Socio-Interactive Practices and Personality in Adult Learners of English With Little Formal Education

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Drawing on a large corpus of video-recorded classroom data, the goal of this study was to understand the processes and mechanisms associated with learning in individuals who have had little education in their home countries. In order to accomplish this goal, we measured the socio-interactive behaviors and the expression of personality behaviors in learners who attended classes to learn English as a second language, and we analyzed the relationship between socio-interactive behaviors and personality with literacy test scores. The results showed that low-education learners behaved differently in the classroom than high-education learners. Socio-interactive behaviors and personality behaviors were related to literacy test scores. Implications of educational background on learning are discussed as well as the limitations and unique contributions of this study.

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Keywords learning; second language acquisition; personality; social behaviors; adult English learners; limited formal education; mixed methods designs

Research in applied linguistics and education has suggested for some time that the amount of education immigrant adults receive in their native languages in their sending countries is a strong predictor of the effectiveness of English language training and, subsequently, of their acquisition of English in the United States (Alcala, 2000; Condelli, 2006; Condelli & Wrigley, 2003; Condelli, Wrigley, & Yoon, 2008; Earl-Castillo, 1990; Reder & Cohn, 1984; Strom & Young-Scholten, 2004). Our team's own analyses of state and national administrative data from federally funded adult English as a second or other language (ESOL) programs also show strong correlations between educational background and second language acquisition (SLA), whether measured by gains on standardized language proficiency tests or by progress through levels of instructional programs (Reder et al., 2006). What research has not made clear, however, is *why* adults with less education acquire second languages (L2s) more slowly or why they progress more slowly through language learning programs. Although researchers have long argued (e.g., Bruner, Oliver, & Greenfield, 1966; Burt, Peyton, & Adams, 2003; Cole, Gay, Glick, & Sharp, 1971; Galimore & Au, 1998; Goody, 1977; Mehan, 1979; Scribner & Cole, 1981; among others) that schooling experience has cognitive and interactional consequences that may support a broad range of learning, including L2 and literacy learning, standard compendia of SLA research (Doughty & Long, 2003; Ellis, 1994; Gass & Selinker, 2001) and a recent comprehensive review of individual differences in SLA (e.g., Dörnyei, 2005) do not mention effects of first-language (L1) education or literacy for learners.

The research cited as well as our own preliminary analyses suggest that it may be that for a population of adult learners of English who have little formal education, the socio-interactive practices required in formal classrooms limit their ability to learn. We have seen that knowing how to participate in the interactional pedagogical activities of a classroom is problematic for this population of learners. Drawing on data from a longitudinal corpus of video-recorded classroom interaction, one purpose of this study was to investigate the relationship among various configurations of student interaction in formal educational settings (classrooms) to come to an understanding of the causes for the slow development of English language acquisition for this particular population of immigrants to the United States. This database allows us to show the processes for learning by adults with different levels of formal education. Access to classroom video-recording provides the unique opportunity to see learners

as they participate in classrooms, enriching previous research on learners with little formal education that has focused primarily on literacy.

The video data allow us to address how it is that learners with little experience in formal educational settings learn to participate in practices for classroom interaction during language learning. The practices that we focus on in this investigation are those that relate to social interaction and learning. *Socio-interactive practices* such as starting tasks, asking classroom participants for help, giving help to other participants, assuming the expert role (among others) were seen as fundamental in allowing students to be able to understand the content of the classes as well as the sequence of use of that content. Furthermore, our preliminary observations suggested that *personality* factors also play a role in learning the ways and forms of knowledge production in formal education settings. For learners with relatively little such experience, extroversion and introversion, for example, seemed to play a role in the degree to which interaction with teachers, peers, and subject matter concepts is important as a way to learn how to learn in formal settings

Socio-Interactive Practices in Classrooms and Learning

The organization of social interaction in formal educational institutions is different from that of everyday life. Formal education requires interactions that are separate from interactions and context of daily life. These interactions are carried out in a special setting and use specific types of interactional routines (Hellermann, 2005; Mehan, 1979; Sinclair & Coulthard, 1975).

These interactional routines in formal educational settings are done to foster the development of particular cognitive skills (Scribner & Cole, 1973). Children and adults with experience in formal education learn to recognize and organize nonutilitarian, abstract concepts and categorizations, as that is how formal education is organized. These schooled individuals learn to use metastrategies for organizing such abstract information so that it can be used in different but related contexts within formal educational settings (Cole, 1978; Scribner & Cole, 1981). The experience of schooling allows adults to generalize problem solving strategies across contexts and to explain them (Scribner & Cole, 1973; Sharp, Cole, & Lave, 1979). For example, the recall of random lists of numbers seems easier for adults with experience in formal education perhaps because they have developed ways to organize such information. Although little research has addressed the issue of the effect of schooling on the progress of adult language learners, what findings there are show positive correlations between learning and amount of schooling (Green & Reder, 1986;

Reder et al., 2010). These studies are not able to point to causes for such progress but suggest that the experiences talking about, using, and categorizing abstract concepts allow adults to develop skills that are crucial for organizing the information presented in formal classrooms, including language-learning classrooms.

Informal learning is embedded in the social world, where the purpose of an activity to be learned is clear both visually and from custom (Lave & Wenger, 1991). In informal learning settings, learning occurs through inter-action with a more proficient member who is accomplishing work such that the purpose is clear to the learner. In contrast, learning in formal institutional settings uses language almost exclusively to exchange information in interactions without functions that correspond to interactions in nonschool contexts (Scribner & Cole, 1973). Adult language-learning students without a great deal of experience with formal education have likely experienced learning in this apprentice-mentor or socialization model in which observation and learning through practice allows one to move from legitimate peripheral participation to fuller participation through contextualized practice (Hardman, 1999; Klassen & Burnaby, 1993; Lave & Wenger, 1991). The contextualized, culturally bound ways that adults without formal education produce and transmit knowledge have not been as valued in formal educational settings, where learning has become abstracted into problem-solving activities (Cazden, John, & Hymes, 1972; Heath, 1983; Phillips, 1972; Watson-Gegeo & Boggs, 1977).

Formal educational settings present those with little experience with formal education with the need to adjust to a new social and cultural environment. Given the newness of this context, these learners often lack confidence in the procedures for learning in classrooms (Williams & Chapman, 2007). These learners may also struggle in classrooms in which teachers rely on written language to present new language for learning, typical in formal learning settings. Because literacy is usually associated with educational experience, formal learning settings provide even more of a challenge for low-education learners (Whiteside, 2008).

Although research has shown how literacy background does influence language learning, for example, L2 oral development (Tarone, Bigelow, & Hansen, 2007), our goal is to consider how other practices of schooling may influence classroom language learning. Literacy and schooling are highly correlated and it has proven difficult to tease apart their independent effects (Scribner & Cole, 1978). Given our particular data source, we see an opportunity to look for schooling effects other than literacy that play a role in classroom language learning.

Effective interaction with teacher, peers, and subject matter concepts will, likely, also depend on the degree to which students without a great deal of formal education learn the ways and forms of knowledge production learned in formal educational settings. Our study is intended to help us better understand how classroom socio-interactional factors might influence language learning in the classroom among this population.

Although we know what cognitive, cultural, and literacy skills enable students with educational experience to succeed in classroom learning contexts, we do not know how adult learners without these skills interact in formal settings, settings in which particular socio-interactive practices for learning are required for success in these types of cognitive and cultural activities. Without a better understanding of how the various influences of educational background impact processes of classroom learning, we cannot determine appropriate changes to attempt to overcome differing success rates of learners with different experiences with formal education.

The theoretical perspective grounding our research sees language acquisition as stimulated by learners negotiating with other learners in socio-interactive practices in their classrooms (Kramsch, 2002; Long, 1996). Through their socio-interactive practices and the linguistic and interactive modifications entailed in the negotiation, learners identify gaps in their knowledge of language and language use. Working with various mediational means, including written texts, knowledge of the world, and their peer's language, learners acquire language elements that fill the gaps in their knowledge and move closer to their goals for language acquisition. Our methods, focusing both on linguistic and socio-interactive systems, and our extensive and unprecedented database of video-recordings of formal learning settings will allow us to see the socio-interactive processes that are involved in participating and learning in formal educational settings.

Personality and Learning

The relationship between personality and language learning has been widely researched (e.g., Dörnyei, 2005; Verhoeven & Vermeer, 2002). One of the personality dimensions that has been found to be associated with L2 learning is extraversion-introversion (Dewaele & Furnham, 1999, 2000). An extraverted individual is someone who is talkative, is sociable, and prefers to be with people and in large groups. An extravert is also someone who is assertive, is active, likes excitement and stimulation, and is generally an impulsive individual (Eysenck & Eysenck, 1975; McCrae & Costa 1999). In contrast, introverted individuals

are quiet, reserved, introspective, distant, less outgoing, and less involved in the social world (Eysenck & Eysenck, 1968). Researchers support the idea that extraversion is related to better language performance; however, the research that has tested this proposal has been inconclusive (for a review, see Dewaele & Furnham, 1999).

Although some studies found that extraverts score higher in oral production tasks than introverts (Dewaele & Furnham, 2000), other studies did not find such a relationship (Busch, 1982; Oya, Manalo, & Greenwood, 2004). Additionally, the findings become more mixed depending on whether researchers are measuring personality and language performance in informal or formal settings (Dewaele & Furnham, 2000), if the language assessments used are written or oral (Dewaele & Furnham, 1999), or if studies are done in the United States in an ESL setting (e.g., Carrell & Monroe, 1993) or with a homogenous group of people studying in an EFL setting (Carrell, Prince, & Astika, 1996; Oya et al., 2004).

In this investigation, we attempted to provide another piece of information to the puzzling findings on personality and L2 learning. Specifically, instead of analyzing stable traits of personality, we observed introversion-extraversion behaviors as learners participated in classes to learn English as a second language. Furthermore, we focus our observations on low-education learners, a population that has been overlooked in the literature.

Study Overview

There are three specific goals for this study. The first goal was to analyze differences in socio-interactive practices between learners who have had little or no formal education in their home countries and learners who have had formal education in their home countries (i.e., high-education learners) before they attended classes to learn English as a second language in the United States. In order to accomplish this goal, first preliminary *qualitative* observational analyses were done to uncover the socio-interactive practices relevant for this study. Then *quantitative* observational analyses were done (e.g., Longabaugh, 1980; Streeck & Mehus, 2005) to observe mean differences in socio-interactive practices between high-education learners and low-education learners.

The second goal was to observe how behavioral personality relates to levels of previous educational experience. Specifically, we quantified learners' displays of introversion-extraversion behaviors and then observed how the low-education learners' differed from high-education learners on those measures.

The third goal of this study was to analyze the degree to which both the socio-interactive practices and displays of introversion-extraversion relate to scores in standardized assessment measures in both low- and high-education learners.

Method

Step 1: Qualitative Observational Analyses: Establishing Socio-Interactive Practices

Data Collection

The data for the study were drawn from a large corpus of data on adult learners of English collected and stored on a secure server at Portland State University. The Multimedia Adult English Learner Corpus (MAELC) was collected in collaboration between Portland State University and Portland Community College. As part of this development, Portland Community College opened a satellite site for ESOL instruction at Portland State University, which became the Adult ESOL Lab School. At the Labsite,[1] classes were held in two classrooms for four consecutive years (2001–2005). Almost 700 students participated in classes at the Labsite. MAELC includes a number of long-term outcome measures for the adult learners who participated in classes at the Labsite, including students' program participation, hours of instruction, formal education experience, age, and standardized assessments of language proficiency for almost all students at the Labsite. Although the primary data were collected at the Labsite during the 4 years of classes there, the database also includes long-term outcome data, including the Portland Community College courses and hours of attendance for those courses taken by students from the Labsite for up to 5 years after leaving classes at the Labsite.

The most important aspect of MAELC, however, is the inclusion of almost 4,000 hours of recorded classroom interaction made by each of six cameras and five microphones in each of two classrooms at the Labsite (Reder, Harris, & Setzler, 2003). Of the six cameras in each classroom, two were mobile and were operated manually from outside the classroom. These cameras focused on pairs of students who were seated next to one another and were wearing wireless microphones. This technology allowed for the collection of high-quality audio and video documentation of learner-learner and teacher-learner interaction in classroom tasks for language acquisition. While the two mobile cameras in each classroom captured details of learner-learner task interaction, the other four fixed-focus cameras covered the rest of the classroom so that crucial details for understanding the classroom (including the position of the

teacher and other learners relative to the focal pairs) can be observed. This extensive video-recorded coverage of classrooms is unprecedented and allows for a thorough video-based analysis of classroom participation.

These video data were stored on a secure server and retrieved and played for analysis using ClassAction Toolbox (copyrighted by Steve Reder, Portland State University). The Toolbox program allowed analysts to see the six camera views of the classroom simultaneously and to choose any one of the six camera views for closer viewing (Reder et al., 2003). For a display of Toolbox, see Figure S1 in the online Supporting Information.

Together with the recordings, associated written materials (handouts from the teacher, student writing) were collected and are attached to the media files. Standardized assessment measures and statistics on hours of instruction, L1 education, and program participation for the students in the database are available for understanding correlations between success or lack of success in English language acquisition and our own socio-interactional and personality variables from the video-based analysis.

Establishing Socio-Interactive Practices

At the start of the project, our research team saw that established coding models used to understand language learning in classrooms were developed to study language learning among highly educated, highly proficient learners (Harris, 2005). With that consideration, we started the investigation with *qualitative*, video-based observation in order to uncover interactional and learning be-haviors of our focal participants. Such methods can be described, generally, as microethnographic (Erickson & Schultz, 1981; Streeck & Mehus, 2005). Microethnographic methods approach the rich description for research (char-acteristic of ethnography) with a focus toward observations of rich micro-level detail in moment-to-moment interactions. The observations are done via re-peated observations of video, which allows for the focus on micro-level details. These details include the sequential organization of discourse, nonverbal be-havior, and the use and orientation to material objects in the local environment that are used to organize the interactions of participants.

Using our project's proprietary software, we searched our database of in-formation on almost 700 participating students for information on student achievement, including standardized language assessment measures, atten-dance, progress through the college's ESOL system, and previous L1 education. With this information, we identified a subset of four learners who had little for-mal education. Only four learners were chosen for the initial analysis due to limitations on time for our funded research. Over a period of 9 months,

investigators conducted in-depth analyses of these focal learners. Each investigator observed and analyzed one learner on their first day in the classroom, their first class wearing the microphone, and at least one class day for each term the student was in the ESOL classes at the data collection site. All classes were 3 hours long and learners spent time in a variety of groupings, including teacher-fronted whole-group activities and small-group activities. During most class periods, some amount of time was devoted to pair activities. For pair activities, teachers matched learners with a peer, either with the same or different levels of educational experience and language-cultural background. The participation structures were not controlled by the researchers but are representative of community college all-skills ESOL classrooms in the United States.

After their individual analyses, the researchers came together regularly to share and discuss each observational analysis, their findings, and interpretations. The investigators then repeated the process with a different focal learner until each investigator had completed an in-depth analysis of each focal learner. These group sessions helped us to ensure the reliability of the observations and interpretations. From these sets of triangulated observations, we then established a preliminary set of descriptive codes. After pilot testing, we kept the categories that could be coded reliably. The process resulted in the socio-interactive practices and coding inventory that included interactional and personality variables in the classroom.

Socio-Interactive Practices and Personality Coding Inventory
This inventory comprised five category clusters: learner's *language-learning tasks* (e.g., the learner understands the activity, starts the activity, engages in extra learning behavior), *resources* (e.g., the learner uses the blackboard, uses other learning resources, asks for help), *engagement* (e.g., the learner enjoys the activity; pays attention), *personality* (e.g., the learner displays extraverted behaviors; introverted behaviors), and *interaction* (e.g., the learner assumes the novice role; the expert role). The inventory coding categories are nonexhaustive and nonmutually exclusive; that is, coding categories only exist for visually detectible behaviors and several categories can apply within a single observation (e.g., the learner is using a learning resource while enjoying the activity; the learner is assuming the expert role and displaying an extravert behavior).

The coding inventory was first tested to observe how reliable the selected categories were. Specifically, three coders observed and coded three learners for 2 minutes every 10 minutes of a 3-hour class session. Then each category's reliability was tested to observe the degree of agreement across coders. Based on these analyses, seven unreliable categories were removed. Another eight

Table 1 Socio-interactive practices and personality coding inventory

Socio-Interactive Practices Categories	
Starting	If the learner started the activity immediately after the teacher gave the instructions
Not Starting	If the learner *did not* start the activity immediately after the teacher gave the instructions
Asks for Help	If the learner asked for help during an activity
Gives Help	If the learner offered help to someone else
Receives Help	If the learner received help without asking for it
Does Not Flow	When interacting with others in group or dyad activities, if the interaction did not flow
Expert Role	When interacting with others in group or dyad activities, if the learner displayed the role of expert; for example, if the learner displayed that he/she knew the activity and guided others on how to do the activity.
Novice Role	When interacting with others in group or dyad activities, if the learner displayed the role of novice; for example, if the learner chose to observe how others did the activity, instead of having the initiative to start the activity.
Personality Categories	
Extraversion	If the learner displayed an extraverted personality; for example if the learner was talkative, was not shy to ask questions, used a loud voice, laughed loudly, assertively responded to teacher questions, or any other behavior that the coders would consider a display of extraversion
Introversion	If the learner displayed an introverted personality; for example if the learner was quiet, did not ask questions, if his/her voice was difficult to hear, or any other behavior that the coders would consider a display of introversion

Note. Following the link http://www.labschool.pdx.edu/Viewer/viewer.php?pl=sociointeractiveandpersonalityillustration, readers will be able to download a browser plug-in to view video clips from the classroom that illustrate these categories. The clips are available for those who are able to download the browser plug-in (i.e., for those who have administrator privileges on the computer) and who are using Internet Explorer with a Windows operating system.

categories were removed because the frequencies of their behaviors were close to zero. The resulting final coding inventory had eight socio-interactive categories and two personality categories. Table 1 offers definitions and a link to an illustrative video clip for some of the categories.[2]

Step 2: Quantitative Observational Analyses: Establishing Percentage of Time Learners Engaged in Each Behavior

Selecting the Learners

As in our preliminary observational analyses, we used the proprietary software (Toolbox) to search for two groups of learners. In the first group were learners with little experience with formal education. We chose students with 6 or fewer years of education for this group based on previous research on low-literacy students (Elmeroth, 2003; Florez & Terrill, 2003; Hood & Joyce, 1995) and based on research suggesting that 8 years or more of schooling may cause significant cognitive changes (Scribner & Cole, 1981). Although there is not a qualitatively sharp threshold at a given number of years of schooling, 6 years is a line that is traditionally drawn. Six years of schooling is often the point at which learners experience school system changes and, in developing countries, major contextual shifts as well. Children may leave home to attend middle or high school and, in many cases, the language of instruction will change as well. In the second group were students with 12 or more years of formal education. Because there is no qualitatively sharp threshold for years of schooling, we selected the approximate years of high school completion to avoid possible confusion. We were confident that learners in the second group were experienced with formal schooling.

Information on the level of education for each student was collected in multiple ways for the purposes of accuracy. In order of increasing confidence in its accuracy, students were asked the number of years that they had attended school during the admission process for the ESOL program. Specifically, they were asked to write this information on their standardized test form and were asked again by their teacher during a second short writing assessment when placed into a particular class. Students enrolled in a related in-home interview study were asked a third time about their years of formal education by a bilingual interviewer using the student's L1. We used the most accurate information available for each learner.

All of the learners in the study were in their first class of beginning English as a second language at the time they were initially recorded. All had been placed into the same beginning level (although in different terms) by the program placement procedures, which included a listening test, a short interview, and a writing sample from a picture prompt. Standardized assessment measures (a listening and literacy test) were given each term in all classes at the Labsite (this was the same procedure done at all the other community college program sites). Due to issues with attendance common to adult learners, by chance, the standardized listening test scores were not taken as regularly by our focal

students as the standardized literacy test, and only the latter scores could be used for statistical analyses (see Step 3 for a fuller explanation of this test).

The Selected Learners

Twenty learners from the MAELC database were selected according to their level of education. The mean years of education for the 10 low-education learners (mean age = 38.8, *SD* = 17.78, and half were women) was 4.4 (*SD* = 2.50). The mean years of education for the 10 high-education learners (mean age = 39, *SD* = 12.44, and 9 were women) was 13.7 (*SD* = 2.31). Of the low-education learners, six reported that their L1 was Spanish, one French, two Chinese, and one Somali. Of the high-education learners, six reported that their L1 was Spanish, three Chinese, and one Vietnamese. There were relatively few learners with little formal education in the database who had regular attendance compared to those with high levels of formal education and that limited our selection of students to code to a total of 20.

Coding Procedure

Five coders were recruited to code the low-education learners (coders' mean age = 26.20, *SD* = 6.69, 3 were women), and five coders were recruited to code the high-education learners (coders' mean age = 26.80, *SD* = 7.01, all were women). All coders were white U.S. Americans from the Seattle area and were paid. The coding work took place at the Institute for Learning and Brain Sciences at the University of Washington. Coders received an hour of training. During this hour, coders were trained in the meaning of each category and were taught to use the Toolbox software so they could access streamed video-recordings of the focal learners for the selected date and classroom. After training, the coders observed and listened to each learner for 2 minutes every 10 minutes during a 3-hour class (i.e., coders did 170 observations). For each observation, coders recorded a 1 if any of the categories applied to that observation. The coding procedure took approximately 10 hours for each coder (i.e., 1 hour per learner).[3]

Data Preparation

First, we tested the degree to which coders agreed with each other. Intraclass correlations based on a two-way random effect model (ICC [2, k]; Shrout & Fleiss, 1979) were calculated for each category for the low-education learners' coders and the high-education learners' coders independently. Two categories (i.e., *not starting*, *does not flow*) were removed from further analyses because the intraclass correlations were low and not significant at the .001 level. The

average intraclass correlations for the remaining eight categories were .63 for
the low-education learners' coders and .71 for the high-education learners'
coders. A second step was to convert the raw codings from each coder into
relative time-use estimates by calculating the percentage of time the person
engaged in a certain behavior during the 3-hour class (e.g., the percentage
of time the learner asked for help during the 3-hour session class). Finally,
we averaged the ratings across coders for the high-education learners and the
low-education learners.

Correlations Between Socio-Interactive Practices and Personality Behaviors
In order to observe if averaged ratings were intuitively perceived in the expected
direction, we performed correlations between the socio-interactive practices
and personality behaviors across the 20 learners. Significant correlations went
in the logical expected direction. For example, the more frequent introverted
behaviors the learners showed, the less frequently they started the activity ($r = -.47, p < .05$) and the more they assumed the novice role ($r = .46, p < .05$).
Whereas the more frequently the learners displayed extraverted behaviors, the
more frequently they started the activity ($r = .66, p < .001$), helped others ($r = .57, p < .01$), and assumed the expert role ($r = .63, p < .01$) but the less often
they displayed a novice role ($r = -.48, p < .05$) in their interactions.

Step 3: Assessing Literacy Using Standardized Measures
The final step of this investigation was to use a standardized measure to assess
literacy. This was done so we could accomplish one of the goals of this study,
which was to observe the degree to which both the socio-interactive practices
and behaviors of personality relate to scores on standardized assessment mea-
sures in both low- and high-education learners. We used the BEST Literacy
Assessment.[4]

BEST Literacy Assessment
Developed in 2006 by the Center for Applied Linguistics (CAL) as an updated
version of the Basic English Skills Test (BEST), the BEST literacy test measures
reading and writing literacy skills of adult English language learners. It is
administered and scored locally, with scores of both the writing and reading
sections translated into two scale scores that are then summed into a final
scale score (i.e., sum writing and reading). It constitutes a competence-based
assessment that tests ESOL learners' ability to use survival-level English and is
used by educational programs to test, place, and provide remedial instruction to
adult learners. The test's validity has been established by matching the content of

its skills to real-life language tasks performed by ESOL learners. Correlations between teacher ratings of their students' proficiency and correlations among the reading, writing, and total scale scores provide confirmation of the validity of each test component (Center for Applied Linguistics, 2008). At the Lab School, the BEST Literacy Assessment was administered systematically (one time per term). All the learners selected in this study had taken the BEST Literacy Assessment at least two times while taking ESOL classes at the Lab School.

Test Scores in High- and Low-Education Learners
In order to observe if there were significant differences for test scores across time (i.e., Test at Occasion 1 vs. Test at Occasion 2) and across groups (i.e., low-education vs. high-education learners), we performed an ANCOVA with repeated measures on the variable Occasion. This was done independently for each BEST Literacy dimension: Reading, Writing, and the Sum of Reading and Writing. In order to control for number of months between Test at Occasion 1 and Test at Occasion 2, the analyses were done using as a covariate the number of months.

BEST Reading
A significant main effect was found for group $F(1, 17) = 13.49$, $p < .01$. Pairwise comparison with Bonferroni correction showed that low-education learners' test scores were lower than high-education learners (mean = 15.53 and 31.56, respectively, $p < .01$). No significant interactions were found between Occasion and Group. Note that although it did not reach significance, learners' means were higher on Occasion 2 than Occasion 1 (Time 1 mean = 22. 85, $SD = 12.06$; Time 2 mean = 24.25, $SD = 12.55$).

BEST Writing
The ANCOVA results showed a significant main effect for group, $F(1, 17) = 17.14$, $p = .001$. Pairwise comparison with Bonferroni correction showed that low-education learners' test scores were lower than high-education learners' (mean = 8.59 and 17.06, respectively, $p < .001$). No significant main effects were found for Occasion and no significant interaction between Time and Group.

Sum BEST Reading and Writing
The ANCOVA results showed a significant main effect for Occasion, $F(1, 17) = 4.71$, $p < .05$. Pairwise comparison with Bonferroni correction showed
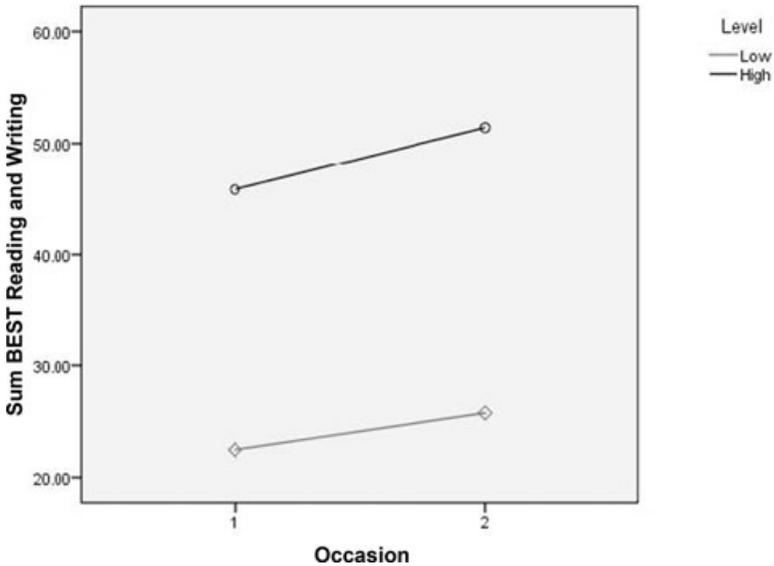
Figure 1 Sum BEST scores at Occasion 1 and Occasion 2 for low- and high-education learners.

that scores at Occasion 1 were significantly lower than at Occasion 2 (mean = 34.15 and 38.60, respectively, $p < .01$). A significant main effect was found for Group, $F(1, 17) = 16.65$, $p < .001$. Pairwise comparison with Bonferroni correction showed that low-education learners' test scores were lower than high-education learners' scores (mean = 24.12 and 48.62, respectively, $p < .001$). No significant interactions were found between Occasion and Group. Note that although both groups increase their test scores, the low-education learners' test score at Occasion 2 is significantly lower than the high-education learners' test score at Occasion 1 (mean = 25.77 and .45.82, respectively). See Figure 1 for an illustration.

Results

Goal 1: Testing If Low-Education Learners Differ From High-Education Learners in Socio-Interactive Practices

Independent t-tests were done across the six socio-interactive practice categories to observe differences across low- and high-education learners. Table 2 shows means, standard deviations, t-test scores, and effect sizes. The results indicate that low-education learners assumed the novice role a significantly higher

Table 2 Low- and high-education learners' socio-interactive practices in a classroom setting: Testing Goal 1

	Low-education learners		High-education learners		Significance tests		
	Mean	SD	Mean	SD	t-Value	p-Value	d-Value
Starting	29.88	11.54	39.53	10.83	−1.93	.07	−0.83
Asks for Help	4.82	4.35	9.06	8.17	−1.14	.16	−0.49
Gives Help	10.59	7.94	10.24	6.95	11	.92	0.05
Receives Help	10.82	5.81	10.82	7.27	0	1	0
Expert Role	12.59	14.35	11.18	10.61	0.86	.4	0.17
Novice Role	20	10.91	4.59	6.71	3.8	.001	1.63

Note. Mean indicates the average percentage of time learners engaged in each social behavior, d-value = Cohen's d.

percentage of the time than high-education learners, with a statistically significant and very large difference of $d = 1.63$. Other interesting findings were that low-education learners tended to start peer dyadic interactions a lower percentage of the time than high-education learners and that low-education learners tended to ask for help a lower percentage of the time than high-education learners. Note that although group differences for these two categories did not reach significance, the effect sizes for each category were large to medium size (i.e., Cohen's $d = -0.83$ for Starting and -0.49 for Asks for Help), which suggests that in this study we may have lacked statistical power due to the small sample size. Low- and high-education learners did not differ in the other three socio-interactive practices categories (*gives help, receives help, expert role*).

Goal 2: Testing If Low-Education Learners Differ From High-Education Learners in Personality Behaviors
Figure 2 shows the mean percentage of time that coders perceived the learners' extraverted and introverted behaviors. The results show that the percentage of time that the low-education learners displayed behavioral extraversion was lower than the percentage of time for a similar display by the high-education learners (low-education mean $= 19.88$, $SD = 14.14$ and high-education mean $= 34.24$, $SD = 20.84$, t-value $= -1.80$, $p = .08$, $d = -0.77$). Likewise, low-education learners displayed behavioral introversion a greater percentage of the time compared to the high-education learners (low-education mean $= 29.06$, $SD = 11.31$ and high-education mean $= 17.65$, $SD = 14.47$, t-value $= 1.95$, $p = .06$, $d = 0.83$).
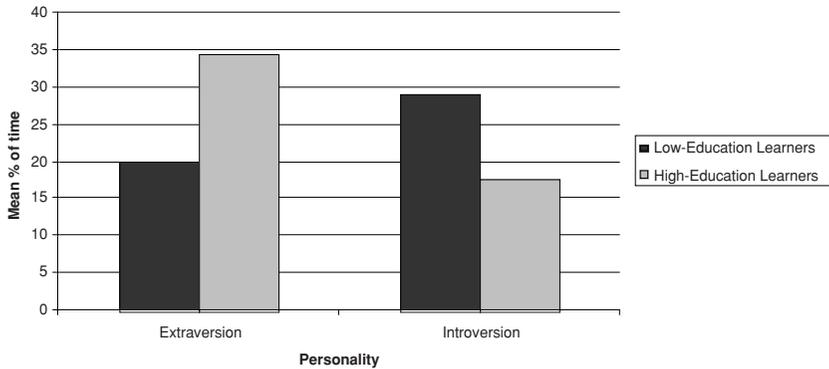
Figure 2 Low- and high-education learners' behavioral personality in a classroom setting: Testing Goal 2. *Note*. Cohen's $d = -0.77$ for Extraversion, and 0.83 for Introversion.

Goal 3: Correlating Standardized Test Scores With Behavioral Measures

In order to observe if BEST Literacy scores correlate with behavioral measures, we averaged scores for Time 1 and Time 2 for Reading, Writing and the Sum of Reading and Writing. Then, using the standardized scores, we observed if there were outliers in the sample for the each of the averaged BEST scores and the behavioral variables. Five outliers were found: one for the average of Writing, one for Starting, one for Asks for Help, one for Receives Help, and one for Novice Role. Finally, we correlated the three averaged BEST composites with the eight behavioral variables removing the outliers. The outliers were removed because the sample was small and one or two people could influence the regression score. Table 3 shows the Pearson correlations and sample size for each correlation. Results show that for the categories of socio-interactive practices, positive correlations were found for Starting and negative correlations for Novice Role. This means that the more learners start their activities, the better scores they have, and the more they take the novice role, the lower their test scores. For personality, Introversion correlated negatively and Extraversion positively with test scores. This means that the more learners expressed introverted behaviors, the lower their test scores; likewise, the more that the learners expressed extraverted behaviors, the higher their test scores.[5]

Further analyses were done for those correlations that were significant in order to observe differences across low- and high-education learners for socio-interactive practices (see Figure 3) and personality (see Figure 4).

Table 3 Correlations between average of BEST scores and behavioral categories: Testing Goal 3

Behavioral categories	BEST		
	Reading	Writing	Sum Reading and Writing
Socio-interactive practices			
Starting	.48*	.30	.48*
N	19	18	19
Asks for Help	−.00	.11	.01
N	19	18	19
Gives Help	.11	.13	.11
N	20	19	20
Receives Help	−.26	−.23	−.25
N	19	18	19
Expert Role	.24	.07	.18
N	20	19	20
Novice Role	−.70***	−.63**	−.69***
N	19	18	19
Personality			
Introversion	−.64**	−.67**	−.65**
N	20	19	20
Extraversion	.53*	.51*	.51*
N	20	19	20

Note. BEST = average of BEST at Time 1 and BEST at Time 2; N = sample size.
*$p < .05$. **$p < .01$. ***$p < .001$ (see Note 6).

Figures 3 and 4 show scatterplots for correlations between the behavioral and personality variables and each of the literacy scores composites (i.e., average for Writing, Reading, and the Sum of Writing and Reading). Note in the figures that black squares and the dark regression square line represent the low-education learners; likewise, gray dots and the gray dotted square regression line represent the high-education learners. Figure 3 shows the scatterplots for Starting (see Panel A) and Novice Role (see Panel B). Results indicate that for Starting, there were only significant correlations for high-education learners for the Average of Reading and the Sum of Reading and Writing (Pearson = .77, $p < .01$ and .74, $p < .05$, respectively). For Novice Role, the strongest correlation found was with Average of BEST Writing for the high education learners (Pearson = −.60, $p = .09$).

Figure 4 shows the scatterplots for Introversion (see Panel A) and Extraversion (see Panel B). Results indicate that for Introversion, there were only
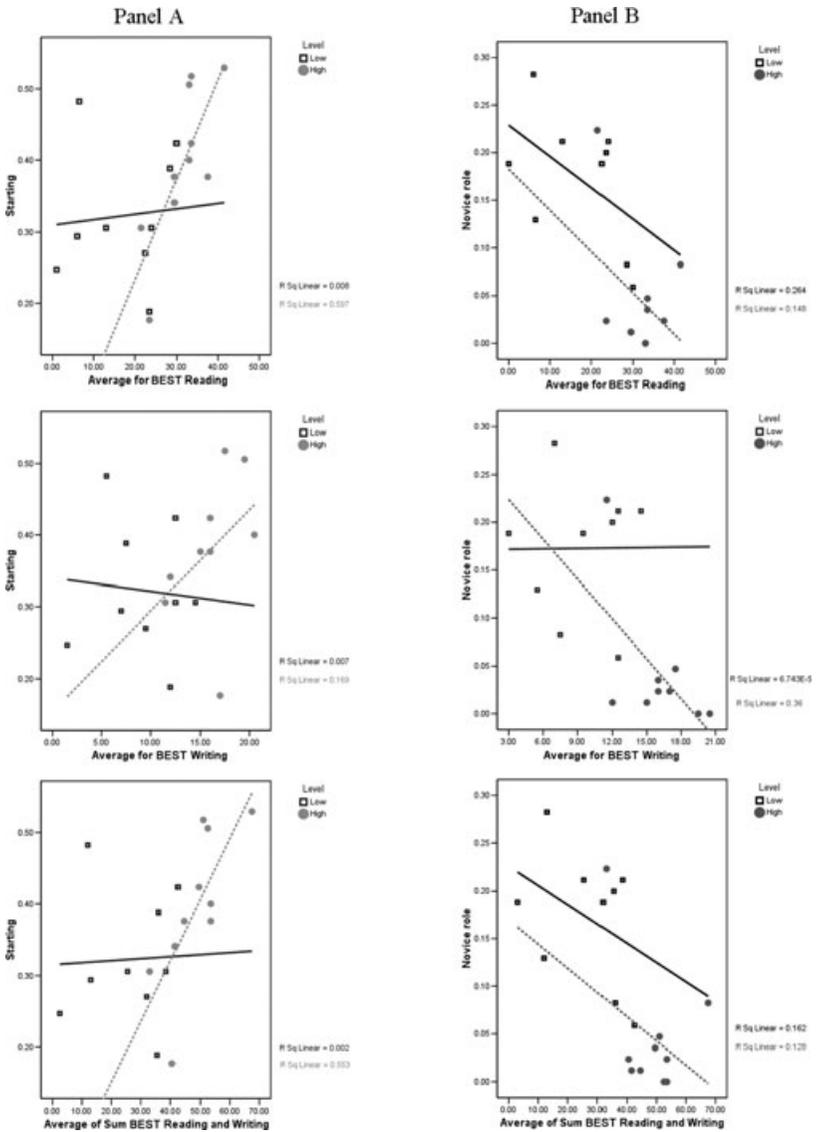
Figure 3 Correlations between socio-interactive practices and BEST scores: Testing Goal 3.

significant correlations for low-education learners for the Average of Reading, Writing, and the Sum of Reading and Writing (Pearson $= -.73$; $-.73$, and $-.76$, respectively; all p-values $< .05$). For Extraversion, the strongest
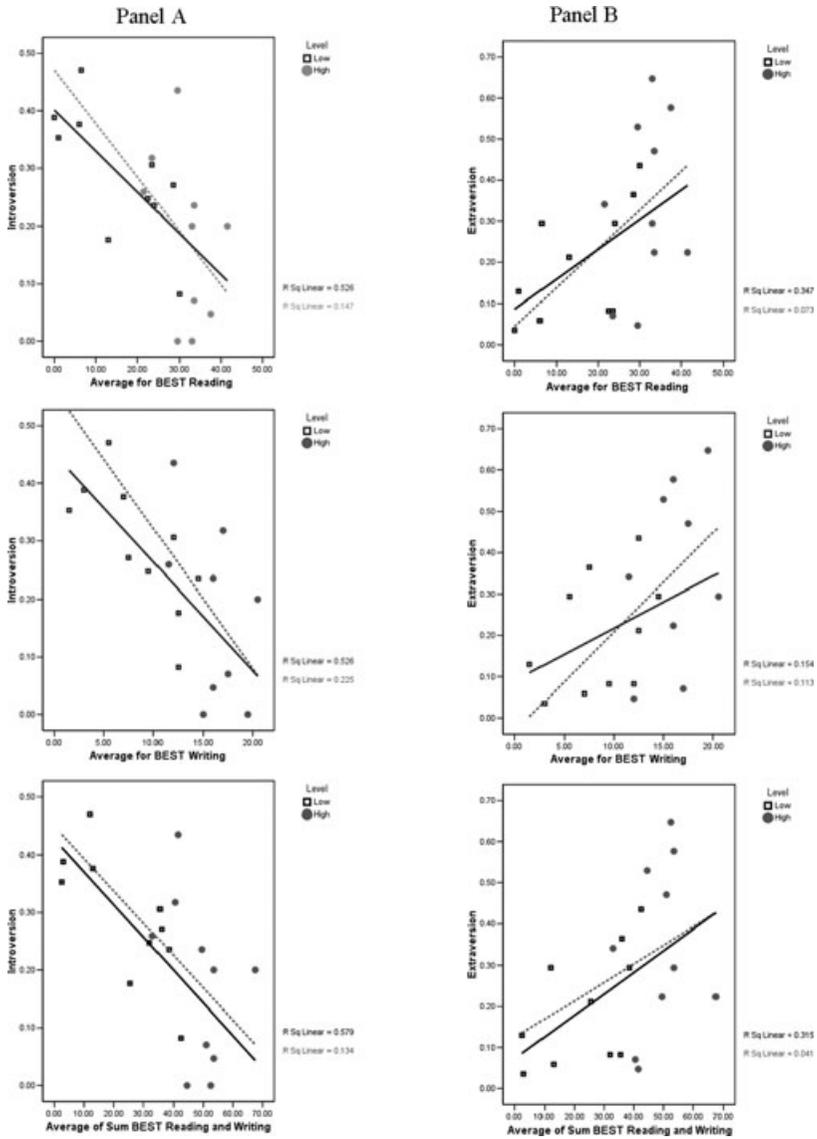
Figure 4 Correlations between personality and BEST test scores: Testing Goal 3.

correlations found were with Average of BEST Reading and the Sum of Writing and Reading (Pearson $= .60$, $p = .07$ and $.56$, $p = .09$, respectively) for the low-education learners.

Discussion

Several conclusions can be drawn from the present study. As we expected, the low-education learners' test scores were significantly lower than those for the high-education learners. Although they improved from Test score 1 to Test score 2, their scores were significantly lower than those who were high-education learners at both Occasion points. The low-education learners in this study started with BEST Literacy scores that were lower than those of the high-education learners. Although both groups of learners make similar gains, at the ending point the low-education learners had not reached the starting level of the high-education learners. These findings suggest that low-education learners make approximately the same amount of progress as high-education learners as measured by a literacy test score. Yet because of their very low beginning and ending test scores, these learners may take longer to reach a level at which they may progress to the next program level. It was not possible to verify this interesting possibility in the present study because of the availability of assessment at only two time points. However, it is worth further examination in a future study.

Regarding socio-interactive practices, low-education learners more often assumed the novice role in interactions, more often let their partner start the activity, and less often asked for help, demonstrating their difficulty with some of the socio-interactive practices in formal learning settings upon which learning is based. We have seen that students at the data collection site can develop skills for starting interactions as part of their participation in classroom interaction (Hellermann, 2007). However, the current study shows that, in general, this interactive practice, like others, may come more slowly for learners without experience with formal education. Being able to identify other socio-interactive practices that are difficult for low-education learners should guide future directions for research and practice in working with this population.

The low-education group of learners seems to be learning, which is encouraging, but they start at a much lower level than their peers who have more experience with formal education. This suggests to us that instructional attention needs to be paid to literacy and schooling issues—these learners have more to learn than students with more schooling. We saw instances in which confusion over basic issues like the progression of an assigned task seemed unusual to these students. Our observations also showed, as has been reported elsewhere (Alcala, 2000; Burt et al., 2003; Condelli & Wrigley, 2003; Strom & Young-Scholten, 2004), that these students lack of experience with school coincides with a lack of literacy skills. This lack often interfered with other

classroom tasks such as spoken dyadic interaction. In these cases, a potentially accessible spoken language task was significantly hindered by the teachers' incorporation of literacy work.

One example of a program that accommodates learners with low education is the Arlington Education and Employment Program (REEP). It states that

> Students with low education level and/or weak literacy skills are likely to progress through the program by taking all instructional levels, some twice. These students often have a hard time developing the reading and writing skills for [intermediate courses] . . . Students with higher education level and/or strong literacy skills are more likely to skip the [beginning] levels, progress through [lower] levels skipping, and repeat fewer levels. Therefore, these students tend to complete the program faster. (Progress, 2009)

Our findings help to explain why low-education learners take longer to progress through programs. They have more to learn than their high-education counterparts. Low-education learners need to learn the socio-interactive practices of how to participate and what to attend to in the classroom, including understanding literacy and literacy practices. These learners' expressions of introversion and extroversion seem to interact with participation in the socio-interactive practices of formal schooling and contribute to the slow progress that learners appear to make as they move through education programs.

To improve learning opportunities for low-education learners, programs may need to provide support so that low-education learners get instruction and practice with strategies for classroom interaction with which learning is associated. In the case of the variables studied in the present study, learners can receive instruction and practice with the way that classroom activities are structured, how to start them, how to actively participate in their construction, how to ask for help, and how to use oral language to participate in learning activities with expressions of extraversion. This could work in two different ways.

First, where possible, the low-education students could benefit from extra tutoring or class time working with other low-education learners. When all of the students in the class have the same need to learn the socio-interactive practices for learning, it is possible to focus on these issues. For example, the class may watch video of language classrooms, paying special attention to the way that students participate in the language activities, start them, ask questions about them, and use language in new ways. Without the presence of high-education learners, it may be possible for low-education learners to use

language to express extraversion characteristics as language-learning practice, taking the extra time that they need. These practices can be strictly oral and not rely on written language support.

Second, programs and teachers can take advantage of the fact that circumstances often require programs to mix low-education learners with high-education learners in the same classes. In these classes, high-education students can participate in a mentorship relationship with low-education students (Rogoff, 1990). In these mixed classes, high-education students can mentor low-education students, modeling how to participate in class activities and how to ask for help when needed. Working together with high-education students, low-education students can move from legitimate peripheral participation (Hellermann, 2008; Lave & Wenger, 1991), which includes observing the class and the students' socio-interactive and literacy practices in which low-education students work side-by-side with high-education mentoring students. As low-education learners work with mentoring students in the classroom community, they gradually learn the socio-interactive practices, moving from peripheral participation to full participation. We can see an example of this with Li, one of the students in this study. In this set of video clips (http://www.labschool.pdx.edu/Viewer/viewer.php?pl=Lilearnssociointeractivepractices), we see Li at the start of her L2 education as a legitimate member of the classroom participating in a very peripheral way (*day 5 interaction*). Next, we see Li working with a mentor student in the clip *Li term 3 interaction.* This was one of many interactions that Li had with high-education students in her first three terms of study. In the last clip, after 7 months of experience working in the classroom, Li is a fully participating member of the classroom community (the clips *Li term 4 what time do you get up* and *Li term 4 interaction*).

In addition, teachers can include activities that are completely oral for the benefit of the low-education learners. These activities can be in addition to those that provide written language support that is helpful for the high education learners.

Research Limitations and Contributions

Although it has been established that personality is related to learning (Dörnyei, 2005; Verhoeven & Vermeer, 2002), our finding was that personality was related to test scores *only* in low-education learners. Among the low-education learners, introverted learners had lower literacy test scores when compared to extraverted learners. These findings suggest an important role that personality,

as well as prior experience in a formal school setting, plays when trying to learn novel things, such as a new language. This finding also adds a piece of evidence to the previously contradictory findings on the relation between introversion/extraversion and language performance (for a review, see Dewaele & Furnham, 1999). Researchers should consider educational background as a variable when studying the relation between personality and learning.

In this investigation we show that low-education learners *behave* in more introverted ways at different moments during the class than high-education learners. Future studies need to be done, however, to observe the degree that having a stable introverted personality influences learning or if the experience with formal education leads to behaviors in the classroom that are considered introverted. For example, do low-education learners also score lower in personality self-reports than high-education learners? Is self-reported personality related to socio-interactive practices? Perhaps being introverted affects socio-interactive practices such as assuming the novice role and asking for help. Indeed, this study would have benefited greatly from self-reported data and/or teachers' personality ratings (Verhoeven & Vermeer, 2002).[6]

In this investigation we provided an innovative approach by combining both qualitative and quantitative analyses. Although difficult to undertake, such mixed-methods studies have long been advocated (Denzin, 1978; Hatch & Lazaraton, 1991; Lazaraton, 2000). As Dewaele (2005) wrote:

> I believe that a good alternative to a forced choice between quantitative and qualitative instructed Second Language Acquisition research is a triangulation, that is, the use of a combination of different research methodologies in order to answer common research questions. (p. 369)

Indeed, in this investigation, by taking advantage of an unprecedented view of naturalist classroom interaction (Reder et al., 2003), we were able to do rigorous *qualitative* observations to design an interaction-based coding system that permitted us to systematically *quantify* relevant behaviors in learners. This triangulation provided us the opportunity to describe culture-based behavior in the classroom and then to empirically test differences between learners with different educational backgrounds.

Furthermore, by using this methodology we were able to overcome some of the obstacles so commonly found in language and cultural research (Ramírez-Esparza, Gosling, Benet-Martínez, Potter, & Pennebaker, 2006; Ramírez-Esparza, Gosling, & Pennebaker, 2008). By simply asking uninvolved judges to observe snippets of learners' behaviors in a classroom setting, we avoided using translated questionnaires and imposing cultural preconceptions from

researchers and teachers. However, it is important to note that in future investigations, ratings from neutral judges living in other cultures who speak other languages may be ideal (Ramírez-Esparza et al., 2008).

Another highlight from this investigation is the interdisciplinary approach brought by investigators working from a variety of disciplinary perspectives (sociological, linguistic, and psychological approaches to SLA). Researchers on SLA have concluded that SLA is chaotic and complex, and dynamic and nonlinear (Larsen-Freeman, 1997; Larsen-Freeman & Cameron, 2006). Similar conclusions have been made from psycholinguistic perspectives. Dewaele (2005) wrote that

> L2 acquisition is an extremely complex process; we need to abandon the dream of representing a learner's progress in a gently upwards line toward native-like status. It is equally unworkable to try to fit every learner into a single well-defined category and make simplistic predictions about his or her linguistic development. (p. 371)

Our varied interests led to this investigation of another complex variable–experience with formal education–to show how this influences the path of classroom language learners by way of literacy, sociocultural, and personality variables.

Revised version accepted 23 October 2010

Notes

1 The National Labsite for Adult ESOL (known locally as the Lab School) is funded, in part, by a small grant for experimental research award 0751362 from the National Science Foundation and by grant R309B6002 from the Institute for Education Sciences, U.S. Dept. of Education, to the National Center for the Study of Adult Learning and Literacy (NCSALL). The Lab School is a partnership between Portland State University and Portland Community College. The school and research facilities are housed at the university and the registration, curriculum, and teachers of the ESOL students are from the community college.

2 Although introversion/extraversion personality can be thought as a continuum along a unidimensional scale, we include both introversion and extraversion as two different categories. We do this because we wanted to capture in a single observation whether a learner either showed an introvert behavior or an extravert behavior.

3 We did not ask the same coders to rate the low- and high-education learners because coders could have learned the goal of the study and that could have influenced their ratings.

4 After comparing standardized assessment measures for all students, we have the most and most consistent test scores for the BEST Literacy test. This was due primarily to student attendance, a factor beyond the researchers' control.

5 One correlation that might be of interest to readers is the one between Introversion and Novice Role. As expected, these two variables correlated significantly (i.e., $p = .46$, $p < .05$); however, when controlling for years of education, this is no longer significant (i.e., $p = .29$, ns). This makes sense, given that, as shown in the analyses presented for Goal 3, Introversion is only relevant for the low-education learners.

6 The design of data collection that obtained the video corpus was naturalistic and therefore purposefully did not ask students or instructors for assessments other than those that would occur as part of the college's curriculum.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Figure S1. ClassAction Toolbox Data Viewing Tool.

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