



EFL Incidental Vocabulary Acquisition and Retention: Effects of Different Collaborative Output Tasks on Field Independent/Dependent Learners

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A plethora of studies concerning second language acquisition have argued that collaborative output task, as a reading enhancement activity, is facilitative to promoting second language incidental vocabulary acquisition. However, how learner's cognitive style indexed by field dependent (FD) or field independent (FI) mediates L2 incidental vocabulary learning and retention through collaborative output tasks in Chinese EFL context remains under-explored. Inviting a total of 120 Chinese university students as participants, this study investigated the effects of different collaborative output tasks on FI and FD Learners' incidental vocabulary acquisition. The results showed that 1) collaborative written output task was more contributive to receptive lexical acquisition and retention for FD learners whereas FI learners were less susceptible to output collaborative task type; 2) regardless of learner's cognitive style, collaborative written output task was superior over the oral output mode in productive lexical gains, but not in retaining lexical learning; 3) FI learners have advantages in L2 vocabulary learning, compared with their FD counterparts.

Keywords: cognitive style, field independence/field dependence, collaborative output, incidental vocabulary acquisition

Introduction

The fact that vocabulary acquisition lies at the heart of a good command of a second language or a foreign language (Schmitt, 2010) is indisputable since the size of learner's vocabulary plays a crucial role in their language performance (Alderson, 2005). As a result, L2 vocabulary learning has attracted a great deal of attention among researchers, as contributed by a growing bulk of studies (see, for example, Coady & Huckin, 1997; Carter & McCarthy, 1988; Huckin, Haynes, & Coady, 1993; Nation, 1990; Rott et al., 2002; Zheng, 2009). Apparently, language acquisition researchers have reached a wide consensus that reading activities serve as an effective tool with the help of which learners' repertoire of vocabulary knowledge could be acquired (e.g., Chun, Choi, & Kim, 2012; Krashen, 1989, 2008; Nation & Wang, 1999; Rott, 2007; Takaki, 2003; Wang, 2013; Waring & Takaki, 2003). The exposure to extensive reading during which vocabulary learning predominantly occurs is termed as "incidental" learning since acquisition of new words becomes "a by-product of a meaning-focused communicative activity" (Huckin & Coady, 1999, p. 185) or "a by-product of other cognitive exercises involving comprehension" (Gass, 1999, p. 319) rather than being the target of reading activities.

Though evidence has been accumulating to demonstrate that reading could be considered an important source for acquiring new vocabulary, challenges have been raised with regard to the effectiveness and

efficiency of reading for incidentally acquired word knowledge (e.g., Laufer, 2003; Paribakht & Wesche, 1997; Pellicer-Sánchez & Schmitt 2010; Teng 2014; Waring & Takaki 2003). For example, it remains unknown whether learners, during reading, could make correct inferences of unknown words and then retain them afterwards (Waring & Takaki, 2003), especially in comparison with reading plus word-focused activities (Laufer, 2003; Paribakht & Wesche, 1997) involving collaborative output tasks and vocabulary exercises, for example, cloze tests and translation exercises on target words. These doubts, in essence, pointed to the necessity of reading enhancement activities in L2 vocabulary acquisition, among which collaborative output tasks were deemed as effective means to facilitate co-construction of language knowledge on the part of learners (Kim 2008; Leeson, 2004; Swain & Lapkin, 1998; Watanabe & Swain, 2007), in particular, in L2 vocabulary acquisition (Ellis & He, 1999).

It has been agreed that the process of second language/foreign language learning is compounded by individual differences of learners like age, intelligence, motivation, strategies and learning styles, to just name a few. Among these factors, learner's cognitive style, reckoned as an indispensable dimension for learning styles, has been investigated by a substantial number of inquiries. However, reported findings were inconsistent or even contradictory. Some defended that field independent learners (FI) outperformed field dependent (FD) learners in vocabulary acquisition (Golaghaer, 2011; Nezhad & Shokrpour, 2012; Niroom and Rostampour, 2014; Yamini & Rahnama, 2008) whereas others were convinced that no relation had been found between learner's cognitive styles and second language acquisition (Dryer & Osborne, 1996; N. Ellis, 1994; Griffith & Sheen, 1992).

In light of the above-mentioned discrepancies in extant literature, the intricate process of L2 vocabulary acquisition mediated by learning styles together with output task types deserves to be further investigated.

Literature Review

Collaborative Output Tasks as Reading Plus Activities and L2 Vocabulary Acquisition

Proposed by Paribakht and Wesche (1993), the notion of reading plus characterized by enhancing vocabulary acquisition through relevant vocabulary focused exercises or collaborative output activities after reading activities has been tested repeatedly. These studies undertaken documented evidence that reading supplemented with another activity was conducive to the vocabulary growth compared with the effectiveness of reading only activity (Knight, 1994; Laufer, 2000, 2003; Luppescu & Day, 1993; Min, 2008; Paribakht & Wesche, 1997). Illustrative of this was the research conducted by Paribakht and Wesche (1997), which examined the effects of the reading only and reading plus text-based vocabulary enhancement exercises on ESL college students' vocabulary growth. As reported, the reading plus activity with enhancement of vocabulary exercises contributed to more gains of L2 vocabulary knowledge. But, the question of long-term retention was left untouched in this study. Building upon that work, Laufer (2003), drawing on results from three experiments, further demonstrated that reading only group performed worst in recalling the words, in comparison with scores gained by sentence writing group and sentence completion group in both immediate and delayed post-tests. But, applicability of this finding was dwarfed in authentic instructional contexts for learners were only given one encounter of target unknown words from texts in the study.

Sociocultural perspective conceptualizes the occurrence of learning as being grounded in a social process through interaction (Vygotsky, 1978). A number of empirical studies have generated converging evidence for favorable learning outcomes through learners' interaction in which they were required to accomplish collaborative tasks (see, for example, Kim 2008; Kwon, 2006; Leeson, 2004; Rassaei, 2017; Swain & Lapkin, 1998; Watanabe & Swain, 2007). Output, as a conscious raising function, entails immense benefits for learners in language acquisition in terms of drawing their attention to the gap between target language forms and their choice of interlanguage, testing their hypotheses as well as

enhancing learners' metalinguistic development (Swain, 1985, 1995). The value of collaborative output work lies in that it could assist in creating effective opportunities to facilitate peer feedback and scaffolding (e.g., Kowal & Swain, 1997; Lapkin et al., 2002). An important literature contributed by O'Donnell et al. (1985) sought to shed light on the effectiveness of collaborative written output in contrast with written output alone, denoting that learners working in a collaborative written task performed much better than those who did not in both the initial writing task and the individual writing task. Likewise, in another study (Kwon, 2006), it was also indicated that learners engaged with interaction output mode significantly outperformed those involved with non-interaction mode in the aspect of vocabulary acquisition.

Cognitive Styles as a Predictor for L2 Vocabulary Acquisition

Field dependent/field independent (FD/FI), a cognitive variable stemming from theory of psychological differentiation put forward by Witkin (Witkin et al., 1962; Witkin & Goodenough, 1981), has been extensively researched in second language acquisition. This psychological construct describes individual's tendency to rely on internal or external reference while perceiving and processing information as well as interacting with surroundings. An FI learner is prone to approaching problems analytically with self-reliance as opposed to an FD learner who has inclination of approaching problems globally with more reliance on others. The attempts to prove the relationship between FI/ FD and L2 acquisition have been quite a few but with divergent results. Some investigations provided compelling evidence for a strong relationship between learner's cognitive style and L2 achievement (e.g., Abraham, 1985; Hansen, 1984; Larsen-Freeman & Long, 1991; Naiman et al., 1975, 1978; Stansfield & Hasen, 1983) whereas other inquiries evidenced that only weak or no relation should be claimed with reference to cognitive style and L2 achievement (N. Ellis, 1994; R. Ellis, 1985; Griflith & Sheen, 1992; Liu & Reed, 1994).

In one study inviting English-speaking Canadian students who learned French for L2 as participants, researchers argued that field independence was significantly predictive of L2 proficiency when learners were instructed to imitate and repeat French sentences (Naiman et al., 1975). By comparison, another investigation using Canadian learners speaking French as L2 yielded mixed results. The findings indicated positive relationship between FI index and students' performance on listening comprehension (receptive skill) and imitation (productive skill) tests for French language learners from 12th grade but exhibited rather weak relationship between FI index and language learners from 8th grade. It was postulated that age might be a factor influencing the relationship between FI/FD cognitive style and second language acquisition (Naiman et al., 1978). In addition, the research examining correlations between FD/FI and L2 achievement supports the superiority of FI learners in cloze tests performance but failed to identify a significant link between cognitive style and communicative competence (Stansfield & Hansen, 1983). By contrast, a more recent study which further explored correlations between individuals FI/FD and learner's achievement on language proficiency tests including dictations, grammar tests, TOEFL test, oral communicative competence, pointed to FI as a significant predictor for proficiency and communicative competence (Chapelle & Roberts, 2010).

Not surprisingly, the opposing camp was not persuaded by the correlation between FI/FD cognitive style and L2 acquisition. R. Ellis (1985), by reviewing literature pertinent to the issue under discussion declared FD/FI did not have to be a crucial factor in L2 acquisition. Furthermore, Griffiths and Sheen (1992) also maintained that FI/FD was irrelevant to L2 acquisition. As an extension of previous work, Liu and Reed (1994) again found no differences in vocabulary achievement among field dependent, field independent and mixed FI/FD learners. Likewise, N. Ellis (1994) probed into the correlation between FI index and learner's performance on vocabulary and argued for a weak connection. Interestingly, these conclusions were in contrast to some recent studies in which this issue was revisited. They contended that second language achievement, particularly in the aspect of vocabulary acquisition was indeed mediated by language learner's cognitive styles (Golaghaei, 2011; Nezhad & Shokrpour, 2012; Niroomand &

Rostampour, 2014). For example, it was implied that in vocabulary instruction, field-independent learners were less susceptible to both static task type featured with more linguistic context and dynamic task type targeting free and uncontrolled production. On the other hand, field-dependent learners performed worst when exposed to static task-type but scored better with dynamic task type in instructional context (Nezhad & Shokrpour, 2012). Moreover, it was revealed that cognitive style and gender did have roles to play in learner's vocabulary growth, but no interactive effect was observed between FI/FD and gender (Niroomand & Rostampour, 2014).

In view of the inconsistent findings embodying intertwined relationship between L2 learner's cognitive style, output task type and vocabulary retention, more empirical studies concerning how incidental vocabulary learning is mediated by output task type and cognitive style should merit more scholarly attention. To date, there has been no study taking into account both learner's cognitive styles and collaborative output interventions for optimizing the effectiveness of incidental vocabulary acquisition in EFL (English as a Foreign Language) context in China. Therefore, this study constitutes an effort to probe into the relationship between FD/FI and types of reading plus activities with the purpose of addressing the following two questions:

- 1) What is the effect of collaborative oral or written output on field independent/field dependent learners' receptive vocabulary acquisition and retention?
- 2) What is the effect of collaborative oral or written output on field independent/field dependent learners' productive vocabulary acquisition and retention?

Research Methodology

Research Design

The experiment was of 2 (cognitive style: FI vs. FD, between-subject variable) x 2 (task type: collaborative oral vs. collaborative written, between-subject variable) x 2 (post-test time: immediate vs. delayed, within-subject variable) mixed experiment design. Cognitive style, task type and post-test time were independent variables and L2 incidental vocabulary acquisition (receptive and productive) was the dependent variable which was measured by the post-tests scores gained by participants.

Participants

One hundred fifty-three English-major freshmen selected from a cohort of approximately 210 students in their 2nd semester in one of local universities in Shaanxi, China were recruited as participants of the study. They were gauged by end-of semester scores for *Integrated English*, one of the core English courses offered in the department. Group Embedded Figures Test (GEFT) was administered for assessing learners' cognitive style. The first 60 students scoring highest in the test were reckoned as Field Independent (FI) learners and those 60 students who scored lowest were identified as Filed Dependent (FD) learners. The remaining 33 students whose scores ranked in the middle were excluded from the study for not demonstrating obvious cognitive tendency. The resulting participant pool consisted of 120 students with 39 males and 81 females in their late teens/early twenties (aged from 17-19). The length of their exposure to English study previously ranged from 10 to 13 years, with a mean of 11.3 years, $SD = 2.49$. Informed consent forms were obtained from the participants and they were rewarded with a gift for contributing to the experiment.

The 120 participants with different cognitive styles were assigned to one of two collaborative output groups, collaborative written task group (henceforth CW) and collaborative oral task group (henceforth CO) at random. The final scores of *Integrative English* course obtained by the four groups (FI-CO; FI-CW; FD-CO; FD-CW) in previous semester were analyzed by one-way ANOVA ($F = 1.381, p = .249$),

denoting no significant difference in their overall English proficiency level.

Instruments

GEFT test

This study employed a modified Chinese version of Group Embedded Figures Test (GEFT) (Oltman et al., 1971) to measure the ability of subjects to overcome the interference of the background to separate the embedded simple figures from the complex ones. This test encompassed basic figures and 29 complex figures comprised of three sections. The first section, the easiest part, served as a warm-up exercise whose scores obtained were not taken into account. Among the ten complex figures in the second and third section, the first two figures scored 0.5 points and the third one as well as the fourth one scored 1 point respectively. The rest six complex figures scored 1.5 points.

Reading input text

The reading material was taken from TEM-4 (Test for English Majors-Band 4)-Practice Tests in 2018. The reading text was a narrative piece with 592 words, describing an intern's experience of misdiagnosis in the hospital. The reasons for this choice of reading were two fold. First, a narrative article is easier to be reconstructed due to its storyline and clear structure. Furthermore, passage chosen from TEM-4 is close to students' current language proficiency level.

A pilot study preceded the main study to identify the target words and determine the allotted time for reading and reading plus activities. Thirty peers of the participants from two parallel classes (who did not participate the main study) were instructed to read the article and mark the unknown words, from which 16 mutually shared new words were identified. Six words whose meaning might be easily guessed due to the affix or the context were excluded, thus leaving 10 target words with two nouns, three adjectives, four verbs and one adverb.

The coverage of known words in the reading was approximately 97% of the word tokens, thereby ensuring the immediate comprehension on the part of learners (Hirsh & Nation, 1992). Sixteen cued words including 10 target words and 6 distractors for this reading were glossed with part of speech, phonemic transcription as well as Chinese meaning in a separated sheet attached to the reading for the purpose of assisting learners to commit them to memory after comprehension (Rott et al., 2002). All the cued words aligned with the order of the occurrence in the article to facilitate learners' reconstruction work. The target words are *assign*, *staggering*, *rookie*, *stuffy*, *haunt*, *attending*, *overlook*, *feebly*, *respiration* and *persist*.

Collaborative output tasks

Collaborative output tasks involve collaborative oral task (CO) and collaborative written task (CW), in which learners were prompted to reproduce the text for enhancing the form-meaning connection of target words or to "notice the hole" when using target words (Swain, 1998). Students in a dyad assigned to CO/CW were required to reconstruct the article in oral/written form without the text but with the cued words. One dyadic member was in charge of reporting/writing and the other assisted to accomplish the output task by monitoring the language expression and reminding his/her partner of the content. The provision of cued words was facilitative to L2 vocabulary acquisition if learners were pushed to utilize them for task completion (Rott et al., 2002).

Vocabulary pretest and post-tests

In vocabulary pretest, students were requested to translate given words (10 target words and 30 distracting words) into Chinese to set up the participants' baseline of vocabulary knowledge of target words. The pretest effects resulted from using real word distractors may not be erased completely as nonsense (nonce) words might serve better to reduce pretest effects (Nation & Webb, 2011); yet, we posited that the pretest effects, if any, would affect different groups, given the large number of recruited participants.

Vocabulary post-tests, as "surprise" tests, consisted of receptive vocabulary post-tests and productive vocabulary post-tests with each being varied in terms of word order. A modified version of Vocabulary Knowledge Scale (VKS) (Paribakht & Wesche, 1997) was employed as the receptive vocabulary self-report instrument to detect the nuances in vocabulary acquisition. In VKS, each level represents a degree of subject's familiarity with vocabulary, ranging from absolute unfamiliarity with a word to the capability of providing the correct translation or synonym of the target word. The modified scale (as shown in Table 1) was translated into Chinese to ensure the subjects' accurate understanding of the expressions.

TABLE 1
The Adapted VKS Self-report Scales

Self-report Categories

- I. I don't remember having seen this word before.
 - II. I have seen this word before, but I don't know what it means.
 - III. I have seen this word before, and I think it means _____. (provide Chinese meaning).
 - IV. I know this word. It means _____. (provide Chinese meaning).
-

Drawing on controlled test for productive vocabulary size (Laufer & Nation, 1999), this study utilized letter-cued sentence blank-filling exercises with Chinese meaning and cued letters serving as prompts to assess the test takers' productive lexical acquisition as illustrated below:

I don't want to have another r_____ (新手) to train. (rookie)

The sentences used were adapted from the Corpus of Contemporary American English for optimum authenticity.

Interview

In addition to the instruments encompassing vocabulary pretests and post-tests for collecting the quantitative data, a retrospective semi-structured interview was conducted to generate some qualitative inquiries that may unfold students' feedback and attitudes towards the reading plus activities and collaborative output tasks. The interview, conducted in Chinese around 20 minutes, was recorded and transcribed for data analysis. Four participants selected randomly from each group (N = 16) were asked to respond to the questions listed below.

- 1) Do you think that reading plus collaborative output tasks will contribute to your vocabulary acquisition?
- 2) Do you believe that collaborative output in pairs outperforms individual output in the aspect of vocabulary learning?
- 3) Would you like to choose written form or oral form to complete the output tasks?
- 4) Which one do you think is more conducive to vocabulary acquisition, collaborative written output or collaborative oral output?

Data Collection Procedures

Data collection was conducted in learners' *Integrated English* classes across 4 weeks. In the first week, the participants completed the pretest within 10 minutes without being informed of the following treatments. Only the target words were scored, and the result showed none of the target words were known by learners. In the following week, the four assigned collaborative groups were instructed to read the material in 10 minutes with the help of the cued words printed separately. Before they continued with the reading plus activities in their assigned groups, they were reminded that their interactions would be audio-taped to ensure a smooth collaborative task with high quality. The students assigned themselves as the role of "writer", "speaker" or "coordinator" themselves by negotiation. The reading material was collected by the teacher when reading was finished but the cued words were left to learners as prompts for the production task lasting for 15 minutes. After completing the reading enhancement activities, all the subjects took the immediate post-tests in class. The receptive vocabulary test (5mins) was preceded with the productive vocabulary test (5mins) to reduce test effect. The delayed post-tests, with one productive vocabulary post-test (5mins) and one receptive vocabulary post-test (5mins) were administered in week 4 with the order of the target words being changed. The semi-structured interview was conducted upon completion of the post-tests.

Data Analysis

The receptive post-tests were assessed by graded scoring, adopting a five-point scale: 0, 0.25, 0.5, 0.75, and 1 as outlined in Table 2.

TABLE 2
Scoring Criteria for Receptive Vocabulary Test

Self-report category	Scores	Criteria
I: I don't remember having seen this word before.	0	A score of 0 point is awarded if category A is selected.
II: I have seen this word before, but I don't know what it means.	0.25	A score of 0.25 points is awarded if category B is selected.
	0.25	A score of 0.25 points is awarded if category C is chosen but a wrong translation or synonym is given.
III: I have seen this word before, and I think it means_____. (synonym or translation)	0.5	A score of 0.5 points is awarded if category C is chosen but the translation or synonym is partially given.
	0.75	A score of 0.75 points is awarded if category C is selected and the translation or synonym is given correctly.
IV: I know this word. It means _____. (synonym or translation)	0.25	A score of 0.25 points is awarded if category D is selected but a wrong translation or synonym is given.
	0.5	A score of 0.5 points is awarded if category D is selected but the translation or synonym is partially correct.
	1	A score of 1 point is awarded if category D is selected and the translation or synonym is given correctly.

The Lexical Production Scoring Protocol (LPSP-Written) (Barcroft & Rott, 2010; Barcroft, 2002; Niu, 2014) was followed to score productive vocabulary post-tests. Correct letters and the percentage of the correct letters were converted into scores accordingly to capture fine-grained lexical knowledge gains as shown in Table 3.

TABLE 3
Scoring Criteria for Productive Vocabulary Test

0 point	None of word is written; Nothing is written; No correct letter is present
0.25 points	1/4 of word is written; Any one letter is correct; 25-49.9% of the letters are present
0.5 points	1/2 of words is written; 25-49.9% correct; 50-74.9% of the letters are present
0.75 points	3/4 of word is written; 50-99.9% correct; 75-100% of the letters are present
1 point	Entire word is written; 100% of letters correct

Two raters scored the tests independently and the discrepancies were discussed and resolved through negotiation. Inter-rater reliability reached 98.33% and 96.67% respectively for receptive and productive post-tests. The scores were entered into SPSS 25.0 for detecting the significant differences among groups assigned with CW or CO tasks. The responses to the interview were just analyzed by percentages.

Results

Statistical Results

The immediate and delayed post-tests results of FI/FD learners were shown in the Table 4. It could be seen that for both FD/FI learners, CW group outscored in comparison with CO group. In addition, scores obtained in delayed post-tests were lower than that in immediate post-tests. Moreover, receptive post-test scores gained were higher than productive post-test scores.

TABLE 4
Descriptive Statistics of Immediate and Delayed Post-tests

Cognitive Style	Task type	Receptive				Productive			
		Immediate post-test		Delayed post-test		Immediate post-test		Delayed post-test	
		Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.
FI	CO	7.65	2.100	5.85	1.966	6.21	1.946	4.76	2.070
	CW	8.23	1.800	5.78	1.795	7.15	1.444	4.47	1.931
FD	CO	6.22	1.832	4.24	1.812	5.18	1.938	3.56	1.966
	CW	7.36	1.905	5.11	1.520	6.16	1.823	4.04	1.832

Note: FI: field independent cognitive style; FD: field dependent cognitive style; CO: collaborative oral output group; CW: collaborative written output group

Effects of CO or CW tasks on FI/FD learners' receptive vocabulary acquisition and retention

For receptive lexical learning, the results of the 2 x 2 x 2 repeated measures ANOVA showed the main effects of cognitive style, test time were significant with large effect size ($F(2, 117) = 28.95, p = .000, \eta^2 p = .26$; $F(1, 117) = 198.58, p = .000, \eta^2 p = .43$). Additionally, the interactive effect between cognitive style, output task type was significant ($F(2, 117) = 4.78, p = .000, \eta^2 p = .31$). With reference to the retention effect of receptive vocabulary, results pointed to no significant interactive effect between cognitive style and test time ($F(2, 117) = .76, p = .88, \eta^2 p = .07$). Further analysis of ANOVA signaled no significant difference between output task types in retaining receptive vocabulary ($F(2, 117) = .41, p = .75, \eta^2 p = .01$).

TABLE 5
Independent Sample T-Test of FI/FD for Receptive Vocabulary Immediate and Delayed Post-tests

		Levene's		t	df	Sig. (2-tailed)	Mean difference
		F	Sig.				
Immediate post-test	FI (CO&CW)	2.676	.107	-.974	58	.334	-0.492
	FD (CO&CW)	0.001	.974	-2.193	58	.032	-1.058
Delayed post-test	FI (CO&CW)	0.562	.456	-.154	58	.878	.075
	FD (CO&CW)	1.651	.203	-2.007	58	.049	-.867
Immediate post-test	CO (FI&FD)	1.513	.224	2.588	58	.012	1.317
	CW (FI&FD)	0.238	0.628	1.567	58	.122	.750
Delayed post-test	CO (FI&FD)	0.088	.767	3.295	58	.002	1.608
	CW (FI&FD)	0.413	.523	1.554	58	.126	.667

* The mean difference is significant at the .05 level

As revealed from Table 4 and Table 5, both FI/FD learners performed better in immediate post-tests if exposed to CW task in receptive vocabulary test. However, in delayed post-tests, FI learners in CO task scored more points, in contrast with FD learners who seemed to benefit more from CW task. Results in Table 5 indicated that there existed no significant difference in immediate post-tests and delayed post-tests for FI learners ($p = .334/.878$; > 0.05) for receptive vocabulary when exposed to CO or CW tasks. Conversely, for FD learners, the difference was significant both in immediate post-tests ($p = .032$; < 0.05) and delayed post-tests ($p = .049$; < 0.05).

When comparing effects of the same task type on learners with different cognitive styles, it can be observed that FI learners outperformed FD learners significantly in CO task in immediate ($p = .012$; < 0.05) and delayed post-tests ($p = .002$; < 0.05) whereas in CW task, the difference was not significant in immediate ($p = .0122$; > 0.05) and delayed post-tests ($p = .126$; > 0.05).

Effects of CO or CW tasks on FI/FD learners' productive vocabulary acquisition and retention

For productive vocabulary acquisition and retention, results of the repeated measures ANOVA suggested that main effects of cognitive style, task type were significant with large effect size ($F(2, 117) = 31.25$, $p = .000$, $\eta^2 p = .33$; $F(1, 117) = 182.34$, $p = .000$, $\eta^2 p = .39$), but no statistically significant interactive effect for task type and cognitive style ($F(2, 1117) = 4.17$, $p = .017$, $\eta^2 p = .31$). With regard to the retention effect of productive vocabulary, it was implied that no significant interactive effect between cognitive style, task type and test time could be observed ($F(2, 117) = .76$, $p = .88$, $\eta^2 p = .07$). However, retention of productive vocabulary exhibited significant difference between output task types ($F(2, 117) = 9.56$, $p = .000$, $\eta^2 p = .10$).

As shown in Table 4, in a similar vein, both FI/FD learners scored more points in immediate post-tests with CW task for productive vocabulary learning. In delayed post-tests, task type exerted influence on vocabulary acquisition on the part of learners with different cognitive styles. This was consistent with what occurred in receptive vocabulary, which demonstrated that CW task was more facilitative for FI learners than their CO counterpart.

From Table 6, it was also revealed that both FI and FD learners in CW significantly outperformed those in CO regarding the effect of immediate productive vocabulary acquisition ($p = .042$; $.045$ respectively). Nevertheless, for FD and FI learners, there was no statistically significant difference between the learning outcomes of two collaborative output groups in productive vocabulary acquisition in the delayed post-test ($p = .564$; $.337$ respectively).

TABLE 6
Independent Sample T test of Productive Vocabulary Immediate and Delayed Post-tests

		Levene's		t	df	Sig. (2-tailed)	Mean difference
		test	Sig.				
Immediate post-test	FI (CO&CW)	2.580	.114	-.2053	58	.045	-.908
	FD (CO&CW)	.367	.547	-.2075	58	.042	-1.008
Delayed post-test	FI (CO&CW)	.012	.718	.580	58	.564	.300
	FD (CO&CW)	.132	.203	-.968	58	.337	-.475
Immediate post-test	CO (FI&FD)	.009	.925	2.127	58	.027	1.067
	CW (FI&FD)	1.086	0.302	2.276	58	.022	.967
Delayed post-test	CO (FI&FD)	.231	.633	2.350	58	.022	1.225
	CW (FI&FD)	.701	.406	.925	58	.358	.450

*The mean difference is significant at the .05 level

With reference to effects of the same task type on learners with different cognitive styles in L2 productive vocabulary acquisition, it could be postulated that in immediate post-tests, FI learners greatly outperformed FD learners ($p = .038; 0.027; < 0.05$); In collaborative oral output task, significant difference was observed in retention effect on vocabulary between FD/FI learners ($p = .022; < 0.05$); but in collaborative written output task, there exhibited no significant difference between FD/FI learners ($p = .358$).

Interview Results

The responses to the interview from the learners helped to tap their perceived value of the collaborative tasks and the results, as outlined in percentage in Table 7.

TABLE 7
Interview Results (n = 16)

Q 1: Do you think that reading plus collaborative output tasks will contribute to your vocabulary acquisition?	very helpful	25%
	helpful	69%
	Slightly helpful	6%
Q 2: Do you believe that collaborative output in pairs outperforms individual output in the aspect of vocabulary learning?	positive	81%
	negative	13%
	not sure	6%
Q3: Would you like to choose written form or oral form to complete the output tasks?	written	63%
	oral	19%
	not care	18%
Q4: Which one do you think is more conducive to vocabulary acquisition, collaborative written output or collaborative oral output?	CW	50%
	CO	38%
	not sure	12%

The first interview question concerned with the general attitude held by learners towards the effect of reading enhancement activity on their vocabulary acquisition. 16 participants were unanimously positive regarding the reading plus activities. They emphasized the “usefulness” or “help” derived from these activities. As one of them articulated (The responses are translated version of Chinese):

I believe that reading plus task is really helpful. When I am reading the article, I primarily pay attention to the main idea rather than take notice of the word meaning, which does not contribute to acquiring the new words. I think the tasks focusing on words provide me with the opportunity of remembering the words.” (Student C, FD cognitive style.

The second interview question aimed to investigate their willingness to conduct collaborative output tasks. Interestingly, 13 interviewees (81%) maintained that collaboration fostered learning commitment and interest except that 2 (13%) field independent learners were not convinced that collaborative learning could bring about optimum learning outcomes.

As for me, I could accept the pattern of collaboration because I agree that partners can offer each other help when one is stuck for expressions. But I would feel more confident to handle the task if I work individually because discussing sometimes is a waste of time. It does not matter if it is a collaboration work or individual work. (Student B, FI cognitive style)

The third question pertained to learners’ preferences on output modes. 10 out of 16 (63%) preferred written output mode whereas 3 (19%) had preferences on oral output mode.

From my perspective, I would like to finish the task in written form. sometimes I will struggle with retrieving words properly or I have no idea of what I am going to say next. I almost have no time to organize my thoughts... When I write ideas down, I could have better organization and could express my ideas more accurately. (Student B, FI cognitive style)

In oral communication, I don’t have to choose very complicated or academic words for expressing myself. I have more tolerance on my speaking. I like talking with people. (Student A, FD cognitive style)

However, students’ viewpoints diverged when asked which output mode was more conducive to L2 vocabulary acquisition.

In my opinion, I think written output is more beneficial to learning new words because writing them down could leave deeper impression on me... (Student E, FI cognitive style)

...in speaking, if I have to use this word to express myself, I will spell it out and practice its pronunciation again and again to ensure I will be understood. In this way, I think I will remember the words better... (Student D, FD cognitive style)

Discussions

As presented in Table 6, CW group greatly outperformed CO counterpart in immediate productive vocabulary acquisition for both FI and FD learners. It maybe surmised that the more stressful nature of speaking compared with writing might induce levels of anxiety for speaking required “real time processing whereas writing tasks allows the writer much greater control over the time spent in formulation and monitoring” (R. Ellis & Yuan, 2004, p. 63). As reflected in the follow-up interview, 63% learners reported they preferred to be exposed to written work.

However, in receptive vocabulary acquisition, it seemed that FI learners were not susceptible to the influence of the output task type than their counterparts. When learners constructed conceptual knowledge of unknown vocabularies that may impede reading comprehension, their inferencing efforts would stop once the mental model has reached sufficient specification due to its “economic effort

calculation” (Rieder, 2004, p. 60) Thus, only when the target words were processed consciously with “focus” and “enrichment” contributive to salience of the information, could these words be acquired by the learners (Rieder, 2004). For one thing, the learners were required to accomplish the output tasks using the target words that were not highlighted in bold or italics, because of which the degree of focus and salience of target words were almost the same for CO and CW tasks; for another, in reconstruction work, either in oral or written form, contextual richness did not exhibit differences for FI learners in output task type given that both groups were cued with Chinese meaning of target words, and they were probably not prone to looking for global or general meanings. Therefore, both groups had the same amount of *need* for semantically processing the target word (Laufer & Hulstijn, 2001). Furthermore, word exposure frequency effect, as a strong predictor of word learning (Laufer & Rozovski-Roitblat, 2011; Eckerth & Tavakoli, 2012), remained the same for two groups. As a result, though FI learners outscored in CW in comparison with CO task (Mean = 8.28 vs. Mean = 7.65), the statistical difference was not significant in immediate and delayed post-tests. By contrast, FD learners in CW group outperformed those in CO group in receptive vocabulary learning. Since FD learners were more likely to rely on contextual clues or surrounding perceptual field for obtaining information and thus performing better in open-ended tests and compositions (Witkin, 1977), writing had a role to play in terms of assisting in providing more tangible and precise context with which FD learner’s weakness identified in analytical and reasoning abilities would be counterbalanced. Collaborative written output could thus engender more benefits for them. This result ran counter to some previous studies that maintained oral output task facilitated vocabulary acquisition compared with written output (De la Fuente, 2002), or output task type would not result in significant difference in vocabulary acquisition (Niu, 2014). It should be noted, however, the discrepancies yielded may be attributed to learner’s cognitive style as a possible mediator.

The results that CW task engendered more positive effects on both FI and FD learner’s immediate productive vocabulary acquisition than CO task did indicated that writing, as a more complicated and higher-level cognitive process, required more mental work (Wolff, 2000). Compared with speaking, writing output mode demanded for more accuracy in language, which may contribute to a repeated meaning negotiation on word usage for appropriateness. In this process, a stronger form-meaning link in the target words could be established, thereby enhancing the retention of target words. This corroborated some studies that writing was more facilitative to language acquisition than speaking (Harklau, 2002).

Nevertheless, no significant statistical difference was observed between the FI and FD groups across different tasks in their productive vocabulary retention in two weeks. CW task enabled the learners to devote special attention to the spelling of target words for they have to write them down. When exposed to productive vocabulary tests, learners could benefit from unconsciously enhanced spelling, as supported by Jessie, a FD participant in a written output dyad: “*Spelling a word orally and then writing them down letter by letter helped me to recall...*” This was in contrast with what learners did in CO task in which they allocated more attentional resources to the pronunciation of target words rather than *noticing* the spelling. *Noticing Hypothesis* (Schmidt, 1990, 2001) contended that the occurrence of vocabulary learning resided in learners’ elaborate noticing of or attending to L2 forms, whereby input could be transformed into intake. This could account for why CW task triggered a better effect on immediate productive vocabulary acquisition regardless of learner’s cognitive styles. However, in the delayed post-tests, the advantages of written output disappeared two weeks later with no significant difference between CO group and CW group. Although CW task had a significant influence on immediate acquisition, its effect on vocabulary retention was not obvious. Niu (2014) argued that the collaborative written output requested the learners to notice some points related to writing itself, which resulted in a dispersive attention resource and a relative decline on vocabulary processing. Moreover, Sheng (2011) accounted for the similar results and claimed that the frequency of vocabulary use in CO task was higher than that in CW task. Learners in oral dyad may articulate phonological forms via repetition, self or other-correction or uptake of the pronunciation to ensure they were understood. In this sense, “focus” and “enrichment” which consolidated phonological forms of target words would be conducive to committing them to long-term memory. Hence, collaborative written output had a superiority on learners’ immediate productive

vocabulary acquisition, but its predominance on productive vocabulary retention was not sustained.

As revealed, both FI/FD learners outscored in receptive vocabulary post-tests than they did in productive vocabulary post-tests. It was generally assumed that receptive vocabulary acquisition preceded productive vocabulary acquisition and discrepancies existed when the two kinds of vocabulary developed (Laufer, 1998). Productive lexical learning which referred to retrieval and production of the orthographical form of words when given its meaning (Read, 2000) had much more difficulties to attain than receptive lexical learning which required learners to retrieve and produce the meaning of words when provided with the orthographical form (Nation, 2001). This was because learners, in their mental lexicon, had asymmetrical connections between L1 and L2 representations. On one hand, L1 lexicon, being more dominant, had a solid network with stronger mental representations than L2 did, thus making the mental work of retrieving L2 phonological or orthographical forms more effortful. On the other hand, the reason could be attributable to the cognitive processes and mental efforts required in vocabulary production. Comprehension involved with “data-based” whereas production demanded for “self-activated mechanisms” (Ringbom, 1987, p. 62). In other words, receptive lexical meaning, as a matter of fact, could be “accessed, if appropriate external stimulation is available” (Meara, 1990, p. 153) with information disclosed from context, while productive lexical meaning did not have to be engaged with external stimulus, but its access could be achieved through language user’s control and efforts spent in activating the impulses and choosing from a large number of items being activated or the different forms from the same item (Ringbom, 1987). In this sense, more word processing efforts evidenced by the capability of retrieving information were needed in productive lexical acquisition.

For both FI/FD learners, lexical retention all fell in both receptive and productive delayed post-tests in comparison with immediate post-tests, which suggested the attrition of both form and meaning in a two-week time span on the one hand, and supported the forgetting curve signaling the lost of information along with the time without attempts to retain (Ebbinghaus, 1885) on the other.

Generally speaking, FI learners had more advantages than FD learners in incidental vocabulary learning given the scores gained in receptive and productive vocabulary post-tests. FI learners had a strong capability of analyzing problems with cognitive strategies and inferring the information (Reid, 2002). Inferring the meaning of unknown words from the context to fill in the conceptual gap resembled the action of separating figures by overcoming inferences from the background, which aided decoding processes in reading with time constraint, thus increasing the likelihood that form and meaning of words would be allotted with more cognitive processing resources. This confirmed findings from previous investigations that FI learners had better second language learning effects in the formal language environment (Carter, 1988; Seliger, 1977; Xu, 1999). Conversely, FD learners might be inclined to gain some natural language input in the course of communicating with others (Reid, 1995), and they tended to benefit more from authentic language environment. The input of reading was not natural input and the nature of collaborative output task was close to result-oriented activity, which posed some challenges for FD learners in reading enhancement activities.

Conclusions

This study, probing into the effect of collaborative output tasks on FI/FD learners’ lexical gains in Chinese EFL context, added to the current literature by lending support for the mediating role played by learner’s cognitive styles. The conclusions were drawn as follows.

First, both two types of collaborative output tasks were proved to be conducive to incidental vocabulary acquisition. For FI learners, they were less susceptible to output collaborative task type. However, as far as FD learners were concerned, CW output mode could better facilitate their L2 vocabulary acquisition. With regard to the productive lexical gains, collaborative written task was superior over the oral output in immediate vocabulary post-tests, it did not demonstrate advantages over oral mode in retaining lexical learning.

Secondly, FI learners outperformed FD counterparts in receptive vocabulary acquisition and retention only in collaborative oral output tasks. Nevertheless, for productive vocabulary acquisition and retention, FI learners outperformed FD learners in both two output tasks, implying the former group's advantages in L2 vocabulary learning.

Thirdly, learners' attitude towards reading plus activities, especially the collaborative output tasks after reading, was positive and they approved the role of collaborative output task in instructional settings. Furthermore, they preferred to adopt collaborative written output exercise as the learning tool regardless of their cognitive styles. In addition, a majority of learners would like to be exposed to collaborative work with their peers with only a few preferring to work individually.

In light of the above-mentioned, the pedagogical implications emanated from this study were manifold. To begin with, collaborative output tasks, as one of the reading plus activities entailed great benefits in terms of internalizing input and adjusting learner's output via peer feedback, during which receptive vocabulary knowledge might be transformed into productive vocabulary knowledge. Moreover, collaborative written output mode should be fully utilized given its more facilitative role in acquiring vocabulary incidentally. Furthermore, to optimize learning outcomes, students were supposed to be exposed to different task types in line with their cognitive styles. Finally, FD learners should receive more timely help from the teacher or their peers to overcome the possible adverse effects their cognitive styles may bring about.

Of course, the findings of this study may be dwarfed since learners were chosen from a university featuring in disciplines of science and engineering and learner's traits and other learning strategies were left out of consideration. In addition, this study only examined controlled active vocabulary acquisition and future work would further build upon the current work by investigating free active vocabulary knowledge gains. Furthermore, the paucity of literature on incidental acquisition of multi-word units such as formulaic chunks and the role of learner's metalinguistic knowledge through reading plus activities in lexical learning may warrant further investigations.

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