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大學生的學習投入與學習成果、心理社會發展的關連性(I)

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中文關鍵詞：成就動機、認知發展、個人發展、社會發展、學習成果、大學生

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The role of achievement motivations and achievement goals in Taiwanese college students' cognitive and psychological outcomes

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The Role of Achievement Motivations and Achievement Goals in Taiwanese College Students' Cognitive and Psychological Outcomes

Abstract

This study explored how motivational factors are associated with Taiwanese college students' cognitive, personal, and social development by incorporating both relatively global static self attributes, such as social-oriented achievement motivation and individual-oriented achievement motivation, which are considered to be a culturally balanced conception of achievement motivation for Chinese people, and more domain-specific self attributes, such as achievement goals, which are widely adopted internationally. The findings suggest that institutions can encourage students to set their own motivational goals, rather than adopting goals set by the family or the clan, and to focus on self-referenced competence development and personal improvement.

In a review study, Kuh et al. (2007) proposed that college-student success be defined to include academic achievement, engagement in educational purposeful activities, satisfaction, acquisition of desired knowledge and competencies, persistence, and attainment of educational objectives. They also argued that the foundation for student success consists of several variables, including student demographics, family and peer support, academic preparation, motivation to learn, and enrollment patterns. Many empirical studies have used data from the College Student Experiences Questionnaire (CSEQ) and later from the National Survey of Student Engagement (NSSE) to investigate relationships among various foundation variables, such as gender, race, majors, first-generation college student, parental educational level, and academic preparation, to college students' outcomes, including academic achievement and students' self-reported estimated gains regarding cognitive competency and psychological development (e.g., Hu & Kuh, 2002; Kinzie, Thomas, Palmer, Umbach, & Kuh, 2007; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008; Pike & Kuh, 2005; Pike, Kuh, & Gonyea, 2003; Zhao, Carini, & Kuh, 2005). Few previous studies, however, have linked motivational variables to students' outcomes in college experience studies. Knowing more about the motivational factors that lead some students to achieve better cognitive and psychological outcomes would help generate insight into how to provide environments that facilitate student learning.

Bandura's Social Cognitive Theory (SCT) (1997) provides a useful framework for conceptualizing the diverse influences on college-student success. The SCT emphasizes the role of self-referent thinking in guiding human motivation and behavior and recognizes the mutual, interacting influences between individuals' behavior and their environments. According to this framework, individuals control their own behavior through cognitive processes and the environment. Specifically, Bandura (1986) advocated a triadic reciprocal determinism among the environment (e.g., college curriculum/activities, family and peer

support), the individual (e.g., academic preparation, motivation to learn), and behavior (e.g., academic achievement). In this scheme, external environmental factors, personal attributes, and overt behavior operate as interlocking mechanisms that affect one another bidirectionally. As such, we need to take into consideration all three broad influencing factors to fully understand college students' academic success. In addition, SCT emphasizes the situational and domain-specific nature of behavior, the relatively dynamic aspects of the self system, and the means by which individuals exercise personal agency. Accordingly, in this study of college students' academic success, we incorporated both relatively global, static self attributes, such as social-/individual-oriented achievement motivations, and more domain-specific self attributes, such as mastery/performance goals. The present study applied the well-established Social Cognitive Theory (Bandura, 1997) as a guiding framework to explore the influences of two key personal attributes, motivations and goals, which existing studies have largely overlooked, on college students' academic success. In addition, we introduced a culturally balanced conception of social- and individual-oriented achievement motivations to both better situate Taiwanese college students' learning experiences and provide a strong foundation for future cross-cultural comparisons.

Achievement Goals in Relation to Academic Performance and Well-being

Finney, Pieper, and Barron (2004) and Midgley et al. (1998) suggested that studies of students' goals have offered one of the most significant frameworks for understanding achievement motivations in educational settings over the last three decades. Achievement goal theory (AGT) is a social cognitive theory of motivation developed to explain differences among students in their achievement motivation and success. In the original framework, two primary reasons for students' engagement in achievement behaviors were identified: mastery goals aiming to develop one's competence and performance goals to demonstrate one's

competence by outperforming peers. Traditionally, mastery goals have been theorized to produce better effects than performance goals on desirable educational outcomes (Dweck, 1986; Nicholls, 1984). In empirical studies, findings concerning mastery goals have been relatively consistent and mostly favorable, indicating that those who pursue mastery goals find their classes interesting, persist when facing difficulty, use deep strategies, and perceive tasks as valuable; studies on performance goals have exhibited a less consistent pattern of results, however (Senko, Hulleman, & Harackiewicz, 2011).

Elliot and McGregor (2001) proposed a 2x2 achievement goal model by adding a mastery-avoidance goal. In this model, mastery-approach goals focus on self-referenced skill development and personal improvement; performance-approach goals focus on demonstrated competence in relation to others; performance-avoidance goals focus on avoiding unfavorable judgments of competency; and a mastery-avoidance orientation is expressed in individuals who attempt to avoid losing their skills, abilities, or knowledge. Finney, Pieper, and Barron (2004) modified this instrument of the Achievement Goal Questionnaire (AGQ) into the AGQ-General, a version that is more suitable for measuring students' goals across classes. With the AGQ-General, Finney et al. found that when previous academic achievement was controlled, American college students' mastery-approach goals positively predicted their semester grade-point averages (GPAs), and performance-avoidance goals negatively predicted GPAs. Later, Witkow and Fuligni (2007) used the AGQ-General to investigate the fit of a 2x2 achievement-goal model for a diverse sample of nearly 700 10th graders from the Los Angeles area. They found that, after controlling gender, performance-approach and mastery-approach goals positively predicted GPA, whereas mastery-avoidance goals negatively predicted GPA. In addition, adolescents' interpretations of their daily school experiences and feelings were found to mediate these relationships. To be specific, average study time, average number of demands, and average daily school

success each significantly mediated the relationship between performance-approach goals and GPA. Similarly, average daily school success significantly mediated the relationship between mastery-approach goals and GPA; further, the relationship between mastery-approach goals and GPA was no longer significant with average daily school success in the model. These results suggested that, while performance-approach-oriented students focused on meeting school demands, spending more time on studying, and feeling good by performing well relative to their peers, mastery-approach-oriented students focused on learning new material and doing well on exams, leading them to feel that they understood the material on which they were being tested. In other words, students with both goal orientations were associated with higher grades, but they followed different pathways to achievement: one through getting good grades and the other through learning well.

In addition to academic achievement and daily school experiences, as mentioned above, achievement goals theory also has been linked to college students' and adolescents' emotional outcomes and well-being. Daniels et al. (2008) used cluster analysis to classify 1,002 Canadian undergraduate students according to their mastery and performance-approach goals, and four clusters emerged. The high mastery/performance cluster, the dominant mastery cluster, and the dominant performance cluster showed equivalent levels of achievement outcomes, but students in the dominant performance cluster were more psychologically and emotionally vulnerable than those in the other two clusters, indicating greater susceptibility to anxiety. The low-motivation cluster demonstrated the least-adaptive profile across all outcomes. Tuominen-Soini, Salmela-Arp, and Niemivirta (2008) investigated 1,321 adolescents from Eastern Finland and identified six groups of students with unique motivational profiles. They found that success-oriented students had the highest GPAs, followed by mastery-oriented students and performance-avoidance students, while avoidance-oriented, disengaged, and indifferent students were equally low in school

achievement. Mastery-oriented students experienced fewer depressive symptoms than other students, however, with the exception of disengaged students. Finally, Luo, Paris, Hogan, and Luo (2011) examined 1,697 Singapore secondary students in their math study and identified four types of goal clusters. This study found that a goal profile with high mastery and performance approach goals, combined with low performance-avoidance goals, is most beneficial for learning. Higher performance-approach goals, when associated with performance avoidance goals, however, have negative effects on affective outcomes, in terms of experiencing anger, sadness and frustration during the past week.

In sum, extant studies across different countries have shown some associations between a 2x2 achievement goals model and college as well as secondary-school students' academic performance, affective outcomes, and well-being. While performance-approach goals were found to be positively linked to GPAs of U.S. 10th graders (Witkow & Fuligni, 2007), performance-avoidance goals were negatively linked to GPA of U.S. college students (Finney, Pieper & Barron, 2004). In addition, students in the dominant performance cluster were more susceptible to anxiety and more likely to report being angry, sad, and frustrated during the past week for both Canadian college students and Singapore secondary students (Daniels et al., 2008; Luo et al., 2011). In addition, results pertaining to the relationships of mastery-approach, mastery-avoidance goals, and academic performance have been inconsistent. While Finney, Pieper and Barron (2004) indicated that mastery-approach goals positively predicted GPAs of U.S. college students, Witkow and Fuligni (2007) suggested that the positive relationship between mastery-approach goals and GPA was no longer significant with average daily success in the model; similarly, the negative relationship between mastery-avoidance goals and GPA was no longer significant with average study time and average daily success in the model for American adolescents. In addition, students in the mastery-oriented cluster indicated fewer depressive symptoms than those in other clusters in

Tuominen-Soini et al.'s (2008) study with Finnish adolescents.

A Chinese Social-oriented/Individual-oriented Achievement Motivation Model

In a study that explored the motivational orientation of college students from Hong Kong universities, Kember, Hong, and Ho (2008) indicated that the achievement motivation theory developed by Western researchers was not appropriate for students in Confucian-heritage countries. Yu and Yang (1987) thus proposed an alternative model of achievement motivation, using a theoretical framework of the psychology of the Chinese people. In this model, the social-oriented achievement motivation (SOAM) was differentiated from the individual-oriented achievement motivation (IOAM), identified by D. C. McClelland (1980). Each of the two types of achievement motivation has its own characteristics with respect to four aspects: achievement value, achievement goal, achievement-related behavior, and outcome evaluation. In the SOAM, the motivation has higher social instrumentality, and the goal is set by others, primarily the family and the clan, rather than the individual. The actions necessary to achieve the goal and evaluation of its attainment are also determined by these important others. In contrast, in the IOAM, the motivation has higher functional autonomy, and an individual sets the goal for himself. The individual also determines the action necessary to achieve the goal and evaluate its attainment. In a later study, Yu (1993) examined the relationship between motivation and behavior for these two types of achievement motivations and suggested that SOAM and IOAM were independent psychological constructs. Even though the Chinese SOAM/IOAM model was linked to parents' training methods (Yu, 1991) and was examined for achievement-related behavior in an experimental context (Yu, 1993), it has never been investigated for its association with educational outcomes within the school context.

Purpose of the Study

The present study applied social cognitive theory as the guiding framework and adopted the culturally based SOAM/IOAM model and the individually based 2x2 achievement goals model, which has been widely utilized in educational psychology studies across cultures, to probe the relationships between motivational variables and Taiwanese college students' cognitive and psychological outcomes, broadly defined as estimated gains in cognitive development, academic class ranking, estimated gains in individual psychological development, estimated gains in social development, and depressive symptoms. Among these outcome variables, previous studies have found academic class ranking and depressive symptoms to be empirically linked with achievement goals, but the three self-reported estimated gains of cognitive development, individual psychological development, and social development, which college-experience studies consider to be important indicators of college students' learning outcomes (e.g., Flowers, 2004; Kuh, Pace, & Vesper, 1997; Pike & Kuh, 2005; Pike, Kuh, & Gonyea, 2003; Zhao, Kuh, & Carini, 2005), have rarely been examined with motivational variables. The specific research questions are as follows:

1. Are a demographic factor (gender), achievement motivations (social-oriented achievement motivation and individual-oriented achievement motivation), and achievement goals (performance-approach goal, performance-avoidance goal, mastery-approach goal, and mastery-avoidance goal) related to estimated gains in cognitive development, academic class ranking, estimated gains in individual psychological development, estimated gains in social development, and depressive symptoms?
2. Does the 2x2 achievement goals model add incremental validity beyond the culturally based SOAM/IOAM achievement motivations in accounting for Taiwanese college students' cognitive and psychological outcomes?
3. What are significant predictors of the five educational outcomes?

Methods

Participants

The participants were recruited from three General Education courses at a highly selective science/engineering research-oriented university in Northern Taiwan. These three courses were selected because their students' majors represented a wide spectrum of academic departments at this particular institution. Of the 415 students, 360 completed the survey (87%). Among them, 242 (67.2%) were male, and 118 (32.8%) were female; 22.2% were electrical engineering and computer-science majors, 25% were engineering majors, 26.7% were science majors, 22.8% were social science and management majors, and 3% had an unknown affiliation; 35.8% were freshmen, 49.4% were sophomores, 7.8% were juniors, and 7.0% were in their fourth or fifth (extended) year.

Measures

Achievement goals. Students' achievement goals were assessed by scales translated from the AGQ-General, a modified version of the Achievement Goal Questionnaire by Elliot and McGregor (2001). The AGQ-General was modified to measure college students' goals in the academic domain (Finney et al., 2004) and was composed of 4 three-item scales for each of the achievement goals in the 2x2 model. Participants indicated the extent to which each item was true for them on a 7-point scale, ranging from 1 (not true for me) to 7 (extremely true for me). Four scores, representing performance-approach, performance-avoidance, mastery-approach, and mastery-avoidance goals, were created for each student. To test the validity of the questionnaire, we conducted a principal components factor analysis with oblimin rotation on the 12 items. One item, "The fear of performing poorly is what motivates me" was eliminated, because it failed to reach a .4 loading on the intended scale of the performance-avoidance goal and had a greater-than .3 loading on another scale, the

performance-approach goal. The factor analysis of the restricted 11-item version led to the extraction of four factors. Factor 1 accounted for 41.85% of the total variance and consisted of three performance-approach goal items (e.g., “My goal this semester is to get better grades than most of the other students”). The second factor accounted for 18.35% of the total variance and comprised the three mastery-approach goal items (e.g., “Completely mastering the material in my courses is important to me this semester”). Factor 3 accounted for 10.42% of the total variance and comprised the three mastery-avoidance goal items (e.g., “I worry that I may not learn all that I possibly could this semester”). Finally, Factor 4 accounted for 7.40% of the total variance and comprised the two performance-avoidance goal items (e.g., “My goal this semester is to avoid performing poorly compared to other students”). Together, the four factors accounted for 78.02% of the total variance. For our sample, the internal consistency reliabilities of the performance-approach, mastery-approach, mastery-avoidance, and performance-avoidance scales were .86, .70, .69, and .87, respectively.

Achievement motivations. Students’ achievement motivations were assessed by scales developed by Yu and Yang (1987). The questionnaire consisted of 60 survey items representing two subscales, social-oriented achievement motivation (SOAM) and individual-oriented achievement motivation (IOAM), with 30 items each. Sample items are “I usually work hard to fulfill my parents’ expectation of my academic achievement” for SOAM and “I usually make my own choice, and do what I really want to do” for IOAM. Participants also indicated the extent to which each item was true for them on a 7-point scale, ranging from 1 (not true for me) to 7 (extremely true for me). Two scores, representing social-oriented and individual-oriented achievement motivations, were summed from the 30 items, and then an average score was computed for each achievement motivation. For our sample, the internal consistency reliabilities for SOAM and IOAM scales were .954 and .958, respectively.

Estimated gains in cognitive development. Students' estimates of gains were assessed by scales translated from the fourth edition of the College Student Experiences Questionnaire (CSEQ) (Pace & Kuh, 1998). With the probing question of "In thinking about your college or university experience up to now, to what extent do you feel you have gained or made progress in the following areas?" the CSEQ Estimate of Gains asked students to respond to 25 items. Participants indicated the extent to which each item was true for them on a 4-point scale, ranging from 1 (very little) to 4 (very much). According to previous studies, students' gains were represented by four scales: gains in general education, gains in intellectual development, gains in communication skills, and gains in personal and social development (Kuh, Pace & Vesper, 1997; Pike & Kuh, 2005; Pike, Kuh & Gonyea, 2003). Since from the perspective of student development, student learning in higher education involves not only cognitive competence, but also establishing identity and developing mature interpersonal relationships (Evans, 2011; King & Baxter Magolda, 2011), for the purpose of this study, we regrouped these items into three categories: gains in cognitive development, gains in personal development, and gains in social development. As one of the cognitive outcome variables, estimated gains on cognitive development included 19 of the 25 items, basically tapping the original three gains in general education, intellectual development, and communication skills; it excluded 5 items of gains in personal and social development and 1 item concerning physical fitness. Sample items for estimated gains in cognitive development include "Developing an understanding and enjoyment of art, music, and drama," "Thinking analytically and logically," and "Presenting ideas and information effectively when speaking to others." For our sample, the alpha reliability was .903.

Estimated gains in personal development. The outcome variable of the estimated gains on personal development in this study comprised 2 items. Although Kuh, Pace and Vesper (1997) created an outcome variable of estimated gains in personal and social

development, for the purpose of this study, personal development and social development were differentiated into two variables. The two items that represented estimated gains in personal development were "Understanding yourself, your abilities, interests, and personality" and "Developing your own values and ethical standards." The alpha reliability was .772 for our sample.

Estimated gains in social development. The three items that represented estimate of gains in social development were "Developing the ability to get along with different kinds of people," "Developing the ability to function as a member of a team," and "Gaining knowledge about other parts of the world and other people." The alpha reliability was .714 for our sample.

Class ranking. Participants were asked to provide their class ranking for the last semester (i.e., 1 = ranked as the lowest 25% of the class, to 2 = ranked as the 50-75% of the class, 3 = ranked as the 25-50% of the class, and 4 = ranked as the top 25% of the class).

Depressive symptoms. Depression was measured by an average score out of the sum score of 12 items, with high scores signifying more depressive symptoms. These items were drawn from various established depression scales, mainly tapping the common affective and physical aspects of depressive symptoms (Chong & Wilkinson, 1989). Participants indicated the extent to which each item was true for them on a 4-point scale, ranging from 1 (not at all) to 4 (more than usual). "Feeling life is hopeless in the last six months" is a sample item for depressive symptoms, and the alpha reliability for our sample was .821.

Data Analysis

The data analysis proceeded in two stages. For research question 1, we employed simple descriptive statistics and correlations to explore relationships among the variables. For research questions 2 and 3, we used a hierarchical regression method to help determine the predictive power of each group of variables (e.g., achievement motivations and achievement

goals), as well as the strongest predictors across groups of variables. Gender was entered first into the regression model as the control variable, followed by culturally based achievement motivations as the second set; individually based achievement goals were entered as the last set.

Results

Descriptive information and correlations for the study variables are displayed in Table 1. Zero-order correlations indicated that for the two achievement motivations, the social-oriented achievement motivation (SOAM) had positive correlations with estimated gains in cognitive development and class ranking, but at the same time had a positive correlation with depressive symptoms; whereas the individual-oriented achievement motivation (IOAM) had positive correlations with two cognitive outcomes: estimated gains in cognitive development and class ranking, and two psychological outcomes: estimated gains on personal development and on social development. Regarding the four achievement goals, the performance-approach goal had positive correlations with two cognitive outcomes; while the performance-avoidance goal had a negative relationship with both class ranking and personal development. The mastery-approach goal had positive correlations not only with the two cognitive outcomes as did the performance-approach goal, but also with two psychological outcomes: estimated gains in personal development and social development. In contrast, the mastery-avoidance goal had a negative correlation with the estimated gain in personal development and a positive correlation with depressive symptoms, indicating a negative association with psychological development.

(Table 1 about here)

Table 2 shows results from the regressions predicting Taiwanese college students' five outcome variables. Some of the associations shown in the zero-order correlations were confirmed by five sets of hierarchical regression analyses, with all the variables taken into

consideration at the same time.

(Table 2 about here)

The results of these regression analyses revealed that, in Model 1, for the estimated gains in cognitive development, in addition to gender, achievement motivations alone predicted 23.7% of the variance of the dependent variable; however, in addition to gender and achievement motivations, achievement goals did not contribute to a significant increase in the overall model fit ($R^2 = .302$). Gender, the individual-oriented achievement motivation, and the mastery-approach goal were significantly related to the estimated gains in cognitive development, with individual-oriented achievement demonstrating the highest relative effect. In other words, students who were male, with a higher individual-oriented achievement motivation, and with a higher master-approach goal, tended to have higher self-reported estimates of gains in cognitive development. When all factors were taken into consideration together, the mastery-approach goal remained a significant predictor for the estimated gains in cognitive development, while the performance-approach goal became nonsignificant.

In Model 2, for the estimated gains in personal development, in addition to gender, achievement motivations alone predicted 16.6% of the variance of the dependent variable; furthermore, in addition to gender and achievement motivations, achievement goals still contributed to a significant increase in the overall model fit, accounting for 8.8% of the variance of the dependent variable ($R^2 = .254$). The individual-oriented achievement motivation, the performance-approach goal, the mastery-approach goal, and the mastery-avoidance goal were significantly related to estimated gains in personal development, with individual-oriented achievement demonstrating the highest relative effect. Among these predictors, performance-approach and mastery-avoidance goals were negatively related to the dependent variable. In other words, students who had a higher individual-oriented achievement motivation, a lower performance-approach goal, a higher master-approach goal,

and a lower mastery-avoidance goal had higher self-reported estimated gains in personal development, on average.

In Model 3, for estimated gains in social development, in addition to gender, achievement motivations alone predicted 12.2% of the variance of the dependent variable; furthermore, in addition to gender and achievement motivations, achievement goals still contributed to a significant increase in the overall model fit, accounting for 3.3% of the variance of the dependent variable ($R^2 = .157$). The individual-oriented achievement motivation, the performance-approach goal, and the mastery-avoidance goal were significantly related to the estimated gains in social development, with individual-oriented achievement demonstrating the highest relative effect. Among these predictors, performance-approach and mastery-avoidance goals were negatively related to the dependent variable. In other words, students who had a higher individual-oriented achievement motivation, a lower performance-approach goal, and a lower mastery-avoidance goal had higher self-reported estimated gains in social development, on average. Models 2 and 3 both showed that when all factors were taken into consideration together, performance-approach and mastery-avoidance goals had a detrimental impact on students' personal as well as social development, while the mastery-approach goal was positively linked with personal development. Even though the performance-approach goal was not significantly related to estimated gains in personal development and social development, it was a significant negative predictor for these two dependent variables in the regression model when all factors were taken into consideration. The same situation also happened for mastery-avoidance goal with estimated gains in social development. MacKinnon, Krull and Lockwood (2000) proposed that it is statistically and practically possible that mediation can exist even if there is not a significant relationship between the independent and dependent variables, or the size of the effect concerning the relationship between the independent and dependent variables could

actually increase when other variables are added.

In Model 4, for the other cognitive outcome measure, class ranking, in addition to gender, achievement motivations alone predicted 4.1% of the variance of the dependent variable; furthermore, in addition to gender and achievement motivations, achievement goals still contributed to a significant increase in the overall model fit, accounting for 8.7% of the variance of the dependent variable ($R^2 = .13$). Only the performance-approach and performance-avoidance goals were significantly related to class ranking. While the performance-approach goal was positively related to the dependent variable, the performance-avoidance goal was negatively linked. When all factors were taken into consideration together, the performance-approach goal remained a significant predictor for class ranking, but the mastery-approach goal became insignificant.

Finally, in Model 5, for the third psychological outcome measure, depressive symptoms, in addition to gender, achievement motivations alone predicted 6.6% of the variance of the dependent variable; furthermore, in addition to gender and achievement motivations, achievement goals still contributed to a significant increase in the overall model fit, accounting for 6.3% of the variance of the dependent variable ($R^2 = .13$). The social-oriented achievement motivation, the performance-avoidance goal, the mastery-approach goal, and the mastery-avoidance goal were significantly related to depressive symptoms. While the social-oriented achievement motivation and the mastery-avoidance goal were positively related to the dependent variable, performance-avoidance and mastery-approach goals were negatively linked. When all factors were taken into consideration together, students who had a higher social-oriented achievement motivation and a higher mastery-avoidance goal tended to have greater depressive symptoms, or lower psychological well-being.

Discussion

This study explored the associations of achievement motivations and achievement goals with Taiwanese college students' cognitive and psychological outcomes. For estimated gains in cognitive development, the achievement goal variables did not add incremental value beyond the culturally based SOAM/IOAM achievement motivations and gender in accounting for Taiwanese college students' self-reported development in general education, intellectual competency, and communication skills. The Western traditional individual-oriented achievement motivation, rather than the traditional Chinese social-oriented achievement motivation, emerged as the strongest predictor among all motivational variables of students' retrospective progress on cognitive development. In other words, when an individual sets a motivational goal, and the individual also determines the action necessary to achieve the goal and evaluate its attainment, the stronger the motivation, the better is the student's report of his/her gains in developing an understanding and enjoyment of art, music, and drama, in thinking analytically and logically, and in presenting ideas and information effectively when speaking to others, among other capacities, during his/her college years. In addition to the individual-oriented achievement motivation, the mastery-approach goal was also positively related to the estimated gain in cognitive development, though to a lesser degree, suggesting that focusing on improving one's competence was beneficial for college students' long-term cognitive development. Previous studies have indicated that the mastery-approach goal is positively associated with course interest, subsequent interest in a subject matter, daily school success, feelings of being a good student, and positive school feelings (e.g., Harackiewicz et al., 1997, 2002; Witkow & Fuligni, 2007), and the findings of this study have provided more evidence to support the positive effects of the master-approach goal of learning.

Results of regression analyses on the other cognitive outcome, class ranking, demonstrated a rather different pattern from findings on the estimated gains in cognitive

development. Achievement goals exerted more predictive power than the achievement motivation variables. Achievement motivations were not significantly associated with class ranking when gender and achievement goals were controlled. Rather, the performance-approach goal remained the best predictor for class ranking in a positive way, which is consistent with results from many previous studies (e.g., Harackiewicz et al., 1997, 2002; Witkow & Fuligni, 2007), while the performance-avoidance goal was negatively related to a lesser degree, as indicated by Finney et al. (2004). In other words, students focusing on performing better than other students tended to outperform other students, while those who focused on not performing worse than others tended to have worse grades. This study also found a significant correlation between the mastery-approach goal and class ranking in the zero-order correlation; however, when all variables were taken into consideration, the mastery-approach goal became a nonsignificant predictor for class ranking. Since results from previous studies regarding the relationship between the mastery-approach goal and academic performance were inconclusive (e.g., Finney et al., 2004; Witkow & Fuligni, 2007), more in-depth investigation is needed in this area.

Generally speaking, even though gains in cognitive development and class ranking for the last semester were both important indicators of cognitive outcomes in college-student experience studies, the findings of this study remind us that these are very different outcomes. Although students who were IOAM-oriented, characterized as having a motivation of higher functional autonomy, and also mastery-goal oriented, characterized as focusing on improving self-referenced competencies, reported higher scores on cognitive development, students who were performance-goal oriented, characterized as focusing on demonstrating competence in relation to others, reported better class ranking.

For the psychological outcome--estimated gains in personal development--achievement goals as a set were found to have significant predictive power beyond gender and the

achievement motivations. The individual-oriented achievement motivation was found to be a prominent predictor, followed by mastery-approach and mastery-avoidance goals, and then the performance-approach goal to a lesser degree. Estimated gains in social development demonstrated a somewhat similar pattern: Achievement goals as a set had significant predictive power beyond gender and the achievement motivation variables, and the individual-oriented achievement motivation was found to be a prominent predictor, followed by mastery-avoidance and performance-approach goals to a lesser degree. For estimated gains in both personal and social development, mastery-avoidance and performance-approach goals were negatively linked. All these results together indicated that when the individual sets a motivational goal, and the individual also determines the action necessary to achieve the goal and the evaluation of its attainment, the stronger the motivation, the better is the student report on his/her college experiences helping him/her in understanding himself/herself, his/her abilities, interests, and personality; in developing his/her own values and ethical standards; in developing the ability to get along with different kinds of people; in developing the ability to function as a team member; and in gaining knowledge about other parts of the world and other people. In contrast, even though focusing on performing better than others was good for academic achievement, it was harmful for college students' retrospective evaluation of their progress in both personal and social development during their college years. These results seem to corroborate results of extant studies suggesting that students with a higher performance goal orientation are more susceptible to anxiety and are more likely to report having been angry, sad, and frustrated during the past week, indicating more psychologically and emotionally vulnerability than other students (e.g., Daniels et al., 2008; Luo et al., 2011). Furthermore, focusing on avoiding being incompetent not only hurt college students' cognitive development, but also was harmful for their long-term psychological development in both personal and social aspects. The only difference between the regression

results of estimated gains in personal development and those in social development was that the mastery-approach goal was found to be a significant predictor for the former only, indicating that focusing on improving one's competence was beneficial not only for long-term cognitive development, but also for college students' personal development.

Finally, for depressive symptoms, achievement goals as a set were found to have significant predictive power beyond gender and the achievement motivations. In addition, for the first time, social-oriented achievement motivation emerged as a significant predictor, in addition to mastery-avoidance, mastery-approach, and performance-avoidance goals. Among them, social-oriented achievement and the mastery-avoidance goal were positively linked to depressive symptoms. Even though the social-oriented achievement motivation was proposed as a better representation of the traditional Chinese form of motivation (Yu & Yang, 1987), its linkage to college students' cognitive or psychological outcomes had not previously been explored. We found that the Chinese-based, social-oriented achievement motivation was associated with psychological well-being in a negative way. In other words, when the motivational goal is set by others, primarily by the family and clan, rather than by the individual, and these important others also determine the action necessary to achieve the goal and the evaluation of its attainment, the stronger the motivation, the higher was the likelihood that the student would suffer the depressive symptoms, like feeling that life had been hopeless over the last six months. Regarding achievement goals and depressive symptoms, again, focusing on improving one's competence was beneficial not only for long-term cognitive development, but also for long-term personal development, as well as for experiencing fewer depressive symptoms compared to other students, as reported by Tuminen-Soini, Salmela-Arp, and Niemivirta (2008).

Conclusion

This study explored how motivational factors associated with Taiwanese college students' learning outcomes by using a guiding framework of social cognitive theory that incorporated both relatively global, static self attributes such as SOAM and IOAM, which are considered to form a culturally balanced conception of achievement motivation for Chinese people, and more domain-specific self attributes, such as achievement goals, which are widely used internationally. Our results indicated that achievement motivations and achievement goals were significantly associated with Taiwanese college students' cognitive and psychological outcomes.

This study was the first to examine the relationship between the Chinese SOAM/IOAM model and students' educational outcomes. The social-oriented achievement motivation, which emphasizes the motivational goal, the action necessary to achieve the goal, and the norm of evaluation as being set by the family or clan, was proposed to be better for understanding Chinese students' motivation, as opposed to the Western traditional individual-oriented achievement motivation (Yu & Yang, 1987). This study found that achievement motivations as a set can help predict all five cognitive and psychological outcomes variables in addition to gender, but the individual-oriented achievement motivation emerged as the best predictor for estimated gains in cognitive development, personal development, and social development. The social-oriented achievement motivation was found to be a significant predictor for Taiwanese college students' depressive symptoms, indicating that students with a higher social-oriented achievement motivation tend to have more depressive symptoms. These findings suggest that it might be helpful for institutions and student affairs practitioners to encourage students to set their own motivational goals and determine the actions necessary to achieve those goals, as well as how to evaluate its attainment, by themselves. In addition, they can also inform faculty and students' parents about the positive learning outcomes associated with IOAM, as well as the potential risk of

adopting SOAM. In addition, since Chinese American and other Asian American students were found to feel pressured to meet their parents' expectations to succeed academically and these students considered their social networks, especially family and peers, to be the most important in making decisions about college choices (Kim & Gasman, 2011), the same suggestions might also apply to how U.S. educational institutions teach, advise, and counsel Taiwanese or international students from regions that share a similar Confucian heritage.

Furthermore, the achievement goals model as a set was found to have significant predictive power beyond gender and the achievement motivations for all of the dependent variables except estimate of gains on cognitive development. Previous studies had established linkages of achievement goals to young people's course grades; academic performance over time; learning interest over time; daily school experiences and feelings; depressive symptoms; and long-term cognitive, emotional, and achievement outcomes (e.g., Daniels et al., 2008; Finney et al., 2004; Harackiewicz et al., 1997, 2002; Luo et al., 2011; Tuominen-Soini et al., 2008; Witkow & Fuligni, 2007). Some of our findings were consistent with results from previous studies, and some have extended established accounts. The performance-approach goal was strongly and positively related to Taiwanese college students' academic class ranking for the last semester; however, it had negative relationships with their estimated gains in personal development and social development. In contrast, the performance-avoidance goal was found to have negative relationships with class ranking and depressive symptoms. The mastery-approach goal was positively linked with estimated gains in cognitive development and personal development, and at the same time, it had a negative relationship with depressive symptoms. Finally, the mastery-avoidance goal was negatively linked with estimated gains in cognitive development, personal development, and social development, and at the same time, it had a positive relationship with depressive symptoms. Overall, the results of this study suggest that the mastery-approach goal has a positive impact on multiple

desirable cognitive and psychological outcomes, while the performance-approach goal is good for academic performance at the cost of psychological development. The performance-avoidance goal appeared to have a detrimental effect on academic performance, whereas the mastery-avoidance goal had a negative impact on multiple psychological outcomes. The implications of the study findings suggest that faculty advisers and student counselors might provide more guidance to students on adopting mastery-approach goals, support the adoption of performance-approach goals that focus on the attainment of positive outcomes, and minimize the adoption of performance-avoidance as well as mastery-avoidance goals.

Finally, it is important to note that the results of this study can be generalized only to college students who have characteristics similar to those of the participants. Future studies could include a larger sample size with a more balanced sample in terms of gender, majors, and class year. Though limited, our findings contribute to the literature on college-student experience by demonstrating the significance of motivational factors on students' cognitive development, personal development, and social development. More important, the findings related to the linkage between SOAM/IOAM and Taiwanese college students' outcomes have added a new dimension to international research and literature. Research from other regions that share similar Confucian-heritage is suggested to explore this issue in more depth.

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Table 1 Inter-Correlations between Research Variables

		1	2	3	4	5	6	7	8	9	10	11	12
1	Gender	1											
2	Social-oriented achievement motivation	.07	1										
3	Individual-oriented achievement motivation	.06	.27**	1									
4	Performance-approach goal	-.10	.52**	.36**	1								
5	Performance-avoidance goal	.00	.30**	-.05	.03	1							
6	Mastery-approach goal	-.08	.35**	.47**	.53**	-.03	1						
7	Mastery-avoidance goal	-.01	.43**	.21**	.20**	.29**	.32**	1					
8	Estimate of gains: Cognitive development	.20**	.15*	.50**	.19**	-.07	.29**	.06	1				
9	Estimate of gains: Personal development	.01	-.01	.41**	.07	-.16**	.24**	-.14*	.62**	1			
10	Estimate of gains: Social development	.00	.09	.35**	.06	.03	.18**	.00	.60**	.60**	1		
11	Class ranking	-.08	.11	.20**	.30**	-.14*	.14*	.07	.10	.05	.01	1	
12	Depression symptoms	-.03	.26**	-.06	.07	.04	-.01	.26**	-.02	-.04	-.11*	-.05	1
M			3.82	4.94	4.74	3.95	5.20	4.49	1.47	1.76	1.75	1.85	0.96
SD			1.05	0.91	1.45	1.59	1.08	1.23	0.48	0.71	0.63	1.07	0.47

Table 2 Hierarchical Regressions of Achievement Goals and Achievement Motivations on Five College Students' Outcomes

	Model 1 Estimate of gains: Cognitive development	Model 2 Estimate of gains: Personal development	Model 3 Estimate of gains: Social development	Model 4 Class ranking	Model 5 Depressive symptoms
Step1					
Gender	.192***	-.017	.001	-.015	-.020
R ²	.045	.000	.002	.002	.000
Step2					
Social-oriented achievement motivation	.070	.038	.109	-.051	.219**
Individual-oriented achievement motivation	.442***	.390***	.366***	.111	-.117
R ² change	.237***	.166***	.122***	.041**	.066***
R ²	.282	.166	.123	.043	.067
Step3					
Performance-approach goal	-.046	-.172*	-.169*	.337***	.025
Performance-avoidance goal	-.048	-.082	.078	-.136*	-.126*
Mastery-approach goal	.137*	.219***	.106	-.106	-.147*
Mastery-avoidance goal	-.094	-.270***	-.156*	.072	.275***
R ² change	.019	.088***	.033*	.087***	.063***
R ²	.302	.254	.157	.130	.130
F value	16.836***	13.730***	7.491***	6.025***	6.099***
Df	(7,273)	(7,282)	(7,282)	(7,283)	(7,287)

*p<.05 ** p<.01 ***p<.001

出席國際學術會議心得報告

計畫編號	NSC 102-2410-H-007-037-SSS
計畫名稱	大學生的學習投入與學習成果、心理社會發展的關連性(I)
出國人員姓名	陳素燕
服務機關及職稱	國立清華大學 學習科學所 教授
會議時間地點	May 10-12, 2014, New Orleans, LA, U. S. A.
會議名稱	International Reading Association Annual Meeting
發表論文題目	Chen, S. Y. & Fang, S. P. (2014). Assessing exposure to print: Development of measures for Taiwanese fifth graders. Paper presented in International Reading Association (IRA) Annual Meeting, New Orleans, U. S. A., May 10-12, 2014. (NSC 100-2420-H-007- 001-MY3)

一、參加會議目地

今年選擇參加 IRA 的原因是因為這是我擔任台灣閱讀協會理事長的第二年任期，到 IRA 與會交流資訊是職責之一；另外，去年 IRA 待任理事長 Dr. Jill Lewis-Spector 來訪，這次也趁年會去她的場次拜訪以聯絡情誼。

二、參加會議過程與心得

雖然這次因為目前同時身兼學校的行政工作（清華學院厚德書院執行長），所以無法停留太久，但短短兩天聽了五個場次，非常充實，獲益良多！

第一場是 5/10（星期六）11:00am-12:00pm 的”Global literacy professional development network (GLPDN) in Bangladesh and Indonesia” (New Orleans Ernest N. Morial Convention Center, Rm 237)。這個場次是國際閱讀協會針對亞洲閱讀學者所籌劃的場次，分享它在一個在孟加拉和印尼等地所進行的國際性 project。在會議當中，遇到來自 IRA 總部全球處的 Amy 和亞洲閱讀協會的下一任理事長來自印尼的 Etty，感覺到分外親切。很難得的隔壁坐一位在非洲地區推廣閱讀的 NGO 成員，跟他請教很多從事此類活動的重要策略，例如：adapt a systematic approach, have capacity to build the project at the country level, use effective models, and integrate technology. 尤其當中的致勝因素是採用 cascade model for teacher development，步驟為 train the trainers, train the trainers to train the teacher，而且一定要教會教師如何轉化簡單的策略來發展適用於當地教學情境的教材教法。此外，如何 involve leadership 也很重要，這些學校的領導者也許不必學細節，但須幫助他們體認這個 project 的價值與過程，成果才會有效落實。

第二場是 5/10（星期六）1:00pm-2:00pm 的”Consuming and producing with JALL: Digital Literature for ALL” (Rm 355)。我個人曾在 2007 和 2009 在 Journal of Adolescent & Adult Literacy，即 JALL，這個 IRA 期下的國際期刊出刊過兩篇論文，所以對它很有情感。前年將三年期的閱讀研究計畫之部分研究成果寫成兩篇論文，一篇投稿這個期刊，另一篇投

稿英國閱讀學會旗下的 SSCI 期刊(Journal of Research in Reading)，結果後者被接受，前者卻進入三稿又被退稿（雖然後來轉投 Reading Improvement 已成功被接受）。帶著好奇的心理去聽 JALL 的 editors 分享他們的哲學，什麼叫做 research balanced practice，以及聽三篇論文的研究者分享他們的研究成果。Editors 分享他們擴大 literacy 的定義來包括 digital literacy 和 critical literacy，去年文章被 download 的次數增加了，投稿的 acceptance rate 為 17%。第一篇的作者談 what the literacy is like in the future，標題叫做 set in stone or set in motion，論點很有意思，在探討究竟我們要擁抱新世代 literacy 的定義，老師與教室現場跟著因應，還是仍堅持傳統對什麼是 literacy、什麼不是 literacy 的古老觀念。這個視角很重要，我自己也一直很想著墨，但不知如何切入。研究者使用問卷問最重要的問題，試圖瞭解青少年和師培中的未來教師的看法，頗有啟發性。但二篇論文討論 app 在 literacy learning 中的應用，但它讓我很困惑，因為這樣的文章題材在其他期刊，例如 Computers & Education 比比皆是，也沒有比這些期刊的論文嚴謹創新。我會後去問 editors，出刊在 JALL 的類似主題論文和出刊在像是 Computers & Education 這樣的期刊，其區別性為何，editors 說是一種 Literacy lenses。有意思，我日後也不排除在 JALL 頭這樣主題的文章，呵呵。第三篇也蠻有啟發性，討論的是使用拍攝錄影帶的作法，探討所謂的 critical literacy，讓我聯想起在清華學院國隆老師將開設的課程。Literacy vision: give students a sense of their membership in society, their right to be actors in history. Critical engagement: maintain critical distance and immersed/emotionally involved. 我提醒自己要去找這篇論文出來讀讀，下學期在學科所教「閱讀研究」也許也用得上。

第三場是 5/10(星期六)3:00pm-5:00pm 的” The intersection of policy and practice: Teachers advocating for outstanding teaching and understanding Common Core State Standards (IRA’ s Literacy Legislative and Advocacy Committee Symposium)” (Rm 278)。這是我比較不熟悉的主題，但似乎這次研討會有不少場次都在談 Advocacy，聽起來好像 literacy 老師在美國媒體受到不少責難，大眾要求學校提升教育標準和 educational accountabilities。當然，最重要的是這場的主講者是 Dr. Jill Lewis-Spector，她看到我坐在聽眾當中，開心又驚訝地指著我，會後則熱情地過來跟我擁抱。有點小好奇的是這兩年出席她的場次聽眾人數都有點冷清，其實她是個不錯的演講者，可能是演講的主題都有點冷門吧！

第四場是 5/11(星期日)11:00am-1:00pm 的” The IRA literacy research panel: Priorities for literacy policy and practice” (Rm 335-336)。這是一場追星而且收穫很多的場次，有我仰慕的閱讀學者如：Peter Afflerbach, Peter Freebody, John Guthrie, Elizabeth Moje, David Pearson, 和 William Teale，我超開心的，會後去用手機拍了一張他們的身影，跟粉絲的心態差不多！最大的收穫是討論到 International Reading Association 將改名為 International Literacy Association 的訊息，印象中去年年底柯華葳院長跟我分享過這個資訊，但我一直未在 IRA 相關的網站或 FB 上看到，我請問坐在隔壁的與會學者，她說這是擴大 IRA 關注的範圍，除了 reading，還包括 writing, speaking, presenting, 和 critical literacy (包括 empower 弱勢和含括 new literacy 如 digital literacy 等概念)。有一位來自德國的學者提出的建議很有趣，她建議改成 ILA 名不符其實，應該是 ALA (American Literacy Association)才對，因為在 IRA 國際學者參與的比重並不高，讓我不禁莞爾。因為這兩年來參加 IRA 年會的確發現少數歐洲學者分享的場次都顯示他

們做的與閱讀相關之跨國努力並不亞於 IRA，但美國的組織總是有一點老大哥的心態，自稱為「國際閱讀學會」。今天寫報告的時候，查詢了一下 key word “IRA turning into ILA” 才發現原來是剛卸任的理事長在 Reading Today 所提出來的，而該篇文章的主題為”Transforming lives through literacy” 而這正好也是 IRA 明年 60 週年在 St. Louis, MI 所舉辦的年會主題，想必屆時會有更多的相關討論，而下一屆的年會正好也是 Jill 擔任主辦人哩！此外，對這個 IRA literacy research panel 有點好奇，查詢之下才發現原來是 IRA 組了一群研究者團隊，其主要定位是：to respond to critical literacy issues facing policymakers, school administrators, teacher educators, classroom teachers, parents and the general public. 主要關注有四：achievement gap, motivation & engagement, standards and assessments, and teacher education。

第五場是 5/11(星期日)1:00pm-2:00pm 的”What’s hot, what’s not: Literacy 2014—A look at the topics receiving current attention and those that were once a focus of interest” (Rm. 280). 這是一個蠻有趣味的場次，Reading Today 每年會進行這個主題的問卷調查，而今年最熱門的主題包括：college & career readiness, close reading/deep reading, common core standard, disciplinary/content area reading, high-stakes assessment, informational/non-fiction texts, adolescent literacy 和 text complexity。比較冷門的主題則為：phonics, phonemic awareness, motivation/engagement, literacy coaching, 和 fluency。研究者提出，有些主題如果已經累積了不少研究和討論，暫時還沒有新的尚待回答的議題，就會較為不熱門；反之，新的議題剛出現的時候則會引來較多關注，而當然，其中有些主題的熱門程度會出現回籠現象，例如 adolescent literacy 曾在 2007 出現在熱門排行，今年又再度出現。

（以下附所發表之會議論文全文。此論文已修改投稿 SSCI 期刊 Asia Pacific Educational Research。）

Assessing exposure to print: Development of measures for Taiwanese fifth graders

Proposal No:

1987

Short Title:

Assessing exposure to print

Session Type:

Research Session (Reviewed)

Presenter:

Su-Yen Chen

National Tsing Hua University in Taiwan

Hsin-Chu, Taiwan, Republic of China

Co-Presenter:

S. P. Fang

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Hsinchu, Taiwan, Republic of China

Category:

Elementary learners (8-11 years old)

Intended Audience:

Librarians/Media Specialists

Reading Teachers/Specialists/Coaches

Researchers

Teacher Educators

Undergraduate or graduate students

Minimum Learner Age:

All

Maximum Learner Age:

All

Audience Background:

Intermediate

[Tables.pdf](#)

Research Question Addressed

A couple of the print exposure checklists, the author recognition test (ART) and the title recognition test (TRT), have been widely used since their creation, and many studies have documented relationships between children's print exposure and their vocabulary knowledge (Cunningham & Stanovich, 1991; Cunningham & Stanovich, 1997; Ecalle & Magnan, 2008), and reading comprehension (Cipielewsk & Stanovich, 1992; Cunningham & Stanovich, 1997; Echols et al., 1996; McBride-Chang et al., 1993;

Spear-Swerling, Brucker, & Alfano, 2010). However, most of the research from the above review study was conducted in Western cultures, especially in English-speaking countries. Regarding the Chinese version of the print exposure checklist, McBride-Chang and Chang (1995) have used a TRT to investigate the relationship between print exposure and reading comprehension with 100 fifth graders in Tianjin, China. They found that print exposure was substantially associated with reading comprehension, but did not significantly help predict additional variance in the reading comprehension measure once vocabulary was forced into a hierarchical regression, while memory abilities did. In this study, neither the procedure for development nor the content of the instrument was mentioned in the study. Most recently, Chen and Fang (2013) presented the process of constructing a Chinese version of the ART (CART) for college students in Taiwan, and established relationships between print exposure and vocabulary size, reading comprehension, as well as two general reading achievement tests (i.e., the “General Scholastic Ability Test-Chinese” and the “Departmental Required Test-Chinese”). Due to the lack of a uniform system of translating the names of foreign authors, however, this version of the ART only consists of Chinese authors. The authors pinpointed this as a research limitation, since, unlike in English-speaking countries, where books originally written in English might fairly well represent most readers’ relative levels of print exposure, in Taiwan, most readers’ reading experiences might consist not only of works written in Chinese but also of those translated from many other languages. For example, according to eight available top-ranked library loan titles and bookstore best-selling lists in 2010, 60% of the titles were translated works. Therefore, this present study aims to develop a TRT composed of both Chinese titles and translated titles, in addition to a Chinese version of ART, for Taiwanese fifth graders, and to investigate their associations with vocabulary and reading comprehension.

Based on the above studies, the goal of this research is fourfold: (1) to develop two versions of TRT for fifth graders in Taiwan, one a translated title recognition test (TTRT) which consists of popular children’s books by writers from other languages, and, the other, a Chinese title recognition test (CTRT), which consists of popular children’s books by Mandarin writers; (2) to develop a Chinese version of an author recognition test (ART) for fifth graders in Taiwan; (3) to examine the overall correlations among the print exposure checklists (i.e., ART, TTRT, CTRT, TRT-composite), three other types of reading habits and print disposition (i.e., diary estimates of absolute reading time, an elementary reading attitude survey, and activity preference), and two criterion measures of reading performance (i.e., number of Chinese characters and reading comprehension), in order to provide preliminary evidence for the ART and TRT’s construct validity; and (4) to investigate the extent to which diary estimates of reading time, reading attitude, activity preference, and ART/TRT help predict criterion variables, especially the extent to which they help predict reading comprehension beyond the number of Chinese characters.

Research Rationale

A variety of methods have been used to assess individual differences in print exposure: self-reported questionnaires, daily activity diaries, and print exposure checklists. A print exposure checklist follows quick-probe logic in which names of best-selling authors or titles of popular books function as probes. Guessing is not an advantageous strategy because it is easily detected and corrected by an examination of the number of foils checked. As a proxy of reading volume, it is assumed that a person who reads frequently will know more about literature and therefore will recognize more correct items than a

respondent who reads less often. According to Stanovich, Cunningham, and West (1998), a print exposure checklist minimizes the complications associated with social desirability involved in self-reporting, and is easier to administer as well as more time saving than the diary estimates of absolute reading time.

A couple of the print exposure checklists have been widely used since their creation, and have consistently proved to be an ideal measure reflecting relative individual differences in out-of-school reading for any age group. Recently, Mol and Bus (2011) meta-analyzed 99 studies that investigated the association between print exposure and components of reading across preschoolers, students attending Grades 1-12, and college students. They found that there are moderate to strong correlations between print exposure and many measures in the outcome domains. Their main findings are consistent with a developmental model of reading comprehension and technical reading and spelling, in which print exposure is considered to play an important role in shaping literacy.

Most of the research from the above review study was conducted in Western cultures, especially in English-speaking countries. Among them, several have shared the procedure of developing print exposure checklists for elementary school students and of how print exposure helps predict children's vocabulary, reading comprehension, and listening comprehension. First, with an effort to extend the findings of Stanovich and West's (1989) initial creation of the ART for college students to the performance of children, Cunningham and Stanovich (1990) demonstrated the utility of an analogous measure, the TRT, by employing children's book titles rather than authors as items. This TRT consisted of a total of 39 items: 25 actual children's book titles, which were not prominent in classroom reading activities, and 14 foils for book names. In a later study, Allen, Cipielewski and Stanovich (1992) revised the TRT from the previous study and developed an ART for fifth graders. They examined whether more indirect indicators of reading habits and print disposition, such as print exposure checklists, the elementary reading attitude survey (ERAS) developed by McKenna and Kear (1990), and an activity preference survey (APS) in which "reading a book" was pitted against six other activities, converged with more direct measures, such as diary estimates of absolute reading time (Anderson, Wilson, & Fielding, 1988). At the same time, criterion validity for all the measures of print habits and attitudes was assessed with several indicators of verbal ability and knowledge. The results confirmed the convergent and discriminant validity of a construct conceived as non-school print exposure that appears to be measured as well by the checklists as by daily activity diaries. Then, using the TRT and ART as instruments, a number of studies have documented relationships between children's print exposure and their vocabulary knowledge (Cunningham & Stanovich, 1991; Cunningham & Stanovich, 1997; Ecalle & Magnan, 2008), and reading comprehension (Cipielewski & Stanovich, 1992; Cunningham & Stanovich, 1997; Echols et al., 1996; McBride-Chang et al., 1993; Spear-Swerling, Brucker, & Alfano, 2010).

Research Methodology

Construction of the TRT and ART for fifth graders in Taiwan

Following the general principle of developing print exposure checklists established by the Western studies, and also the suggestions provided by Chen and Fang (2013) while constructing the ART for college students in Taiwan, we gathered initial book titles from 6 sources, including top-ranked lists from the three most popular book stores, recommended reading lists from the two biggest libraries in Taiwan, and books

recommended by elementary school teachers.

Only books which appeared in multiple sources and are considered to be appropriate for fifth graders were included in the instrument for the pilot study of the TRT. Among the 145 titles, 90 were translated works and 55 were written in Mandarin; 122 were fiction while 23 were non-fiction. We also added four “foils” on the list, to identify and weed out any random responses, yielding a total of 149 titles for the TRT. From the initial book titles, we also came up with 51 Chinese authors for the children’s book, since it is rather unfeasible to include translated names of authors from other languages. Similarly, three “foils” were included, yielding a total of 54 Chinese authors for the ART.

We collected data for the pilot test on both checklists in November 2012 from 1,184 fifth graders in 18 schools from Northern, Central, Southern, and Eastern Taiwan. On both the TRT and ART, we asked respondents to indicate whether or not they were familiar with the titles or the name of a particular author by putting a checkmark next to the name. To prevent the subject from making the mark carelessly and therefore contaminating our data, once any of the “foils” were checked, that particular respondent’s questionnaire was excluded from the data analysis. At the end, data from 1,028 respondents were categorized as valid for the TRT, while 1,135 were categorized as valid for the ART.

For the TRT, according to the 1,028 fifth graders, the selection rate for each of the 145 “real” titles ranged from 0 to 914 (89% of the respondents), with a mean of 16.09 ($SD=8.783$). The top two titles were removed because they are Chinese classics and some teachers reminded us that they are part of the school curriculum. For the remaining 143 titles, we found that translated works not only account for a higher proportion (63%), but they also occupy a higher rank on the list. To be specific, the top 25 translated works on the ranking list selected to be included in the formal checklist of the Translated version of the TRT (TTRT) are ranked between 3rd and 36th, with recognition rates falling between 84% and 10% of the respondents. In contrast, the top 25 Chinese works on the ranking list selected to be included in the formal checklist of the Chinese version of the TRT (CTRT) are ranked between 9th and 91st, with recognition rates falling between 58% and 3% of the respondents. Among the 25 translated titles, 9 are written by American authors, 9 by European authors, and 7 by Japanese and Korean authors. For the ART, according to the 1,135 respondents, the selection rate for each of the 51 “real” Chinese authors ranged from 0 to 834 (73% of the respondents), with a mean of 4.58 ($SD=3.618$). This low recognition rate was consistent with the general impression and empirically supported acknowledgement that, for children, TRT was found to be a more sensitive instrument than ART, because children may read many books but not take any notice of the author information, while ART was found to be the most sensitive instrument for college students (Chen & Fang, 2013). The top 25 authors on the ranking list selected to be included in the formal checklist of the Chinese version had recognition rates between 73% and 4% of the respondents.

Then, we had a version of TTRT consisting of 25 “real” translated titles, and a version of CTRT consisting of 25 “real” Chinese titles. Combining these two versions, with 50 “real” titles, we added 30 “foil” titles as the final version of TRT-complete. Therefore, three kinds of scores were generated for TRT-complete for the purpose of this study. First is the original TTRT score, ranging from 0 to 25. The second is the original CTRT score, also ranging from 0 to 25. The third is the TRT-composite score, ranging from -30 to 50, calculated by taking the number of correct items that were checked and subtracting the number of foils checked. Similarly, for ART, we added 15 “foil” names of the author to the original 25 “real” authors, and

the ART score, ranging from -15 to 25, is calculated by taking the number of correct items that were checked and subtracting the number of foils checked.

Method

Subjects

The formal study was conducted in February and March, 2013. The sample consists of 318 (153 boys and 165 girls) fifth graders in 11 classes from three elementary schools in Northern Taiwan.

Daily activity diaries

We developed our instrument for collecting daily activity data based on Anderson, Wilson and Fielding (1988) and Allen, Cipielewski and Stanovich's (1992) forms of diaries which proposed including nearly exhaustive and mutually exclusive activity categories. We used a graphical layout in which, extended across each row, were time lines ranging from 3:00 p. m. to 12:00 p. m. for school days, and 6:00 a. m. to 12:00 p. m. for non-school days, divided into quarter hours.

Students filled out activity sheets each school day, recording their previous day's activities. Totally, we collected data for seven school days and three non-school days. The children were instructed to date each sheet and to account for all the time blocks. For the purpose of this study, we combined the time for reading self-sponsored print-based reading of fiction and non-fiction, since the TRT was composed of fiction as well as non-fiction titles. Therefore, three kinds of time amount were calculated: average amount of minutes spent on print-based reading of fiction and non-fiction across seven school days (school-day book reading time -diary), ranging from 0 to 540 (9 hours); average number of minutes spent across non-school days (non-school-day book reading time -diary), ranging from 0 to 540 (9 hours); and average number of minutes spent across seven school days and three non-school days (average book reading time -diary), ranging from 0 to 702 minutes.

Elementary reading attitude survey (ERAS)

The Elementary Reading Attitude Survey by McKenna and Kear (1990) yields three scores: a recreational reading score, an academic reading score, and a total score. A sample question for the recreational reading was "How do you feel about reading for fun at home?" while for the academic reading "How do you feel about reading at school?" The Cronbach's alpha for fifth graders for the three subscales were: .86, .82, and .89, respectively. We translated the ERAS into a Chinese version, and the Cronbach's alpha for the recreational, academic, and overall reading attitudes were 0.918, 0.862, and 0.932, respectively. Similarly, three kinds of score were calculated for the purpose of this study, for the two subscales and the total scores, ranging from 10-40, 10-40, and 20-80, respectively.

Activity preference survey (APS)

Allen, Cipielewski and Stanovich (1992) used this instrument as a print disposition measure. With the probing question of "Below you will be given a choice between doing one of two activities. Please put a check next to the one you prefer", in the Chinese version of the activity preference questionnaire, "read a book of my choice" was pitted against each of the following four activities: play an outdoor sport, watch TV, talk to my friends, and surf the Net. The subject's score on the task was simply the number of times that reading was chosen over 1 of these four activities, with a range of score from 0 to 4.

Print exposure checklists

Two kinds of instrument were developed in this present study as indicators of print exposure: ART and

TRT. To be specific, as described above, and we generated four kinds of scores for relative level of print exposure: ART, TTRT, CTRT, and TRT- composite score, and their Cronbach's alpha values were: .788, .831, .705, and .867.

Number of Chinese characters test

The participants completed the Number of Chinese Characters Test developed by Hung et al. (2006) for elementary and junior high school students, with a sample of 2,842. For the purpose of this study, the version designed for 3rd to 9th graders was used. This test consists of 40 Chinese characters, which belong to three frequency levels: 19 words from level 1, which includes those characters occupying ranks above 2,000 in the National Institute for Compilation and Translation (NICT) character-frequency norm; 15 words from level 2, which includes those characters occupying ranks 2,000 to 3,500, with 3 words for every 300 sub-level; and 6 words from level 3 which includes those characters occupying ranks 3,500 to 5,021, with 3 words for every 700 sublevel (Wang et al., 2009). Participants were first asked to respond to each of the test characters by writing down both its pronunciation, using the Mandarin Phonetic Alphabet, and using the character to compose a word or phrase. Then the number of characters that the participants knew was estimated according to a list provided by the test with a score ranging from 0 to 5,021. The Cronbach's alpha for fifth graders was .91, and the split-half reliability score was .93.

Reading comprehension test

Participants also completed the Reading Comprehension Test developed by Ko and Zhan (2006) for second to sixth graders, with a sample of 2,712. Participants had 25 minutes to read 31 comprehension questions. Among them, 12 questions were related to the usage of polysemous words, 6 to proposition assembly, 4 to sentence-level comprehension, and 9 to passage-level comprehension. The score ranged from 0 to 31. The Cronbach's alpha for this specific version was .91.

Evidence Base

Table 1 presents the N, the range of scores, the means, and the SDs of the primary measures taken in this study. According to their daily activity diaries, these Taiwanese fifth graders spent an average of 8.35 minutes (SD=15.10) per day on book reading during school days and 18.54 minutes (SD=34.51) per day during non-school days; while Anderson et al. (1988) reported a mean of 10.1 minutes and Allen et al. (1992) a 10.2 minutes book reading per day. With ERAS, the recreational reading attitude (M=29.25, SD=6.86) was higher than the academic reading attitude (M=25.53, SD=5.83), a finding consistent with most previous studies. Regarding activity preference, reading (M=1.788, SD=1.451) was ranked after surfing the Net (M=2.45, SD=2.526), playing an outdoor sport (M=2.14, SD=1.300), watching TV (M=1.82, SD=1.156), and talking to my friends (M=1.791, SD=1.256). Finally, for the measures of print exposure, these fifth graders on average recognized a higher percentage of translated titles (M=11.62, SD=4.22) than Chinese titles (M=3.79, SD=2.72). They also recognized a greater percentage of book titles with a mean TRT composite score of 14.59, which was derived from taking the number of correctly identified titles out of 50 real titles and subtracting the number of foils checked out of 30 foils, than Chinese book authors with a mean ART score of 3.79, which was derived from taking the number of correctly identified authors out of 25 real authors and subtracting the number of foils checked out of 15 foils.

(Table 1 about here)

Table 2 presents a matrix displaying correlations among all the variables investigated. First, there was a

significant medium correlation (.563) between time spent book reading on school days and time spent on non-school days. Furthermore, among the three book reading time variables, time spent on non-school days and average time spent across school days and non-school days appeared to be significantly correlated with most of the print disposition, print exposure, and criterion variables of reading performance, suggesting that it is a better indicator than time spent on school days. Secondly, among the three reading attitude variables, recreational reading attitude and reading attitude composite scores appeared to have higher correlations with other research variables than academic reading attitude. The other print disposition variable, activity preference- reading, was also found to have small to medium significant correlations with other variables, like the reading attitude variables. Finally, all four print exposure checklists were significantly correlated with most of the book reading time, print disposition, and criterion variables. More importantly, they appeared to have higher correlations with the two criterion variables, number of Chinese characters and reading comprehension, than the book reading time estimates collected from their daily activity diaries.

(Table 2 about here)

To further explore these relationships, a factor analysis was performed. Table 3 provides the factor loadings of a principal component analysis after varimax rotation for the measures used in the present study. Four factors were extracted, using both the Scree test and Kaiser's rule of eigenvalues greater than 1. The combination of the four factors extracted accounted for 79.20% of the variance in the measures of respondents' reading-related habits, attitudes and performances. TRT composite score, TTRT, CTRT and ART clustered under the first factor; reading attitude total, recreational reading attitude, academic reading attitude and activity preference-reading clustered under the second factor; diary- average book reading time, school-day book reading time, and non-school-day book reading time clustered together under factor three; and finally, two criterion variables of reading performance clustered under factor four. In other words, the factor analysis indicated that these dimensions seem to capture slightly different aspects of reading.

(Table 3 about here)

Tables 4 and 5 present two sets of hierarchical regression analyses examining the relative extent to which direct measures of absolute reading time, print disposition variables, and print exposure scores predict Taiwanese fifth graders' number of Chinese characters and reading comprehension. For the purpose of the study, average book reading time was selected to be the indicator for the direct measure of absolute reading time. Recreational reading attitude and activity preference- reading were selected to represent two kinds of reading disposition. In Table 4, Model 1 reveals that average book reading time collected by the daily activity diaries, recreational reading attitude, and activity preference- reading scores altogether helped predict 14.8% of the variance in performance on number of Chinese characters. Models 2, 3, 4, and 5 show that, in addition to the direct measure of absolute reading time and the two reading disposition variables, when CTRT, TTRT, TRT composite score, and ART were each entered as the second step in these hierarchical models, all four contributed to a significant increase in the overall model fit, adding 1.7%, 6.3%, 6.6%, and 10.2% of variance, respectively. Moreover, in these four models the unique contribution of recreational reading attitude was reduced to non-significance, and in model 5, average book reading time was also reduced to non-significance.

(Table 4 about here)

In Table 5, Model 1 reveals that average book reading time, recreational reading attitudes, and activity preference-reading scores altogether helped predict 8.8% of the variance in performance on reading comprehension, with the activity preference-reading score found to be the only significant predictor. Models 2, 3, 4, and 5 showed that in addition to average book reading time, recreational reading attitude, and activity preference-reading scores, when CTRT, TTRT, TRT composite score, and ART were each entered as the second step in these hierarchical models, TTRT, TRT composite score, and ART all contributed to a significant increase, adding 5.9%, 5.7%, and 4.1% of variance, respectively. CTRT was the only exception. Then, when we treated number of Chinese characters as the control variable, model 7 revealed, in addition to number of Chinese characters, the three variables of average book reading time, recreational reading attitude, and activity preference-reading scores altogether did not contribute a significant increase in the overall model fit for reading comprehension. On the other hand, TTRT in model 9 and TRT composite score in model 10 were both found to be able to contribute a significant increase in the overall model fit, adding 3.7% and 3.5% of the variance, respectively, beyond the joint contribution of number of Chinese characters, average book reading time, recreational reading attitude, and activity preference-reading scores.

(Table 5 about here)

Summary of Research Findings

Even though using recognition checklists as the instrument for relative level of print exposure for children is well-recognized, and the linkage between print exposure and reading related performance is well-established, the role of translated books in the composition of a checklist developed for non-English speaking countries has never been explored in the literature. In this study, we constructed a version of a translated title recognition test (TTRT), which consists of popular children's books by writers from other languages, a version of the Chinese title recognition test (CTRT), which consists of popular children's books by Mandarin writers, and a version of the Chinese author recognition test (ART) for Taiwanese fifth graders, based on previous studies from Western cultures (e.g., Allen, Cipielewski, & Stanovich, 1992; Cunningham & Stanovich, 1990) and on a study about developing a Chinese author recognition test for college students in Taiwan (Chen & Fang, 2013). Totally, four kinds of scores were calculated for the purpose of this study: TTRT, CTRT, TRT composite score, and ART score. Then, we investigated the relationship between these four variables and direct measures of absolute reading time collected from the daily activity diaries; print disposition variables which included reading attitude and activity preference-reading, as well as two criterion variables of reading performance: number of Chinese characters and reading comprehension.

Some of our results are consistent with the extant literature, and some invite more international conversation. First, while Allen et al. (1992) suggested that their results from the factor analysis and multiple regressions provided evidence to support a construct argued to be best conceived of as non-school print exposure that appears to be measured as well by the checklist tasks as by the activity-diary method, our findings from the zero-order correlation, factor analysis, and hierarchical regression seem to suggest that recognition checklists are better indicators of non-school print exposure than the activity-diary method for Taiwanese fifth graders. As mentioned earlier, the factor analysis indicated that variables of time spent book reading collected from the activity diaries and variables of

relative print exposure measured by the checklists seem to capture slightly different aspects of reading. Moreover, the checklist variables were found to have higher correlations than the diary variables to the print disposition variables, and especially, to the criterion variables. These results were further confirmed in the hierarchical regressions which showed that, in general, checklist variables have higher predictive power for number of Chinese characters than the diary variables. More importantly, diary variables were found to be a non-predictor for reading comprehension, while checklist variables were significant predictors for reading comprehension. Especially TTRT and the TRT composite score were found to remain predictors, even when controlling for number of Chinese characters. A reasonable explanation is that spending more time on extracurricular book reading does not necessarily equal more reading volume, because the factor of reading ability, especially reading comprehension ability, might play an important role. Rather, a simple recognition checklist, if well-constructed, might be a better equipped instrument to measure relative reading volume, or level of print exposure. Another unexpected result regarding various ways of assessing reading habits and attitudes was that our results from the hierarchical regressions appear to suggest that, between recreational reading attitudes, which has been widely-used, and the activity preference survey on reading, the latter was found to be a better predictor of reading performance, especially for reading comprehension. These interesting findings await future research for in-depth investigation.

Secondly, a unique feature and a major contribution of this present study lies in taking translated book titles into consideration when developing a TRT for Taiwanese fifth graders, and providing empirical evidence to support the significance of making this decision for the first time in the literature. As mentioned earlier, the students were found to recognize a higher percentage of translated titles from the TTRT than Chinese titles from the CTRT in this study. More importantly, the TTRT was found to have higher zero-order correlation to the diary variables, the print disposition variables, and especially to the criterion variables, than the CTRT. These findings were further confirmed in the results from hierarchical regressions: TTRT and TRT composite which consists of both TTRT and CTRT, were both found to have better predictive power for number of Chinese characters and for reading comprehension, than CTRT only. Actually, CTRT was found to be unable to predict reading comprehension beyond time spent book reading, recreational reading attitudes, and activity preference for reading. The TRT composite score and the ART score both applied the rule of subtracting the number of foils checked in score calculation, but the former consisted of the TTRT and CTRT while the latter only consisted of the names of Chinese authors due to the lack of a uniform system of translating names of foreign authors. In their comparison, we found that both the TRT composite and ART were significant predictors of number of Chinese characters, and of reading comprehension, beyond time spent book reading, recreational reading attitude, and activity preference for reading. However, only TRT composite was found to be a significant predictor of reading comprehension once number of Chinese characters was treated as a control variable. ART was not, as shown in Table 5, models 10 and 11. In other words, since reading translated books, or books written by authors from other languages, is an important aspect of the reading experience of Taiwanese children, translated titles should be taken into account when constructing a valid instrument for print exposure. We hope these findings shed light on the process of developing measures for print exposure for researchers from other non-English speaking countries.

In other words, our findings on the one hand corroborate previous Western studies on the linkage

between print exposure and reading abilities, number of Chinese characters and reading comprehension, to be specific; on the other hand, they provide some insights into reevaluating various instruments used in the area of reading habits, reading attitudes, and print exposure, especially the rationale for developing a recognition test as an instrument of print exposure for children from non-English speaking countries.

Description of Proposal Your proposal submission should be based off the theme of Making a Difference.

Even though using recognition checklists as the instrument for relative level of print exposure for children is well-recognized, and the linkage between print exposure and reading related performance is well-established, the role of translated books in the composition of a checklist developed for non-English speaking countries has never been explored in the literature. In this study, we constructed a version of a translated title recognition test, which consists of popular children's books by writers from other languages, a version of the Chinese title recognition test, which consists of popular children's books by Mandarin writers, and a version of the Chinese author recognition test for Taiwanese fifth graders, based on previous studies from Western cultures and on a study about developing a Chinese author recognition test for college students in Taiwan. Our findings on the one hand corroborate previous Western studies on the linkage between print exposure and reading abilities, number of Chinese characters and reading comprehension, to be specific; on the other hand, they provide some insights into reevaluating various instruments used in the area of reading habits, reading attitudes, and print exposure, especially the rationale for developing a recognition test as an instrument of print exposure for children from non-English speaking countries.

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Keyword Priority #1

Assessment Testing, Diagnosis

Keyword Priority #2

Comprehension

Keyword Priority #3

Motivation, Engagement

ASSESSING EXPOSURE TO PRINT: DEVELOPMENT OF MEASURES FOR TAIWANESE FIFTH GRADERS

Su-Yen Chen

National Tsing Hwa University in Taiwan

2014 IRA

Abstract



In this study, we constructed a version of a translated title recognition test, which consists of popular children's books by writers from other languages, a version of the Chinese title recognition test, which consists of popular children's books by Mandarin writers, and a version of the Chinese author recognition test for Taiwanese fifth graders, based on previous studies from Western cultures and on a study about developing a Chinese author recognition test for college students in Taiwan. Our findings on the one hand corroborate previous Western studies on the linkage between print exposure and reading abilities, number of Chinese characters and reading comprehension, to be specific; on the other hand, they provide some insights into reevaluating various instruments used in the area of reading habits, reading attitudes, and print exposure, especially the rationale for developing a recognition test as an instrument of print exposure for children from non-English speaking countries.

Purpose of the study

1. to develop two versions of TRT for fifth graders in Taiwan, one a translated title recognition test (TTRT) which consists of popular children's books by writers from other languages, and, the other, a Chinese title recognition test (CTRT), which consists of popular children's books by Mandarin writers
2. to develop a Chinese version of an author recognition test (ART) for fifth graders in Taiwan
3. to examine the overall correlations among the print exposure checklists (i.e., ART, TTRT, CTRT, TRT-composite), three other types of reading habits and print disposition (i.e., diary estimates of absolute reading time, an elementary reading attitude survey, and activity preference), and two criterion measures of reading performance (i.e., number of Chinese characters and reading comprehension), in order to provide preliminary evidence for the ART and TRT's construct validity
4. to investigate the extent to which diary estimates of reading time, reading attitude, activity preference, and ART/TRT help predict criterion variables, especially the extent to which they help predict reading comprehension beyond the number of Chinese characters.

Literature review

- A couple of the print exposure checklists, the author recognition test (ART) and the title recognition test (TRT), have been widely used since their creation, and many studies have documented relationships between children's print exposure and their vocabulary knowledge and reading comprehension. However, most of the research from the above review study was conducted in Western cultures, especially in English-speaking countries.
- McBride-Chang and Chang (1995) found that print exposure was substantially associated with reading comprehension, but did not significantly help predict additional variance in the reading comprehension measure once vocabulary was forced into a hierarchical regression, while memory abilities did.
- Chen and Fang (2013) presented the process of constructing a Chinese version of the ART (CART) for college students in Taiwan, and established relationships between print exposure and vocabulary size, reading comprehension, as well as two general reading achievement tests
- Due to the lack of a uniform system of translating the names of foreign authors, the existing version of ART only consists of Chinese authors.

Construction of the TRT and ART for fifth graders in Taiwan

- For the pilot study of TRT, we gathered initial book titles from 6 sources, including top-ranked lists from the three most popular book stores, recommended reading lists from the two biggest libraries in Taiwan, and books recommended by elementary school teachers. Only books which appeared in multiple sources and are considered to be appropriate for fifth graders were included. We also added “foils” on the list, to identify and weed out any random responses. From the initial book titles, we also came up with Chinese authors names and adding foils for the ART.

Construction of the TRT and ART for fifth graders in Taiwan

- The pilot test of TRT contained a total of 149 titles, and ART contained a total of 54 Chinese authors. To prevent the subject from making the mark carelessly and therefore contaminating our data, once any of the “foils” were checked, that particular respondent’s questionnaire was excluded from the data analysis. At the end, the data were categorized to valid ranking lists for TRT and ART, respectively.

Construction of the TRT and ART for fifth graders in Taiwan

- For the TRT, the top 25 translated works on the ranking list were selected to be included in the formal checklist of the Translated version of the TRT (TTRT), and the top 25 Chinese works on the ranking list were selected to be included in the formal checklist of the Chinese version of the TRT (CTRT). Combining these two versions, with 50 “real” titles, we added 30 “foil” titles as the final version of TRT-complete.

Construction of the TRT and ART for fifth graders in Taiwan

- For the ART, the top 25 authors on the ranking list were selected to be included in the formal checklist of the Chinese version. We added 15 “foil” names of the author to the original 25 “real” authors, and the ART score, ranging from -15 to 25, is calculated by taking the number of correct items that were checked and subtracting the number of foils checked.

Measures



□ Daily activity diaries

three kinds of time amount were calculated: average amount of minutes spent on print-based reading of fiction and non-fiction across seven school days; average number of minutes spent across non-school days; and average number of minutes spent across seven school days and three non-school days.

Students filled out activity sheets each school day, recording their previous day's activities.

Measures



- Elementary reading attitude survey (ERAS)

The Elementary Reading Attitude Survey by McKenna and Kear (1990) yields three scores: a recreational reading score, an academic reading score, and a total score. We translated the ERAS into a Chinese version, and the Cronbach's alpha for the recreational, academic, and overall reading attitudes were 0.918, 0.862, and 0.932, respectively.

Measures



- Activity preference survey (APS)

The fifth graders were asked to choose their preferences between “read a book of my choice” and each of the following four activities: play an outdoor sport, watch TV, talk to my friends, and surf the Net. The subject’s score on the task was simply the number of times that reading was chosen over 1 of these four activities, with a range of score from 0 to 4.

Measures



□ Print exposure checklists

Two kinds of instrument were developed in this present study as indicators of print exposure: ART and TRT. To be specific, as described above, and we generated four kinds of scores for relative level of print exposure: ART, TTRT, CTRT, and TRT- composite score, and their Cronbach's alpha values were: .788, .831, .705, and .867

Measures



□ Number of Chinese characters test

Participants were first asked to respond to each of the test characters by writing down both its pronunciation, using the Mandarin Phonetic Alphabet, and using the character to compose a word or phrase. Then the number of characters that the participants knew was estimated according to a list provided by the test with a score ranging from 0 to 5,021. The Cronbach's alpha for fifth graders was .91, and the split-half reliability score was .93.

Measures



□ Reading comprehension test

Participants had 25 minutes to read 31 comprehension questions. Among them, 12 questions were related to the usage of polysemous words, 6 to proposition assembly, 4 to sentence-level comprehension, and 9 to passage-level comprehension. The score ranged from 0 to 31. The Cronbach's alpha for this specific version was .91.

Results

Table 1. Mean Scores (with SDs) of research variables

	N	Min. possible	Max. possible	Obtained range	Mean	SD
Diary- school-day book reading time	312	0	540	0~72	8.35	15.10
Diary-non- school-day book reading time	312	0	1,080	0~205	18.54	34.51
Diary- average book reading time	312	0	702	0~140	14.62	23.72
ERAS -recreational reading attitude	319	10	40	10~40	29.25	6.86
ERAS- academic reading attitude	319	10	40	10~40	25.53	5.83
ERAS- reading attitude total	319	20	80	20~80	54.78	11.69
Activity preference - reading	320	0	4	0~4	1.79	1.451
CTRT	318	0	25	0~15	3.79	2.72
TTRT	318	0	25	1~22	11.62	4.22
TRT composite score	318	-30	50	2~33	14.59	5.51
CART	318	-15	25	-1~14	4.15	3.12
Number of Chinese characters recognized	321	0	5,021	0~4,941	3,384.51	890.76
Reading comprehension score	321	0	31	7~31	22.38	4.73

Results

Table 2 Correlations among research variables

	Diary- book reading time			Print disposition measures				Print exposure checklists				Criterion tasks	
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Diary- school-day book reading time	1												
2. Diary- non-school-day book reading time	.563**	1											
3. Diary- average book reading time	.887**	.881**	1										
4. ERAS- recreational reading attitude	.242**	.342**	.330**	1									
5. ERAS-academic reading attitude	.138*	.220**	.202**	.696**	1								
6. ERAS- reading attitude total	.211**	.310**	.294**	.934**	.907**	1							
7. Activity preference- reading	.311**	.444**	.426**	.708**	.462**	.646**	1						
8. CTRT	.095	.137*	.131*	.276**	.251**	.287**	.212**	1					
9. TTRT	.099	.154**	.143*	.371**	.269**	.352**	.267**	.588**	1				
10. TRT composite score	.107	.171**	.157**	.400**	.290**	.379**	.325**	.735**	.926**	1			
11. CART	.129*	.112	.136*	.317**	.275**	.323**	.223**	.435**	.507**	.554**	1		
12. Number of Chinese characters recognized	.220**	.221**	.250**	.347**	.275**	.341**	.354**	.233**	.375**	.402**	.419**	1	
13. Reading comprehension score	.178**	.161**	.192**	.226**	.130*	.197**	.278**	.162**	.304**	.317**	.270**	.492**	1

Results

Table 3. Principal Components Factor Analysis after Varimax Rotation

	Factor			
	1	2	3	4
TRT composite score	.922	.198	.057	.173
TTRT	.865	.175	.041	.189
CTRT	.835	.123	.076	-.050
ART	.620	.148	.043	.333
ERAS- reading attitude total	.204	.957	.115	.091
ERAS -recreational reading attitude	.199	.892	.176	.120
ERAS- academic reading attitude	.177	.876	.023	.042
Activity preference - reading	.093	.678	.341	.239
Diary- average book reading time	.064	.156	.978	.095
Diary- school-day book reading time	.044	.065	.874	.117
Diary- non-school-day book reading time	.071	.212	.855	.050
Reading comprehension	.137	.061	.099	.848
Number of Chinese characters	.230	.227	.129	.761

Results

Table 4. Hierarchical regressions on number of Chinese characters

	Model 1	Model 2	Model 3	Model 4	Model 5
Diary- average book reading time	67.626*	64.063*	63.753*	65.433*	56.228
ERAS -recreational reading attitude	22.284*	18.062	9.52	10.011	9.08
Activity preference – reading	103.723*	102.576*	105.339*	90.969*	111.207*
CTRT		43.643*			
TTRT			57.155***		
TRT composite score				45.626***	
ART					95.359***
R ²	0.148	0.165	0.211	0.215	0.251
R ² change	0.148***	0.017*	0.063***	0.066***	0.102***

Results

Table 5. Hierarchical regressions on reading comprehension

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Number of Chinese characters						0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
Diary- average book reading time	0.267	0.253	0.247	0.256	0.23		0.113	0.109	0.116	0.121	0.108
ERAS -recreational reading attitude	0.014	-0.003	-0.05	-0.045	-0.03		-0.035	-0.041	-0.067	-0.064	-0.049
Activity preference – reading	0.728**	0.723**	0.732**	0.664**	0.752**		0.490*	0.492*	0.516*	0.478*	0.515*
CTRT		0.174						0.072			
TTRT			0.287***						0.165**		
TRT composite score				0.220***						0.123*	
ART					0.316***						0.123
R ²	0.088	0.098	0.146	0.145	0.129	0.225	0.244	0.245	0.262	0.260	0.249
R ² change	0.088***	0.01	0.059***	0.057***	0.041***	0.225***	0.019	0.02	0.037**	0.035**	0.024

Results and discussion



1. Our findings from the zero-order correlation, factor analysis, and hierarchical regression suggested that recognition checklists are better indicators of non-school print exposure than the activity-diary method for Taiwanese fifth graders.

Results and discussion



2. Our results from the hierarchical regressions appear to suggest that, between recreational reading attitudes, which has been widely-used, and the activity preference survey on reading, the latter was found to be a better predictor of reading performance, especially for reading comprehension.

Results and discussion



3. A unique feature and a major contribution of this present study lies in taking translated book titles into consideration when developing a TRT for Taiwanese fifth graders, and providing empirical evidence to support the significance of making this decision for the first time in the literature

Conclusions



our findings on the one hand corroborate previous Western studies on the linkage between print exposure and reading abilities, number of Chinese characters and reading comprehension, to be specific; on the other hand, they provide some insights into reevaluating various instruments used in the area of reading habits, reading attitudes, and print exposure, especially the rationale for developing a recognition test as an instrument of print exposure for children from non-English speaking countries.

科技部補助計畫衍生研發成果推廣資料表

日期:2014/11/18

科技部補助計畫	計畫名稱：大學生的學習投入與學習成果、心理社會發展的關連性(I)	
	計畫主持人：陳素燕	
	計畫編號：102-2410-H-007-037-SSS	學門領域：教育學理論基礎

無研發成果推廣資料

102 年度專題研究計畫研究成果彙整表

計畫主持人：陳素燕			計畫編號：102-2410-H-007-037-SSS				
計畫名稱：大學生的學習投入與學習成果、心理社會發展的關連性(I)							
成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	6	6	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	1	1	100%	篇	部分研究成果已被 SSCI 期刊 Journal of College Student Development 所接受
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		章/本
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

<p>其他成果</p> <p>(無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)</p>	無
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	成果項目	量化	名稱或內容性質簡述
科 教 處 計 畫 加 填 項 目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

科技部補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

☒ 達成目標

☐ 未達成目標（請說明，以 100 字為限）

☐ 實驗失敗

☐ 因故實驗中斷

☐ 其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：☒ 已發表 ☐ 未發表之文稿 ☐ 撰寫中 ☐ 無

專利：☐ 已獲得 ☐ 申請中 ☒ 無

技轉：☐ 已技轉 ☐ 洽談中 ☒ 無

其他：（以 100 字為限）

此研究計畫部分研究結果已被 SSCI 期刊 Journal of College Student Development 所接受。

Chen, S. Y. & Lu, L. (accepted, in press). The role of achievement goals and achievement motivation in cognitive and psychological outcomes of Taiwanese college students. Journal of College Student Development (NSC 102-2410-H-007-037-SSS) (SSCI)

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以 500 字為限）

This study explored how motivational factors are associated with Taiwanese college students'

cognitive, personal, and social development by incorporating both relatively global static self

attributes, such as social-oriented achievement motivation and individual-oriented achievement motivation, which are considered to be a culturally balanced conception of

achievement motivation for Chinese people, and more domain-specific self attributes, such as

achievement goals, which are widely adopted internationally. The findings suggest that

institutions can encourage students to set their own motivational goals, rather than adopting goals set by the family or the clan, and to focus on self-referenced competence development and personal improvement.