally than East Asian Americans. First, the number of items answered correctly in the silence condition (i.e., baseline performance) was examined, and there was no main effect or interaction, showing that the baseline performance was comparable across different conditions (see Table 3). The effect of talking on the number of items answered correctly was then calculated by subtracting participants' performance in the talking condition from their performance in the silence condition to yield the talking effect score. Thus, positive talking effect scores indicate that the performance was better when the participants were talking than when they were in silence, and negative talking effect scores indicate that the performance was worse when the participants were talking than when they were silent.

The talking effect scores were subjected to a 2 (culture: European American vs. East Asian American) \times 2 (talking type: thinking aloud vs. articulatory suppression) ANOVA. Overall, there was no main effect of culture, $F(1, 85) = 1.20$, *ns*, or talking type, $F(1, 85) = 0.60$, *ns*, on the effect of talking on thinking. However, there was the expected two-way interaction between culture and talking type, $F(1, 85) = 11.01$, $p < .01$.

To examine whether thinking aloud or articulatory suppression significantly changed performance, the talking effect scores were compared with zero. One-sample *t* tests revealed that the results in the thinking-aloud condition replicated the findings from Study 1. East Asian American participants' performance was negatively

affected by thinking aloud, as measured by the talking effect score ($M = -1.45$, $SD = 1.95$), $t(21) = 3.51$, $p < .01$, whereas European American participants' performance was not affected by thinking aloud ($M = 0.45$, $SD = 2.48$), $t(19) = 0.81$, *ns* (see Figure 3).

The results in the articulatory-suppression condition showed a different pattern from that in the thinking-aloud condition. As predicted, only European American participants' performance was significantly hindered by articulatory suppression, as measured by the talking effect score ($M = -1.32$, $SD = 1.64$), $t(21) = 3.76$, $p < .01$. In contrast, East Asian American participants' performance was not significantly hindered by articulatory suppression ($M = -0.41$, $SD = 1.74$), $t(21) = 1.11$, *ns* (see Figure 3).

Additional two-sample *t* tests revealed that East Asian American participants' performance in thinking aloud was, in fact, marginally worse than in articulatory suppression, $t(42) = 1.88$, $p < .07$. It was also shown that European American participants' performance was interfered by articulatory suppression to a somewhat greater degree than East Asian American participants' performance, $t(42) = 1.78$, $p < .09$. These between-group comparisons provided further support that the effect of articulatory suppression was not as debilitating for the performance of East Asian Americans as the thinking-aloud procedure. In addition, articulatory suppression was much more debilitating for the European Americans. In spite of the fact that the articulatory-suppression task is still a distraction for East Asian Americans, even though not a crucial one, it is important to note that East Asian Americans were more negatively affected by thinking aloud than by articulatory suppression.

Finally, the effect of talking on the length of time (in minutes) taken to complete the task was subjected to a 2 (culture: European American vs. East Asian American) \times 2 (talking type: thinking aloud vs. articulatory suppression) ANOVA. Overall, there was no main effect, $F(1, 85) = 2.20$, *ns*, or interaction that involves culture, $F(1, 85) = 0.01$, *ns*. Again, these results show that the interaction of culture and talking type with the performance was not due to the different length of time participants spent on the task in different conditions.

Discussion

The results from Study 3 support the hypothesis. European American problem-solving performance did not differ whether they were thinking aloud or silent. However, it was significantly worse when they were distracted by the articulatory-suppression task than when they were silently working on the task, supporting the hypothesis that their problem-solving process is more verbal. In contrast, East Asian American problem-solving performance was impaired only by thinking aloud but not by articulatory suppression, as predicted by the hypothesis that their problem solving is less verbal.

These results provide support for the idea that European Americans tend to process cognitive information more verbally than East Asian Americans. European Americans only needed to vocalize their thoughts when they were thinking aloud, and it was not necessary to take the extra step of conversion from thoughts to words. In contrast, it seems that East Asian Americans needed to engage in an extra task of transforming their thoughts to words and did not perform as well as in silence. At the same time, when

Table 3
Means of Number Correct and Talking Effect Score in Study 3

Talking type	Silence		Talking	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
European American				
Thinking aloud (<i>n</i> = 20)	4.85	1.98	5.30	2.11
Articulatory suppression (<i>n</i> = 22)	5.05	1.84	3.73	1.61
East Asian American				
Thinking aloud (<i>n</i> = 22)	6.18	2.11	4.73	2.10
Articulatory suppression (<i>n</i> = 22)	5.50	2.02	5.09	1.90

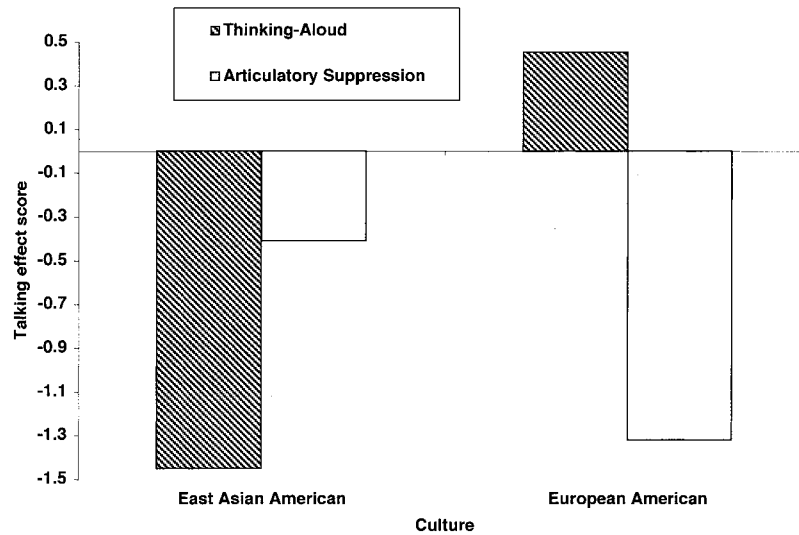


Figure 3. Mean talking effect score as a function of task type and culture in Study 3.

European Americans confronted the articulatory-suppression task while solving problems, the task distracted participants from the problem solving and, consequently, their performance was hurt by the task, whereas East Asian American performance was not hurt by the articulatory-suppression task. The articulatory-suppression task that was designed to suppress internal articulation was distracting for European American participants who are more likely to assume covert articulation. In contrast, the articulatory-suppression task was not as distracting for East Asian participants because they are less likely to use verbal thinking (i.e., internal articulation) and more likely to use nonverbal thinking. The overall pattern of these results suggests that the cultural difference demonstrated in Studies 1 and 2 between European Americans and East Asian Americans in how talking affects thinking can be explained, at least in part, by the fact that European Americans process cognitive information in a more verbal manner than East Asian Americans.

These results emphasize the difference in modes of thinking that people from different cultural contexts use to solve the same set of problems. Although the overall performance of both groups of participants was comparable, the process by which they solved the problems seems to differ, as East Asian American participants tended to use more nonverbal thinking and European American participants tended to use more verbal thinking. This cultural difference in the cognitive process was made salient by the examination of the effect of the manipulations of thinking aloud and articulatory suppression used in the study.

General Discussion

Summary

The present research examined the effect of talking on thinking by focusing on how different cultural assumptions about the relationship between talking and thinking in East Asian and European American cultural contexts are reflected in how talking affects the cognitive processes of East Asians and European Americans. Study 1 examined whether cultural differences in the assumptions about the effect of talking on thinking are reflected in actual

individual psychological processes, the problem solving of a standardized reasoning test. Using the thinking-aloud method, the study demonstrated how verbalization of the problem-solving process damaged the performance of East Asian Americans, whereas it did not change the performance of European Americans.

Study 2 tested the relationships between cultural beliefs and practices, and the effect of talking on thinking more directly. The results support the idea that different representations of cultural assumptions are linked to the cultural differences in the effect of talking on thinking demonstrated in Study 1. Also, the results suggested cultural difference in modes of thinking as a potential underlying mechanism for the phenomenon.

On the basis of the finding from Study 2, Study 3 tested the cross-cultural differences in modes of thinking that might give rise to the phenomenon. Study 3 showed that the differential effect of talking on thinking across cultures can be explained by a different degree of dependency on language in the process of problem solving. Indeed, East Asian American's performance was distracted by thinking aloud but not by articulatory suppression, suggesting that they tend not to rely on language in their thinking to the same degree. In contrast, European Americans' performance was not affected by thinking aloud, but strongly impaired by articulatory suppression, showing that they tend to rely on language more in their thinking.

Alternative Explanations for the Findings

The explanation suggested in the present research for the cultural difference in the effect of talking on thinking is the influence of cultural assumptions on the interplay between talking and modes of thinking. Whereas the idea has been supported by the results from the present research, other explanations might be suggested for the phenomenon demonstrated. These explanations include the influence of the language and stereotype threat.

First, the results from the present studies could be explained by the difference in the languages of the participants. Research has shown that language plays an important role in shaping human thoughts. For example, it is argued that speakers with different

languages are forced by the structure of their languages to pay attention to certain aspects over other aspects of their experience while they are speaking (Slobin, 1996). Thus, the cultural difference in the effect of talking on thinking might be explained by the fact that the structure of English facilitates analytical thinking whereas the structure of East Asian languages (i.e., Chinese and Japanese) inhibits analytical thinking.

Although accepting the idea that language has a powerful influence on human thoughts and probably plays some role in the cultural differences demonstrated, the findings cannot be explained by the cross-linguistic difference only. It is because the cultural difference was demonstrated in English with European American and East Asian American participants who are native English speakers.

Second, the results might be explained by stereotype threat (Steele, 1997). Stereotype threat is a situational threat that can affect the members of any group about whom a negative stereotype exists, and where negative stereotypes about these groups apply, members of these groups can fear being reduced to that stereotype. Because there is a stereotype about East Asians as being quiet and nonverbal, stereotype threat may have been experienced when East Asian American participants in the experiments were asked to engage in an act of talking that is associated with this stereotype. Stereotype threat suggests another factor that might be related to why East Asian students might have difficulty while talking in class.

One aspect of stereotype threat is that it is a reaction to immediate situational cues as well as a reaction to larger societal level stereotypes. In other words, situational cues such as making one's ethnicity salient or framing the task as a diagnostic test of ability that is relevant to a certain negative stereotype can trigger stereotype threat (Steele & Aronson, 1995). Although stereotype threat might contribute to the negative effect of talking on thinking of East Asians in various social settings, it does not seem to explain the finding from the present research.

In the present studies, the ethnicity of participants was not a salient factor. None of the participants knew that they were recruited to the study because of their ethnicity, and ethnicity was never mentioned or made salient in any way. Moreover, the task was not presented in an evaluative way. Even if working on a reasoning test implied evaluative nature of the task to participants, the evaluative focus of the study was on their performance on the task, not on their ability to articulate. Thus, stereotype threat does not fully explain the results.

Limitations and Future Questions

The purpose of the present research was to demonstrate cultural difference in the effect of talking on thinking and to seek a possible mechanism in how people from different cultural contexts process information. Although the studies were designed to achieve these goals, there are some other important questions that were not yet answered.

First, the present research demonstrated and contextualized the cultural differences in how talking affects thinking and tried to make a connection between culturally shared assumptions and individual psychological tendencies. Whereas the results provide support for the connectedness between culture and the psychological tendencies, the correlational results do not provide a causal explanation about how cultural assumptions and the effect of

talking on thinking are related. Thus, it would be beneficial to conduct more direct research that connects cultural practices of talking with the shaping of people's beliefs regarding talking and thinking and also the development of how they think and how they talk. Further examination of the cognitive enculturation process of individuals should provide access to more direct understanding on how culture influences individuals' modes of thinking, and consequently, the effect of talking on thinking.

Second, the present research used a particular type of cognitive task that is supposed to involve more verbal thinking according to previous research, but this task requires neither verbal nor nonverbal thinking by nature, and participants have some flexibility to adopt modes of thinking that they might prefer. Obviously, these are very specific types among many different types of thinking, and whereas the results from the present studies reveal important cultural influence, further research is needed to generalize the findings. A very different pattern of results might emerge with tasks that require more specific styles of thinking, such as entirely verbal tasks or holistic tasks. For example, on the basis of findings on the effect of verbalization on insight problem solving (Penney, 1975; Schooler et al., 1993) where verbalization interfered with problem solving of European Americans, much smaller or no cultural difference might be expected when a task requires holistic thinking. This future research would advance the understanding of the cognitive mechanism for the cultural difference in the effect of talking on thinking.

Third, the present research focused on modes of thinking as an underlying mechanism through which the cultural difference in the effect of talking on thinking is manifested. However, there are probably multiple mechanisms that are likely to contribute to the effect. For example, the act of talking might draw attention to self as one hears his or her voice, and this self-awareness-inducing nature of talking might play a role in how talking affects thinking to the extent that there are cultural differences in the concept of self. Drawing attention to oneself by talking is more likely to be experienced as arousing in East Asian cultural contexts because being singled out is a less common and less positive event (Kim & Markus, 1999; Markus & Kitayama, 1994), and this arousal might contribute to the impairing effect of talking on thinking. In contrast, it might not lead to the same level of arousal in European American cultural contexts where standing out is a more common and positive event, and hence their thinking is not impaired by talking. Arousal caused by such other social factors might well be contributing to the effect additively along with the difference in cognitive style as shown in the present research, and future research should examine the role of arousal in how talking affects psychology.

Cultural Assumptions, Social Practices, and Psychology

The present research was designed to illustrate an example of the way in which psychological tendencies and processes are interdependent with cultural assumptions (Greenfield, 1997). The results support the hypothesis that the different cultural assumptions about the relationship between talking and thinking are consistent with the respective psychological realities in which talking and thinking relate to each other. The framework of mutual constitution between culture and psychology suggests that this consistency occurs because the cultural assumptions reflect psychological realities and, at the same time, cultural assumptions

create reality (Bruner, 1996; Fiske et al., 1998; Markus et al., 1996). The cultural assumptions about talking and thinking become the philosophical and scientific bases of social practices and interactions, and social institutions that become the means by which individual ways of thinking are shaped (Bruner, 1996; Herskovits, 1948; Shweder & Sullivan, 1990). In turn, these actual psychological tendencies reinforce the cultural assumptions represented in the psychological realities.

When there is the assumption that talking is closely related to thinking because good thinking is defined as analytical thinking, people will build their institutions, such as school curricula and teaching philosophy (e.g., Gao, Ting-Toomey, & Gudykunst, 1996; Tobin et al., 1989), and formulate social practices, such as child rearing (e.g., Caudill & Weinstein, 1969; Minami & McCabe, 1995) or interpersonal evaluation (e.g., Henderson & Furnham, 1982; Jones, Briggs, & Smith, 1986), according to the assumptions. Talking will be encouraged and emphasized by parents and teachers to make their children better thinkers, and being articulate becomes a sign of good thinking. Tasks such as talking while thinking are made natural in this cultural context. Thus, these institutions and practices that implicitly represent cultural assumptions about talking and thinking contribute to the development of an analytical thinking style that can be most aided by talking and foster individual minds in which there is a close connection between talking and thinking.

Undoubtedly, the relationships among cultural assumptions, sociocultural institutions and practices, and individual psychology are not quite as consistent and straightforward as the above example illustrates. Often, coexisting sociocultural practices even in the same cultural context can contradict each other by simultaneously reinforcing inconsistent tendencies from individuals. This inconsistency and complexity in cultural practices and meanings are the nature of culture. However, it is also undeniable that sociocultural institutions and practices are founded on certain sets of assumptions, rather than on random events. Thus, no matter how inconsistent and complex the relationships might be, the sociocultural assumptions, institutions, and practices, and individual psychology are interconnected with each other.

Through these processes of mutual reflection and construction of the culture and psychological reality, there might be as divergent psychological realities as different cultural assumptions. Specific cultural assumptions about psychology are real in the particular cultural contexts because the assumptions reflect and also influence the shaping of psychology in the specific cultural contexts. The assumption that thinking is closely related to talking is true in Western cultural contexts, and at the same time, the assumption that talking and thinking are unrelated to each other is true in East Asian cultural contexts. Psychological reality in one cultural context is not any more real than psychological reality in another cultural context.

Implications for a Multicultural Society

The present research on talking, thinking, and culture suggests a reconsideration of the specific cultural assumptions represented in the growing multicultural America. One implication of the findings is to question the role of culture in the issue of talking and thinking, and more general social and cognitive behaviors. In American education and work settings, talking is strongly empha-

sized and communicative assertiveness is generally regarded as a sign of a healthy personality (e.g., Cook & St. Lawrence, 1990; Henderson & Furnham, 1982), and anyone who keeps silent tends to be devalued as shy, passive, or lacking independent opinions (e.g., Jones et al., 1986; Zimbardo, 1977). The consequence of the collective silence of East Asians in America is that they are associated with some of these culturally negative traits of people who do not raise their voice.

The present studies suggest that the assumption of talking as a good tool for better thinking may not apply for people who do not share the same set of assumptions. Basic cognitive processes, such as verbal problem solving, are thought of as universally shared "human" tendencies rather than as socioculturally constructed processes (Shweder, 1995). The results from this study support the idea of the social and cultural influence on even "basic" psychological processes.

Another implication of the findings is the importance of recognizing that even very common and basic acts and tasks might imply culturally specific beliefs and assumptions. This idea leads to challenging questions about acculturation and one-way assimilation. Should East Asian students be encouraged to take debate or theatre classes so as to become more comfortable with standing out and expressing oneself, or should mainstream educational principles be encouraged to reflect the fact that there is diversity in styles and conditions of thinking? The findings of this research should lead to a greater appreciation of the value of tolerance for others with different ways of being, and the importance of developing multicultural places in which people from diverse cultural backgrounds can comfortably exist and adjust to different expectations without experiencing a sense of inadequacy.

Problems arise when certain cultural practices are imposed on people who do not share the cultural values behind the practices. The implications of this research should not be limited to East Asian Americans nor to the effects of talking. Often in evaluating people's abilities, people talk about "objective" criteria, such as intelligence or achievement, and desirable personality traits, such as assertiveness or confidence. The present research suggests that before the merit of a person is discussed, the question that needs to be addressed is how culturally "objective" these criteria are, given many of these criteria reflect culturally specific assumptions and realities.

Conclusion

The goal of the present study was to show the consistency between cultural assumptions about thinking and talking and actual psychological tendencies by focusing on basic cognitive process. Whereas future research is left to generalize the findings to different types of thinking, such as creativity or argumentation, and to different populations, the present research provides an initial demonstration that the relationship between talking and thinking is a lot closer for European Americans than for East Asians. Although one of the goals of the study is certainly to demonstrate the cultural differences in cognition between East Asians and European Americans, the findings from the study illustrate and imply three larger theoretical and practical points.

First, the studies show that cultural assumptions regarding the relationship between talking and thinking can reflect the cultural realities in East Asian cultural contexts and European American

contexts. When there is an assumption that talking is closely related to thinking in European American cultural contexts, there is a reality in which talking and thinking are closely related with each other. When there is an assumption that talking interferes with thinking in East Asian cultural contexts, there is an actual reality in which talking interferes with thinking.

Second, how people process information is not free or independent from the social and cultural contexts of the process, and therefore, can have quite divergent behavioral and social consequences. These findings provide a concrete illustration that even very basic psychological realities can be products of cultural beliefs and assumptions that cannot be thought of outside of their cultural contexts.

Third, an implication of the study is that the seemingly same act does not necessarily have the same consequence, if actors are not from cultural contexts where the cultural assumptions behind the act are shared. Because the task of thinking aloud is based on certain cultural assumptions, even with exactly the same task, the consequences of the task for people from cultural contexts where the assumptions are shared is not the same as the consequences of the task for people from cultural contexts where the assumptions are not shared.

To conclude, perhaps making students speak up in class might not be the only way to make them better thinkers for the colleges who are concerned about East Asian students' silence. Another way might be for the colleges to realize that the meaning of students' silence can be the engagement in thoughts, not the absence of ideas. Perhaps instead of trying to change their ways, colleges can learn to listen to their sound of silence.

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(Appendix follows)

Appendix

Talking Questionnaire Items in Study 2

Talking Belief Questions

1. An articulate person is usually a good thinker.
2. Eloquence does not have very much to do with intelligence.
3. Talking clarifies one's thoughts and ideas.
4. Only in silence, can one have clear thoughts and ideas.

Talking Practice Questions

1. Do your interactions with your mother tend to be more non-verbal or verbal?
2. Do your interactions with your father tend to be more non-verbal or verbal?
3. Which matters more, the verbal or non-verbal interactions with your mother?
4. Which matters more, the verbal or non-verbal interactions with your father?
5. How often do you express your thoughts and opinions to your mother?

6. How often do you express your thoughts and opinions to your father?

7. How often does your mother encourage you to articulate your point of view?

8. How often does your father encourage you to articulate your point of view?

Mode of Thinking Questions

1. How often do you speak aloud your thoughts to YOURSELF when you are trying to clarify your thoughts on how to solve problems such as the problem set you just completed?

2. In general, do you think that you think verbally or non-verbally?

3. How much do you think you rely on language when you think?

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