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LEARNER DIFFERENCES IN STRATEGY USE, SELF-EFFICACY BELIEFS, AND PRONUNCIATION IMPROVEMENT

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After taking an English pronunciation course that raised ESL students' metacognitive awareness of effective pronunciation strategies for use in covert rehearsal (Dickerson, 1989), the students' (N = 37) long-term progress with English stress and linking, and their strategy use was assessed through: a) a read-aloud test the students performed three times—at the beginning of instruction (T1), at the end of instruction (T2), and again somewhere between five months and 25 months after instruction ended (T3); b) self-report questionnaires the students completed at T3; and c) a pronunciation strategy inventory they also completed at T3. The learners were categorized into groups according to strategy use and practice time reported from T2 to T3, self-efficacy beliefs, and achievement over time. The groups were then classified based on their differences in patterns of development from T2 to T3. The findings suggest that individual learner characteristics are strong predictors of students' progress over time.

INTRODUCTION

This study presents an alternative approach for examining pronunciation learning strategies and their effects on pronunciation improvement. In particular, it seeks to provide further empirical evidence in support of the Covert Rehearsal Model (CRM) proposed by Dickerson in the late 1980s. Under CRM (Dickerson, 1989; 1994):

1. Students are taught explicitly how and when to correct their pronunciation through the use of orthographically motivated rules and pronunciation strategies.
2. Students use prediction, production, and perception strategies consciously during their practice time in class and at home while planning, self-monitoring, and self-evaluating their oral performance.
3. Teachers facilitate learning, strategy and rule use by providing students with instructional materials and resources that they can use as models during practice.

In doing all the above, CRM promotes students' autonomy and self-direction, and empowers them to improve on their own after instruction ends (Sardegna, 2009).

Although in the last decade some researchers have proposed taxonomies for pronunciation learning strategies used by L2 learners (Eckstein, 2007; Osburne, 2003; Pawlak, 2010; Peterson, 1997; Sardegna, 2009), only recently have researchers measured the effectiveness of strategy development through instruction (Ingels, 2011; Sardegna, 2009; 2011). Strategy development has been advocated by Dickerson for three decades now, but his model needs further validation from the field.

This study moves the field forward not only by providing evidence of long-term improvement under CRM, but also by conducting an exploratory study of individual differences in strategy use after students receive instruction under CRM, thereby seeking to determine individual

differences that may account for differential progress over time. The pronunciation features targeted were English stress (both word stress and phrase stress), and linking (i.e., the ability to combine sounds within words and at word boundaries without changing their phonetic qualities, or by inserting a brief /j/ or /w/ sound between the sounds). For a discussion and a list of the strategies taught for improving these features during the course, see Sardegna (2009; 2011).

RELEVANT LITERATURE

Research into strategies for second language learning and language use suggests strategy instruction helps promote effective use of strategies (e.g., Cohen, 1998; Cohen & Macaro, 2007; Oxford, 1996). Yet, while some of these studies have revealed a positive correlation between strategy use and L2 proficiency (e.g., Oxford, Cho, Leung, & Kim, 2004), others have not (e.g., Green & Oxford, 1995). It has been argued that frequency counts may not be the best way to capture the nature of strategy use (Yamamori, Isoda, Hiromori, & Oxford, 2003). Self-reports of frequent use of one strategy do not necessarily mean the strategy is being used effectively; self-reports of low use of one strategy may not be related to the actual effectiveness of that strategy, but simply result from learners' lack of knowledge of the strategy per se. Besides, learners may need to combine different strategies to accomplish a given task, and that combination may be as effective as using just one strategy a lot. In addition, other indices of learners' behaviors, such as their sense of self-efficacy, their efforts at learning, their perceptions of what works for them or for the task at hand, and their motivations to learn, have been found to affect students' selection, combinations, and use of strategies as well as the relative effectiveness of the strategies they employ (Moyer, 1999; Oxford, 2003; Smit 2002). Measurements other than correlations need to be used if we are to capture the flexible nature of strategy use and its relationship to L2 achievement.

Despite pedagogical and theoretical arguments in favor of strategy instruction, little associated empirical research has been conducted in the area of pronunciation. Studies that have looked at pronunciation strategies have mostly investigated learner's choices and use of strategies without prior instruction and have offered taxonomies to describe them (Eckstein, 2007; Osburne, 2003; Peterson, 1997). It is only recently that researchers have measured the effectiveness of strategy development through instruction (Ingels, 2011; Sardegna, 2009; 2011). Both Ingels and Sardegna's studies investigated the efficacy of CRM, but their focus of analysis was different. Ingels argued in favor of using three additional techniques in covert rehearsal: learner use of self-recordings, self-transcription, and annotation of transcriptions. Sardegna offered a comprehensive list of strategies that students use during covert rehearsal and provided evidence on the long-term effectiveness of CRM for improving English stress and linking. Both Ingels and Sardegna have furthered our understanding of CRM and how strategies can be taught and used in the pronunciation class. Yet very little is known about individual factors affecting strategy use and achievement over time.

The present study answers calls for further research on the long-term effectiveness of strategy instruction (Cohen & Macaro, 2007; Rees-Miller, 1993; Rubin, Chamot, Harris, & Anderson, 2007; Sardegna, 2009), and pronunciation instruction (Derwing & Munro, 2005; Sardegna, 2009). It also answers calls for employing a variety of measurements when investigating strategy use (White, Schramm, & Chamot, 2007; Yamamori et al., 2003). In particular, it seeks to identify learner differences in strategy use, self-efficacy beliefs, and pronunciation improvement. The analysis is therefore limited to the following research question:

1. What individual learner differences, if any, affect international graduate students' progress with English stress and linking after they receive instruction following the Covert Rehearsal Model (CRM)?

METHODS

Participants and Teaching Intervention

The participants were 37 international graduate students (15 females and 22 males) that took a one-semester ESL pronunciation course at an American university. Their ages ranged from 22 to 47 years old. Their native languages were Chinese (18), Vietnamese (6), Korean (4), Thai (3), Turkish (3), French (1), Portuguese (1), and Spanish (1). According to their self-reports, some participants took the course on their first semester of graduate studies in the US (N = 20), while others took it in their second semester (N = 8), or between their third and fourth semesters (N = 9). Due to their performance on the university's ESL placement test, 22 of them were required to take the course. The remaining participants took the course for personal reasons.

The course taught students how to use a variety of pronunciation learning strategies to improve their English pronunciation outside of class. It met for fifty minutes three times a week for four months. The materials, activities, and pronunciation rules given to students followed Dickerson's (1989; Hahn & Dickerson, 1999a-b) Covert Rehearsal Model (CRM). The basic premise of the model is that teachers should aim at equipping students with predictive skills, pronunciation rules, and strategies to work on the accuracy of their speech in private. That is, teach students for empowerment (Dickerson, 1994) so that they can self-correct and self-teach.

To improve their oral skills, students could use any combination of strategies, either simultaneously or in sequence, while they worked under each of the six conditions for practice out of class delineated by CRM. [For examples of how these strategies can be combined for improving English stress and linking, see Sardegna, 2009; 2011.] The six conditions delineated by CRM are:

1. Find privacy.
2. Perform aloud.
3. Monitor your performance.
4. Compare the performance with models.
5. Change the performance to match the models.
6. Practice the changed performance aloud until fluent.

During the course, students also received written and oral feedback both during regular classroom activities and in five thirty-minute private meetings with the instructor. Both the training and feedback focused on improving students' most problematic pronunciation features as identified through a test administered at the beginning of the course. The targeted features included segmental, suprasegmental, and connected speech phenomena. This means that apart from English stress varieties and linking types, other features were targeted for instruction.

Measures

To explore individual differences in strategy use, self-efficacy beliefs, and pronunciation improvement, this study employed four measures:

1. Three combined pronunciation accuracy (CPA) scores from a read-aloud test that participants performed three times: at the beginning of instruction (T1), at the end of instruction (T2), and again somewhere between five months and 25 months after instruction ended (T3). A participant's CPA scores were obtained by averaging his or her reading accuracy levels with English stress and with linking at each of the testing times (i.e., at T1, T2, and T3).
2. One engagement score obtained from participants' responses at T3 regarding amount of time spent practicing the strategies plus daily amount of time spent talking to others in English from T2 to T3.
3. Three strategy scores (prediction scores, production scores, and prediction scores) obtained from participants' responses to a pronunciation strategy inventory regarding their strategy use from T2 to T3.
4. Participants' answers at T3 to the question "Do you think you have improved"?

The researcher asked students to read aloud a long passage, five dialogs, and a list of 22 words. The test allowed for an objective measure of students' long-term progress with the rules and strategies they learned during the course. It measured progress with many different speech features. This study, however, only reports and analyzes participants' CPA scores (i.e., three averaged scores for linking and English stress obtained at T1, T2, and T3). The experimental design also allowed testing for the effect of time on students' progress. Participants were assigned to three groups according to the time that passed between T2 and T3 (see Table 1), and the groups were tested for significant differences in order to determine if length of time after instruction could be a factor affecting their progress from T2 to T3, and ultimately from T1 to T3. The next section reports the results of this test, and the descriptive statistics, ANOVAs, and pairwise comparisons that were computed to measure participants' improvement from T1 to T3.

Table 1
Months Between Tests for Each Group

Groups	N	Test #1 to Test #2	Test #2 to Test #3	Total
1	9	4 months[a]	5 months	9 months
2	17	4 months	9 months	13 months
3	11	4 months	Over 13 months (13-25 months)	17-29 months

[a] Duration of the pronunciation course.

In addition to analyzing participants' accuracy development with the targeted features, the researcher gathered self-report data regarding participants' practice, strategy use, and self-efficacy beliefs. It was hypothesized that these individual learner differences might help reveal the profile of the participants in this study and, in doing so, help identify the factors that may contribute to greater or lesser improvement over time. These data were gathered at T3 (i.e., between 5 and 25 months after the pronunciation course ended) in order to elicit learner characteristics regarding their practice in covert rehearsal in the intervening months.

First, participants were asked to identify their practice engagement from T2 to T3 in a 5-point Likert Scale with three items: (a) frequency of practice alone (from 1 = "not much" to 5 = "a lot"), (b) frequency of practice with others (from 1 = "not much" to 5 = "a lot"); and (c) average

percentage of daily practice speaking in English with others (1 = 0%-20%, 2 = 30%-40%, 3 = 50%-60%, 4 = 70%-80%, 5 = 90%-100%). Second, participants completed at T3 a strategy inventory that consisted of a 5-point Likert Scale with 24 items. Each of the items described a particular prediction strategy (N = 7), production strategy (N = 10), or perception strategy (N = 7). Participants were asked to identify the frequency of use for each of the strategies by selecting a number from 1 to 5. Frequency counts were then computed and overall mean scores for prediction strategies, production strategies, and perceptions strategies were obtained for each participant. Finally, to measure students' self-efficacy beliefs, participants were prompted to respond to the question *"Do you think you have improved?"* by selecting one of the following choices: (a) *"Yes, I believe I have improved,"* (b) *"I think my pronunciation has stayed the same,"* or (c) *"No, I don't think I have improved."*

This study employed a multivariate statistical procedure called Cluster Analysis to explore individual differences and how these relate to achievement. This procedure attempts to identify relatively homogeneous groups of cases based on selected characteristics, using an algorithm that starts with each case in a separate cluster and combines clusters until only one is left. Although cluster analysis is not widely used in L2 research, some L2 studies (e.g., Kojic-Sabo & Lightbown, 1999; Rysiewicz, 2008; Yamamori et al., 2003) have employed this procedure for the purpose of profiling learners on the basis of certain variables.

Participants in this study were clustered on the basis of six variables: T1 CPA scores, T2 CPA scores, T3 CPA scores, engagement scores, prediction strategy scores, and production strategy scores. These scores were standardized before computation because the measures had differing score ranges. The Furthest-Neighbor approach with the squared Euclidean distance technique was chosen for cluster analysis because this procedure links objects in a cluster at some maximum distance or by minimum similarity. That is, at each stage of the agglomeration, the two clusters with the smallest maximum distance (most similar) are combined (Hair & Black, 2000). The number of meaningful clusters was decided by considering large changes in clustering distances and characteristics of the resulting clusters.

Perception strategies were not computed in the cluster analysis for two reasons:

1. Students reported assigning high scores for some perception strategies both for "listening for pleasure" and for "listening attentively to improve perception/comprehension," which made it impossible to determine their use during covert rehearsal with a focus on form.
2. The mean scores for these strategies were usually rather high for all participants so it was believed that computing them in the clusters might obscure the overall pattern.

After the clustering process, mean scores for perception strategies were added to the resulting clusters in order to complete the learners' profile. Due to the reasons just explained, however, the perception strategy scores reported in the analysis should be taken with caution. Finally, cross-tabulations were computed to measure the association between participants' self-efficacy beliefs (Zimmerman, 2000) and the learner groupings identified through cluster analysis.

RESULTS AND ANALYSIS

Before computing overall group progress from T1 to T3, the researcher investigated the effect of the variable "length of time from T2 to T3" by comparing progress from T2 to T3 on the three groups of participants that purposely varied in the length of time that passed between their T2 and T3 tests (see Table 1). If this variable affected T2-T3 progress significantly, then progress in

the three groups from T1 to T3 would have to be analyzed separately in order to avoid confounding that variable with other variables contributing to change.

To detect the significance of "length of time from T2 to T3" on T2-T3 progress, a Fixed Effects Model was computed with one factor—group (which tested for "length of time from T2 to T3"), and two covariates—T1-T2 progress with CPA scores, and pronunciation strategy practice. The model revealed that T1-T2 progress (that is, progress during instruction) affected scores from T2 to T3 significantly [$F(2,32) = 20{,}366$, $p = 0.000$], but length of time between T2 and T3 did not [$F(2,32) = 1.076$, $p = 0.353$]. These results corroborated previous research findings that investigated the effects of these variables on pronunciation improvement (Sardegna, 2009; 2011). As length of time after instruction did not affect students' scores, tests of individual differences were performed for the whole group regardless of differences in time from T2 to T3.

To test for individual differences, six learner variables were cluster-analyzed in this study: T1 CPA scores, T2 CPA scores, T3 CPA scores, engagement scores, prediction strategy scores, and production strategy scores. T1 CPA scores were included in the computation because the Fixed Effects test revealed their relationship with progress from T2 to T3 was significant. Table 2 provides the mean percentage scores, standard deviations, and observed maximum and minimum scores for the clustered variables.

Table 2
Descriptive Statistics for the Clustered Variables

Variable	*N*	*M*	*SD*	Minimum	Maximum
T1 CPA	37	57.39	7.879	39	73.5
T2 CPA	37	81.95	6.636	72	95.67
T3 CPAA	37	73.95	8.151	52.83	86.83
Engagement	37	2.32	1.132	1	5
Prediction	37	2.69	0.894	1	4.29
Production	37	2.52	0.827	1.10	4

A repeated measures ANOVA was used to examine the overall time effect on participants' performance from T1 to T3. The results revealed that participants' CPA scores differed significantly over time: *df-within* = 2; *df-error* = 72; $F = 264.157$; $p = 0.000 < .01$. Pairwise comparisons indicated that students' scores for all the pairs changed significantly ($p = 0.000 < 0.01$). Participants significantly improved (+24.56 percent) their CPA scores from T1 to T2, and although their scores decreased a little (-7.99 percent) by T3, there is still a distinct change (+16.56 percent) from T1 to T3 in students' performance.

With the aid of the Dendogram obtained from the Cluster Analysis, participants can be categorized in groups. The Dendogram is a graphic representation showing the steps involved in the clustering process (see Figure 1). Based on the approach chosen for the analysis (in this case, the Furthest-Neighbor approach with the squared Euclidean distance), an algorithm combines clusters starting from individual cases until only one cluster or group is left. The fundamental structure represented in the cluster solution should be examined from a conceptual perspective to decide a meaningful number of clusters and whether small number clusters represent a valid structural component in the sample (Hair & Black, 2000).

A close inspection at the Dendogram obtained with the clustered variables revealed seven categories, but only six meaningful groupings. Cases 20, 22, 25, and 36 (represented at the bottom of the Dendogram) were identified as two distinct groups because these participants differed slightly in their reported use of strategies. However, after considering the characteristics of the seven resulting clusters, these four participants shared a characteristic that distinguished them from all the other participants (i.e., they exhibited the highest initial CPA scores) and, therefore, it was more meaningful to keep them all together in one group.

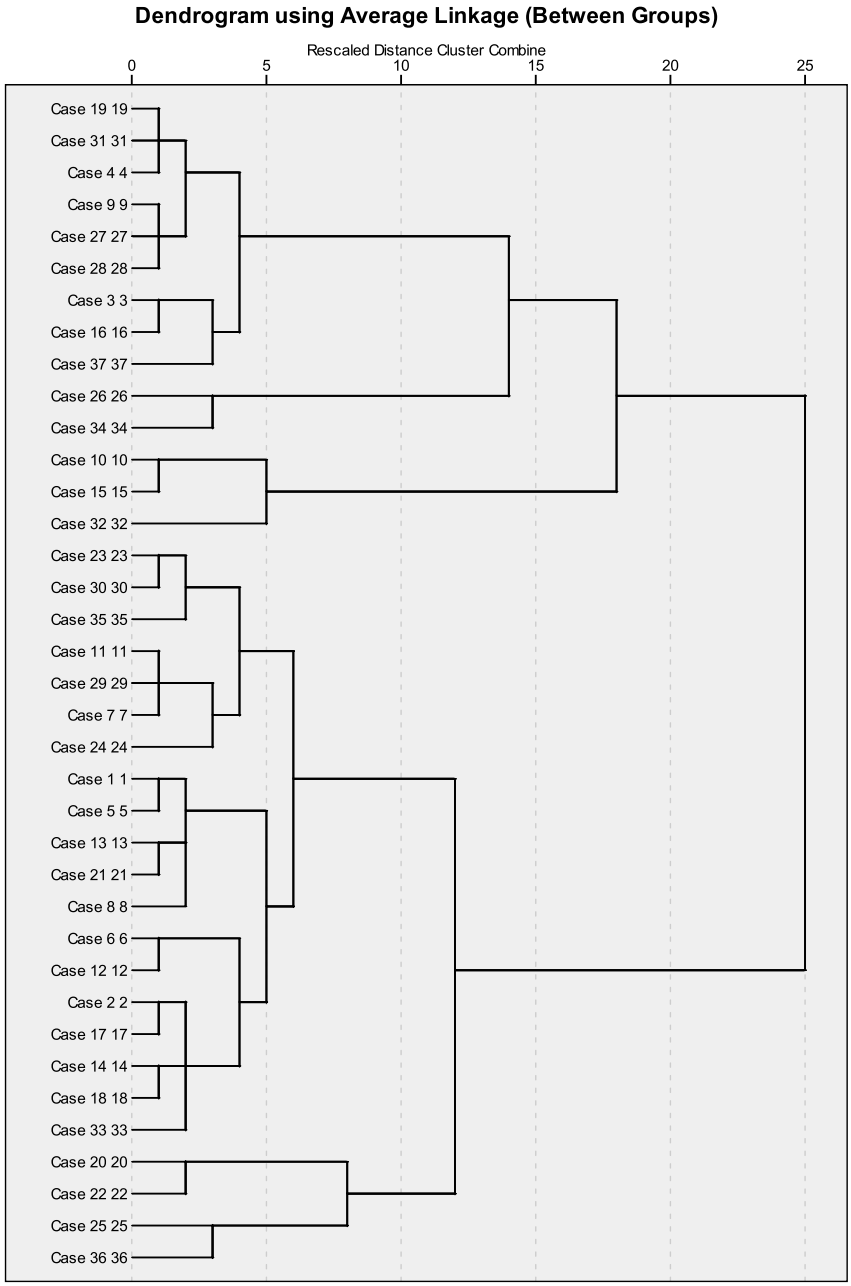

Figure 1. Dendogram using average linkage.

Each group was then labeled according to its characteristics. Table 3 provides the cluster group number and initial level grouping, the number of participants, and the label assigned to each group based on its profiling characteristics. It also details the variables that characterize the profiles: CPA mean scores for the three tests, including percentages of improvement (in parentheses), and the mean scores for engagement and the three strategy types (prediction, production, and perception).

Table 3
Participants' Profiles

Group	*N*	LABEL	T1 CPA	T2 CPA	T3 CPA	Eng.	Pred.	Prod.	Perc.
1 Mid	12	CONSISTENTS	59.57	83.97 (24.4)+	76.47 (-7.5)++ (16.9)+++	2.00 (M)*	2.99 (M)	2.73 (M)	3.35 (MH)
2 Mid	9	UNMOTIVATED	57.93	80.83 (22.9)+	72.26 (-8.57)++ (14.3)+++	1.33 (ML)	1.73 (ML)	1.68 (ML)	2.46 (M)
3 Mid	7	HARDWORKERS	57.14	78.81 (21.7)+	75.12 (-3.7)++ (18)+++	2.86 (M)	3.633 (MH)	3.375 (MH)	3.45 (MH)
4 High	4	OVERACHIEVERS	68.29	93.46 (25.2)+	84.46 (-9)++ (16.2)+++	3.5 (MH)	3.07 (MH)	2.35 (M)	3.04 (MH)
5 Low	3	MISUSERS	41.44	72.33 (30.9)+	54.61 (-17.7)++ (13.2)+++	2.00 (M)	2.62 (M)	3.13 (MH)	4.24 (H)
6 Low	2	SOCIALS	44.84	77.25 (32.4)+	70.34 (-7)++ (25.5)+++	5.00 (H)	1.79 (ML)	1.6 (ML)	2.71 (M)
Total	37		57.39	81.95 (24.6)+	73.95 (-8)++ (16.6)+++	2.32 (M)	2.70 (M)	2.52 (M)	3.15 (MH)

+ T1-T2 improvement. ++ T2-T3 improvement. +++T1-T3 (i.e., duration of the study) improvement.

*Denotes frequency: L (low use) = 0-1; ML (mid-low use) = 1-2; M (mid use) = 2-3; MH (mid-high use) = 3-4; and H (high use) = 4-5.

If we only consider T1 CPA and T2 CPA mean scores, there are three main groups:

a. High-level Group (Group 4; N = 4). These students exhibited a high initial accuracy level (68 percent), and an overall improvement to 93 percent after instruction.

b. Mid-level Group consisting of Group 1 (N = 12), Group 2 (N = 9), and Group 3 (N = 7). These students exhibited a mid-initial accuracy level (57-59 percent), and an overall improvement of 22-24.5 percent after instruction.

c. Low-Level Group consisting of Group 5 (N = 3) and Group 6 (N = 2). These students exhibited a low initial accuracy level (41-45 percent), an overall improvement of 31-32.5 percent after instruction.

Arguably, the differences in percentages of improvement during the course between the low and the higher level groups may be attributed to the fact that low level students had more room to improve than the higher level students (also noted by Dickerson, 2002; Sardegna, 2009). Percentages of improvement after the course ended, i.e., from T2 to T3, differed not only between the three main groups (high, mid, and low), but also within both the mid and low level groups, thereby forming the six meaningful clusters shown on Table 3.

According to the characteristic profiles of the groupings revealed through the clustering process, the resulting six groups were labeled: the Consistents, the Unmotivated, the Hardworkers, the Overachievers, the Misusers, and the Socials. A description of the characteristics that motivated the group labels follows.

The Consistents: Group 1 (N = 12) has the largest number of participants and its mean scores in all measures strongly reflect the group trend for all 37 participants (compare Group 1 mean scores with Total under Table 3): around a 24.5 percent increase in accuracy during the course, around an 8 percent decrease in accuracy after the course ended, medium reported use of perception strategies, production strategies, and engagement practice, and a mid-high score for perception strategies. Because this group's progress seems the most "consistent" with the overall group trend, it was labeled "the Consistents."

The Hardworkers. Group 3 (N = 7) started a bit lower in accuracy than the Consistents, and even achieved a lower increase during the course (22 percent as opposed to the 24.5 percent increase obtained by the Consistents). In fact, by T2 the Consistents scored 5.15 percent above this group. Yet, by T3 this difference was only of 1.28 percent. This group was labeled the Hardworkers because they were the group with the least drop in accuracy from T2 and T3 and, coincidentally, the group that reported higher level use for all strategy types. It is hypothesized that their use of strategies (mid-high level use for all types) and their engagement (mid level) may have facilitated maintenance, or little decrease in accuracy, for all the participants in this group after the course ended. Overall, the group mean decreased only 3.7 percent from T2 to T3, achieving a long-term progress of almost 22 percent.

The Unmotivated: Group 2 (N = 9) obtained lower T3 CPA scores (72 percent) than both the Consistents (76 percent) and the Hardworkers (75 percent) despite having an initial level similar to the Hardworkers and a large increase in accuracy from T1 to T2 (almost 23 percent). This difference in long-term progress seems to be associated with their reported lower use of pronunciation strategies, and their mid-low engagement scores. The reasons for these low scores are uncertain. A number of possible explanations are: (a) no interest in improving further or on committing time and effort to improve further; (b) no time to practice due to a busy schedule; (c) interest in focusing practice on other pronunciation features (such as sounds) or other language skills (such as writing), and/or (d) no opportunities to speak with other people in English. Unfortunately, the strategy inventory did not gather information that would reveal participants' reasons for not practicing much in covert rehearsal so we can only speculate why they did so. Regardless of the reasons, though, this group seemed unmotivated to use the strategies or engage in practice opportunities; thereby it was labeled "the Unmotivated."

Figure 2 shows how the three mid groups compared on their strategy use and engagement, and in relation to the high group—The Overachievers.

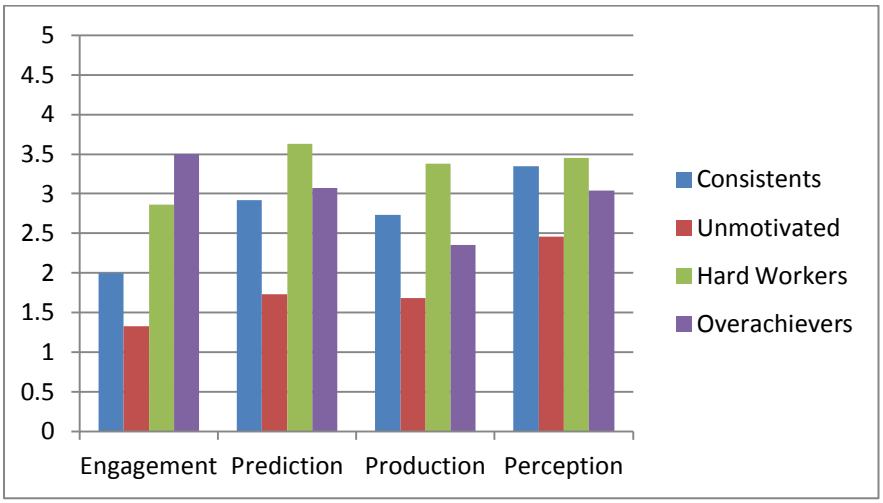

Figure 2. Mean engagement, prediction, production, and perception scores for the mid- and high-level groups from T2 to T3.

The Overachievers: Group 4 (N = 4) consisted of a group of students whose initial accuracy level was already high (68 percent) by comparison with the other groups. Despite their high initial level, these students worked hard during and after the course in an effort to improve further, as demonstrated by their accuracy scores at T2 and T3, and their reported mean scores for strategy practice (most in the mid-high range). Also, this group exhibited a higher index of seeking opportunities to talk in English with others than all the three mid-level groups.

The two low-level groups (Groups 5 and 6) represented a small sample of the population, but it was meaningful to keep them apart because they showed different patterns of behavior from T2 to T3 that may explain their big difference in accuracy at T3. One group was labeled the Socials and the other the Misusers.

The Socials (Group 6, N = 2*)* reported the highest level of engagement (5.00) of all the clustered groups. This score indicated that they practiced in covert rehearsal a lot and engaged in as many opportunities as they could to talk and practice with others in English. They were called the Socials because of their reported engagement with others. Although they reported mid-low scores for strategy types, their high score for engagement in practice also indicates a high score for practice on their own. Perhaps their low scores in strategy types did not capture amount of practice well enough. It is possible that these students had high scores for only a few of the items in the list and not across the board, which may have lowered their strategy count.

The *Misusers* (Group 5, N = 3) started at an initial level similar to the Socials, but their long-term improvement was 12 percent lower than that of the Socials. Group 5 reported mid engagement and mid-use of strategies, with perception strategies being the highest (4.24 percent). Their resulting decrease in accuracy from T2 to T3 (almost 18 percent) may be associated with the fact that these students engaged in many perception activities (e.g., listening to the radio, to the TV, etc.), but most probably did not focus too much on form. Also, lack of improvement may be associated with their being unable to correct themselves well during their practice in private. While this analysis may sound speculative, especially because of the number

of participants involved, it was somewhat validated when a cross tabulation computed between participants' answers to "Do you think you have improved?" and the clustered groups revealed that two of the three students in this group felt they had not improved. They commented that did not feel that they were practicing correctly. This group, therefore, received the label of the Misusers. Figure 3 shows strategy use and engagement scores for the low level groups.

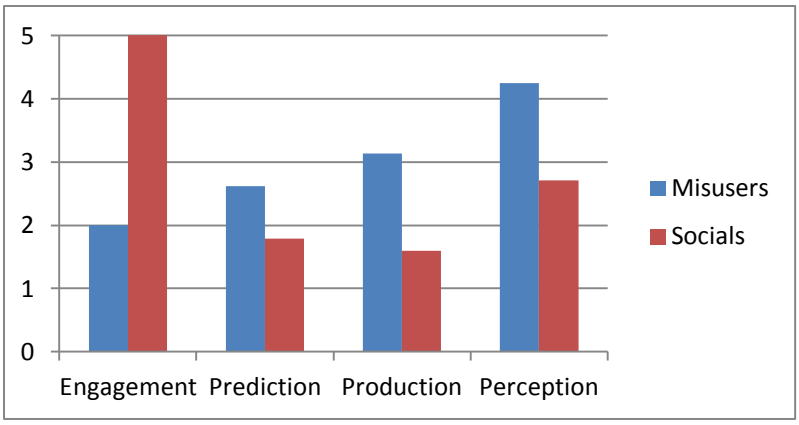

Figure 3. Mean engagement, prediction, production, and perception scores for the low-level groups from T2 to T3.

A cross tabulation between participants answers to "Do you think you have improved?" with the clustered group revealed that the majority of the participants (23 out of 37) believed that they had improved as a result of their work in covert rehearsal from T2 to T3 (see Table 4). It is also interesting to note that most of the students that felt that their pronunciation stayed the same (N = 4) were among the Unmotivated. One can speculate that these students perhaps did not practice much in covert rehearsal after the course because they were already happy with the level they had achieved during the course and may have thought their accuracy would stay the same. In fact, the researcher found that some students in the Unmotivated group were surprised when they received their scores at T3 even when they had reported little practice in the intervening months.

Table 4
Crosstabulation Between Self-Efficacy Answers and Clustered Groups

C#	LABEL	Yes, I believe I have improved	I think my pronunciation has stayed the same	No, I don't think I have improved	Total
1	CONSISTENTS	7	2	3	12
2	UNMOTIVATED	4	4	1	9
3	HARD WORKERS	6	1	0	7
4	OVERACHIEVERS	3	0	1	4
5	MISUSERS	1	0	2	3
6	SOCIALS	2	0	0	2
Total		23	7	7	37

Figure 4 shows CPA accuracy scores for all the clustered groups from T1 to T3. From the figure, we gather that the Overachievers performed above average in all three tests compared to all the other groups, while the Misusers performed below average in all three tests than all the other

groups. Despite an initial level similar to the Misusers, the Socials achieved a much higher overall long-term progress than the Misusers. The Consistents, Unmotivated, and Hardworkers started with a similar initial level, but their progress differed somewhat long-term. Despite these differences, the figure also shows that there is a similar overall trend for all these groups: a decrease in accuracy after instruction. How much students decrease seems to be partially dictated by the individual differences identified in the analysis.

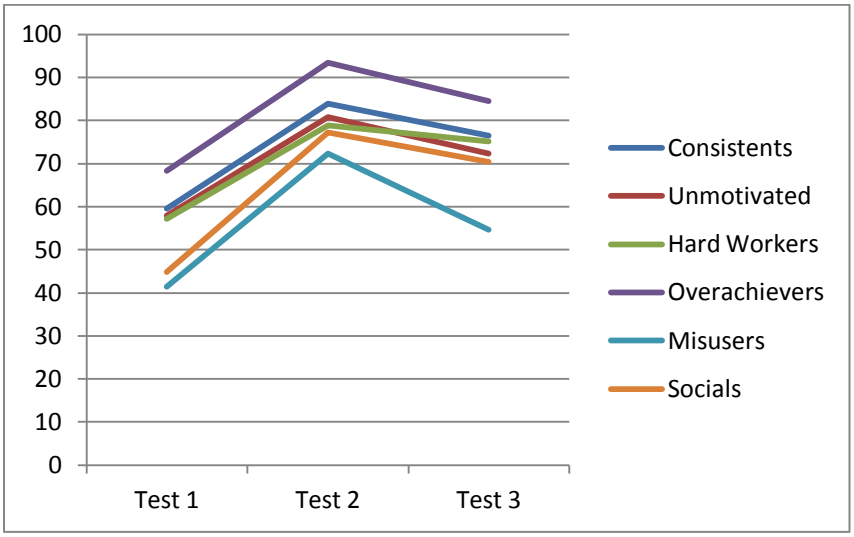

Figure 4. Resulting clusters' progress from T1 to T3.

DISCUSSION

The evidence from participants' CPA mean scores suggests that changes from T1 to T2 may indeed be related to the effect of instruction under CRM. After four months of instruction on and practice with pronunciation learning strategies, students' scores increased significantly (24.6 percent). Backsliding after pronunciation improvement resulting from instruction is to be expected (Beebe, 1988; Sardegna, 2008; 2009; 2011), yet these participants were able to maintain an average improvement of 16.6 percent after the course ended regardless of the amount of time that passed between test #2 and test #3. These findings corroborate other studies' findings regarding the effectiveness of CRM (Ingels, 2011; Sardegna, 2008; 2009; 2011), and of pronunciation instruction in general (Derwing, Munro, & Wiebe, 1998). They also support claims (e.g., Dickerson, 1994) in favor of empowering students with explicit pronunciation rules and strategies. To make a stronger claim on the efficacy of the methodology used, however, this study's findings should be compared to other studies of the same kind utilizing other methodologies or with groups of students receiving no instruction.

The experimental design employed also revealed some valuable information regarding the factors possibly contributing to individual differences after the course ended (i.e., from T2 to T3). It was found that T1-T2 progress was a strong predictor of T2-T3 progress, but length of time between T2 and T3 was not. Participants' self-report data regarding strategy use and engagement shed light on learner differences that might affect progress when students are left to their own devices to work privately on their pronunciation problems. When these variables were clustered with participants' progress from T1 to T3, six groups of learners were identified: the Consistents, the Unmotivated, the Hardworkers, the Overachievers, the Misusers, and the Socials. Each of these groups exhibited individual learner characteristics that helped explain

differences in long-term improvement. However, due to the exploratory nature of the study and the use of self-report accounts of strategy use and engagement, this analysis may not tell the complete story. Other studies using other data sources and employing tests other than Cluster Analysis are needed to provide a more complete picture of the nature of strategy use.

Future studies should be carried out across different types of groups with learners of different L1 backgrounds, ages, and proficiency levels. The students were all college level students with an intermediate level of English. It could be argued that the results of this study can only be generalized to populations of the same kind. Other suggestions for further study may include the effectiveness of strategy use for improving other pronunciation features, such as sounds and intonation, and the use of more delayed tests to measure whether students' accuracy continues to decrease or stabilizes for each of the identified groups as time goes by. This study provides evidence that CRM leads to unconscious use of the features that were being practiced. Other interesting avenues of future research would be to investigate whether the same results would be found for freer speech, or if ratings of students' comprehensibility would show similar improvement.

CONCLUSION

This study presented an alternative approach for examining pronunciation learning strategies and their effects on pronunciation improvement. It also shed some light into instructional and learner factors that may contribute to pronunciation improvement over time. The findings led to a modified view of the nature of pronunciation learning strategies. A picture emerged of what makes students maintain a significant progress with English stress and linking after receiving strategy instruction under CRM. This picture revealed that there is more than one route to success in L2 pronunciation improvement. The analysis showed that a combination of strategies and other factors, such as students' practice engagement, their progress during instruction, and their sense of self-efficacy, affect pronunciation progress over time. As this is an exploratory study and the first of its kind investigating learner profiles with regard to pronunciation strategies and achievement over time, further in-depth investigations are needed to mitigate its limitations and generalize its findings to other populations.

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REFERENCES

Beebe, L. M. (Ed.). (1988). *Issues in second language acquisition*. Rowley, MA: Newbury House.

Cohen, A. D. (1998). *Strategies in learning and using a second language*. Harlow, England: Longman.

Cohen, A. D. & Macaro, E. (2007). *Language learner strategies.* Oxford, UK: Oxford University Press.

Derwing, T. M. & Munro, M. J. (2005). Second language accent and pronunciation teaching: A research-based approach. *TESOL Quarterly, 39,* 379-397.

Derwing, T. M., Munro, M. J. & Wiebe, G. (1998). Evidence in favor of a broad framework for pronunciation instruction. *Language Learning, 48,* 393-410.

Dickerson, W. B. (1989). *Stress in the speech stream: The rhythm of spoken English*. [Student and Teacher's Text]. Urbana: University of Illinois Press.

Dickerson, W. B. (1994). Empowering students with predictive skills. In J. Morley (Ed.), *Pronunciation pedagogy and theory: New views, new directions* (pp. 17-33). Alexandria, VA: TESOL Publications.

Dickerson, W. B. (2002). Grading pronunciation progress: The roles of absolute and relative scales. In W. Davis, J. Smith, & R. Smith (Eds.), *Ready to Teach* (pp. 59-166). New Forums Press, Inc..

Eckstein, G. T. (2007). *A correlation of pronunciation learning strategies with spontaneous English pronunciation of adult ESL learners* (Unpublished master's thesis). Brigham Young University, Provo, UT.

Green, J. & Oxford, R. L. (1995). A closer look at learning strategies, L2 proficiency, and gender. *TESOL Quarterly* 29(2), 261–297.

Hahn, L. & Dickerson, W. (1999a). *Speechcraft: Discourse pronunciation for advanced learners.* Ann Arbor: University of Michigan Press.

Hahn, L. & Dickerson, W. (1999b). *Speechcraft: Workbook for academic discourse.* Ann Arbor: University of Michigan Press.

Hair, J. F. & Black, W. C. (2000). Cluster analysis. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding more multivariate statistics* (pp. 147-205). Washington, DC: American Psychological Association.

Ingels, S. A. (2011). *The effects of self-monitoring strategy use on the pronunciation of learners of English.* Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign. Retrieved from http://hdl.handle.net/2142/26259

Kojic-Sabo, I. & Lightbown, P. M. (1999). Students' approaches to vocabulary learning and their relationship to success. *Modern Language Journal, 83*(2), 176-192.

Moyer, A. (1999). Ultimate attainment in L2 phonology: The critical factors of age, motivation, and instruction. *Studies in Second Language Acquisition, 21,* 81-108.

Osburne, A. G. (2003). Pronunciation strategies of advanced ESOL learners. *IRAL, 41,* 131-143.

Oxford, R. L. (1996). *Language learning strategies around the world: Cross-cultural perspectives* (Tech. Rep. No. 13). Honolulu, HI: Second Language Teaching and Curriculum Center, University of Hawaii Press.

Oxford, R. L. (2003). Language learning styles and strategies: Concepts and relationships. *IRAL, 41*, 271-278.

Oxford, R., Cho, Y., Leung, S. and Kim, H. (2004). Effect of the presence and difficulty of task on strategy use: An exploratory study. IRAL (International Review of Applied Linguistics in Language Teaching, 42, 1-47.]

Pawlak, M. (2010). Designing and piloting a tool for the measurement of the use of pronunciation learning strategies. *Research in Language, 8,* 189-202.

Peterson, S. S. (1997). *Pronunciation learning strategies and learning strategies related to pronunciation ability in American university students studying Spanish* (Unpublished doctoral dissertation). The Ohio State University, Columbus.

Rees-Miller, J. (1993). A critical appraisal of learner training: Theoretical bases and teaching implications. *TESOL Quarterly, 27*, 679-689.

Rubin, J., Chamot, A. U., Harris, V. & Anderson, N. J. (2007). Intervening in the use of strategies. In A. D. Cohen & E. Macaro (Eds.), *Language learner strategies* (pp. 141-164). Oxford, UK: Oxford University Press.

Rysiewicz, J. (2008). Cognitive profiles of (un)successful FL learners: A cluster analytical study. *The Modern Language Journal, 29*(1), 87-99.

Sardegna, V. G. (2008 April). *Pronunciation learning strategies that work.* Paper presented at the 42nd Annual TESOL Convention and Exhibit, New York, NY.

Sardegna, V. G. (2009). *Improving English stress through pronunciation learning strategies.* Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign (UMI No. 3363085).

Sardegna, V. G. (2011). Pronunciation learning strategies that improve ESL learners' linking. In. J. Levis & K. LeVelle (Eds.). *Proceedings of the 2nd Pronunciation in Second Language Learning and Teaching Conference,* Sept. 2010. (pp. 105-121), Ames, IA: Iowa State University.

Smit, U. (2002). The interaction of motivation and achievement in advanced EFL pronunciation learners. *IRAL, 40,* 89-116.

White, C., Schramm, K. & Chamot, A. U. (2007). Research methods in strategy research: Re-examining the toolbox. In A. D. Cohen & E. Macaro (Eds.), *Language learner strategies* (pp. 93-116). Oxford, K: Oxford University Press.

Yamamori, K., Isoda, T., Hiromori, T. & Oxford, R. L. (2003). Using cluster analysis to uncover L2 learner differences in strategy use, will to learn, and achievement over time. *IRAL, 41*, 381-409.

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25,* 82-91.