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Adult college learners of British Sign Language: Educational provision and learner self-report variables associated with exam success

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Abstract

This study investigated educational provision and learner self-report factors associated with exam success for adult learners of British Sign Language (BSL) studying either Level 1 or Level 2 courses. These levels are equivalent to the first and second year of a United Kingdom General Certificate of Secondary Education (GCSE) qualification. Two hundred and thirty five students from three further education colleges answered a self-report questionnaire covering a range of variables. Analysis of the data suggests that: 1) success rates differed markedly for Level 1 and 2; 2) enhancements of educational provision, such as the use of extra conversational classes, appeared to play a role in increasing exam success rates; 3) individual factors associated with exam success varied between course level and between types of provision; 4) variables related to exam success at Level 2 were more numerous and more specifically related to the learning of sign language than those seen at Level 1; 5) Effect sizes seen for enhancements of educational provision were larger in size than for individual characteristics. These results offer insights into the factors that affect the success rates of people learning sign language.

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The second half of the 20th century has seen the growing recognition of the linguistic status of sign languages. One consequence of this has been the emergence of the formal teaching of sign language as a second language (L2). For American Sign Language (ASL), the most researched of the sign languages, this began in earnest in the early 1970s (Peterson, 2009), and now it is the fourth most popular language studied at US colleges and universities (Furman, Goldberg & Lusin, 2010).

Learning any language as an L2 in adulthood is difficult; progression through levels requires increasing effort and learners usually stop short of native level proficiency (Dörnyei 2005). Binkley (2011) reports that the US Foreign Service Institute (FSI) & Defense Language Institute (DLI) have proposed four categories of L2 learning difficulty for native English speakers, with higher levels being more difficult. ASL difficulty estimates include category 2 (Francis, 1980, cited in Kemp, 1998) and category 4 (Jacobs, 1996). What is consistent across these two positions is that ASL does not fall into the easiest level category.

Given the popularity of sign language courses and their apparent difficulty for L2 adult learners, it is important to understand the factors that impact on learning sign language. However, McKee, Rosen and McKee (2014) note that, despite the progress made in the scientific understanding of the linguistic and cultural properties of sign languages in recent decades, 'knowledge in the sphere of sign language teaching remains scarcely documented' (p. 1). As a result, sign language teaching has relied upon the generation and sharing of tutor insight rather than evidence-based teaching practices.

Quinto-Pozos (2005) proposed that sign language L2 learning can be influenced by many factors, some that are unchangeable and some that are changeable. Examples of factors he viewed as unchangeable, or hard to change, include transfer from a first language to L2 and the learner's motivation to interact with deaf people. Examples of factors which he viewed as changeable include the type of language the learner is exposed to and the goals of learning. Empirical studies into the factors that might affect learning a sign language have focused on the individual characteristics of the learner and aspects of teaching and learning.[1] The following describes studies that have explored the relationship between such factors and objective measures of signing performance that are of direct relevance to adult hearing sign language L2 learners learning in an academic setting.

Individual characteristics of the learner

Data on the individual characteristics of the learner have primarily been collected from university settings in the United States and from beginner or intermediate learner levels. Studies have explored a range of personal characteristics covering gender, age, cognitive processes, personality, attitudes, motivations, and anxiety. Effect sizes seen have commonly been medium in size. Some of these studies were conducted several decades ago.

Bergfield-Mills and Jorden (1980) tested the relationship between age, gender, sensitivity to the time intervals between sequences of visual events appearing on a computer screen and signing ability. Visual timing sensitivity was investigated because it was thought likely to be important for the processing of the body movements made by signers. The data were collected at Gallaudet University from 103 hearing students attending semester long ASL classes open to staff and members of the public. Participants' ages

ranged from 18 to 53, and the classes included those for ‘beginners’, ‘intermediate’ and ‘advanced’ signers. Signing ability was measured by an end of term exam. Analyses found that age correlated negatively with several measures of signing ability while timing sensitivity correlated positively with several measures. Effect sizes were small or medium, and larger for timing sensitivity.

Kyle, Woll and Llewellyn-Jones (1981) and Kyle and Woll (1985) investigated factors associated with British Sign Language (BSL) skill in 134 social workers for the deaf in the UK. All were hearing and 77% were L2 learners. A range of variables were measured including: hearing status of relatives; age; years of signing; frequency of sign language classes; visual perceptual and reasoning skills; spoken ‘language sensitivity’; and attitudes towards deaf people. Signing ability was measured by tests of receptive and productive ability. Several variables were found to be associated with signing proficiency, with age of acquisition showing the largest association. Length of signing experience showed a significant effect, even when age of acquisition and age of testing were controlled for. Effects were also seen for frequency of classes, whether the signer had grown up with deaf parents or siblings, visual perceptual reasoning, degree of field independence, spoken English language sensitivity to the omission of words from sentences and the ability to suggest semantically and grammatically correct replacements.

L2 theorists (e.g. Gardner 2001) have distinguished between two main motives for learning a L2: integrative and instrumental. Integrative motives relate to where learners see the L2 group in a positive light, wish to learn about them, interact with them and be like them. Instrumental motives relate to where learners study to attain some practical benefit usually described as being ‘social’ or ‘economic’ in nature. Classically, learners motivated by integrative motivation have been thought to be more likely to achieve higher levels of L2 proficiency because they will be more likely maintain their language use in the long-term. Lang, Foster, Gustina, Mowl and Liu (1996) investigated the relationship between motivation, attitudes towards deafness and ASL proficiency in 115 adult hearing employees at the National Technical Institute for the Deaf who knew no ASL before they began their employment. Data were collected using questionnaires designed for the study by the authors, and potential predictors of signing skill measured included integrative motivation; instrumental motivation; attitudes towards deafness; and background variables such as self-rated comfort around deaf people. Sign language proficiency was measured using the Sign Communication Proficiency Interview. Significant positive correlations were seen between sign proficiency and integrative motivation (r=.29), attitude towards deafness as a cultural phenomenon (r=.31), and comfort around deaf people (r=.38). A multiple regression analysis found that only integrative motivation accounted for unique variance in signing skill.

Pfanner (2000) surveyed the anxiety experiences of 154 students from two American universities in the second semester of an ASL 1 course using an adapted version of Horwitz’s (1996) Foreign Language Classroom Anxiety scale. Twenty-one of the 35 items elicited high anxiety in at least 25% of the students, with using expressive skills in front of class and communicating with a Deaf person causing the most concern. Analysis of the sign language data showed that higher anxiety levels were associated with lower grades (r=-.37), however the directions of causality between the variables in the correlation are not certain. It may be that ability determined anxiety level, that anxiety interfered with course learning or assessment or performance, or a more complex relationship exists such that both effects occur.

Gomez, Molina, Benitez, and de Torres (2007) investigated factors associated with sign language skill in trainee interpreters at the University of Granada, Spain. Participants were 28 students from either the first year of a two-year course, or an intensive ten-month course, who had no prior knowledge of Spanish

Sign Language (Lengua de Signos Española, LSE). Participants completed a battery of tests in the first two months of their training. Potential predictors of signing skill measured included: a test of perceptual-motor coordination skill which tested participants ability to view a set of 'pseudosigns' ('signs' that were meaningless but constructed according to LSE formation parameters) and then accurately repeat them; cognitive subtests from the Wechsler Adult Intelligence Scale (Wechsler 1995); personality measures from the Minnesota Multiphasic Personality Inventory (MMPI, Hathaway & McKinley 1971); and the participants' current level of academic achievement. Signing skill was measured by a teacher at the end of the training period. A forward stepwise regression created a model with predictor variables listed in order of entry as: the perceptual motor coordination test, MMPI dominance, Wechsler similarities, Wechsler digit span, and level of academic achievement (adjusted R^2 = .59). Because only perceptual motor coordination explained unique variance in the criterion variable, the authors concluded that the processes involved in the perceptual motor coordination test, motor coordination, visual discrimination and visual immediate memory were the most important predictors for learning LSE.

Aspects of teaching and learning

Data on aspects of teaching and learning have also primarily been collected from university settings in the United States and at beginner or intermediate learner levels. Studies have tested the effectiveness of two types of learning tools, transcription techniques that encourage the close analysis of sign language features, and video disc systems. Results suggest that transcription techniques are effective at enhancing student's knowledge of sign language grammar, and that video discs may be able to reduce the learning time of aspects of sign language such as sign vocabulary. Interventions that are effective appear to be able to produce moderate or large effect sizes.

Buisson (2007) tested the impact of out of class on-line English glossing transcription training on knowledge of sign language grammar, based on the rationale that glosses could act as a 'bridge' between ASL and English. Glossing involves representing signs in the form of English words or phrases which are by convention written in capitals, for example 'NAME-YOU-WHAT?'. Participants were 155 beginner ASL students from four American universities. Participants in an experimental group visited a web site outside of class time over five weeks to receive training in the glossing of ASL phrases. The training provided instruction in ASL grammar, its differences from English grammar and glossing rules across seven lessons. Details of the aspects of sign language grammar taught were not described by Buisson, although, given the linear nature of glosses, this would seem likely to have been the sequential aspects of ASL syntax. Participants in a control group read on-line articles about deaf education. Analysis of the ASL grammar pre- and post-test results showed the glossing lessons significantly improved ASL grammar knowledge in the experimental group relative to the control group. The experimental group scores improved by 31% (Cohen's d was 1.9), while the control group scores improved by 7%.

In a similar fashion, Kaul, Griebel & Kaufman (2014) investigated the use of web-based video transcription tasks to increase awareness of sign language non-manual features. Non-manual features are aspects of a sign language conveyed on the upper parts of the body other than the hands. Participants were 33 deaf education students attending the University of Cologne, Germany in fifth semester intermediate German Sign language (Deutsche Gebärdensprache, DGS) classes. In the experimental group classes participants received transcription training sessions once a week for five weeks. Each session focused on

one video which lasted 6-9 seconds which showed two signers using idiomatic signs or questions with accompanying eyebrow and mouth gestures. The session involved the tutor and students engaging in transcription analysis of the signs. In control group classes, instructors showed a sign, explained its meaning and played its video several times while discussing it. After the training participants' awareness of non-manual features were tested with further videos of new ideographic sign phrases some of which contained errors. The participants' performance on these tests were measured in terms of accuracy of error detection and accuracy of error identification. Both tests were scored out of 10. Analysis of the data showed that the experimental group scores to be significantly higher for error detection (9.0 versus 6.8) and error identification (6.1 versus 4.2).

Slike, Chiavacci & Hobbis (1989) tested the effectiveness of the use of a videodisc system to teach sign language vocabulary. Participants were 40 American university students taking an introductory sign language course which had three classes a week. Participants were split into experimental and control groups half way through the semester and learned a set of 90 miscellaneous signs. The experimental participants used two of their weekly lessons to learn the new vocabulary using a videodisc. The disc had a menu driven programme that allowed students to quickly locate & view a sign. Signs were shown with simultaneous front and side signer views with text explaining how to produce it. The control participants learned the signs using a traditional lecture method. Analysis of the data showed that post intervention test scores of the two groups did not differ significantly. However, the experimental group reported viewing each sign less often (1.5 viewings versus 3 viewings) and taking less time to learn each sign (44seconds per sign versus 1 minute per sign).

Thoryk (2010) similarly tested the in class use of a commercially available DVD for sign language fingerspelling and accompanying tutor text. The fingerspelling resources were designed based on the practitioner experience of the disc's authors. Participants were 186 students from an American university taking ASL classes for 'beginners', 'intermediate' and 'advanced' signers. The experimental group involved tutors using the DVD & text resources in class. The DVD included 16 lessons organised around specific fingerspelling topics such as types of commonly fingerspelled words. The lessons included information on the topic, exercises and homework as well as fingerspelling tests. The control group were taught fingerspelling in their beginners classes and then only used it as it naturally occurred in their subsequent classes. ASL fingerspelling receptive skill showed no evidence that the in class use of DVD and text materials enhanced student receptive skills. The experimental group participants' mean improvement across the course on a test marked out or 60 was +10 marks, while the control group participants mean improvement was +12 marks.

The current study

The current study aims to investigate educational provision and learner self-report factors associated with success in adult L2 learners of BSL by relating answers on a questionnaire covering a range of personal variables to success on the course. The focus on factors that could be elicited through self-report was adopted on pragmatic grounds. It allowed the study to explore a wide range of potentially influential factors and maximize the sample collected, while limiting the demands made on tutor and student time.

The study contained several unique elements. First, data were collected from three colleges of further education in the UK that differed in some aspects of their mode of delivery. Two centres offered

provision that was typical of the UK sector. A third centre included several initiatives in their provision which were atypical, such as additional weekly conversational classes, which had the potential to enhance the student experience. Comparison of success rates between centres offered the prospect of evaluating the impact of these differences on success. Second, this paper investigates variables that might be important for success on UK courses of different levels i.e. Levels 1 and 2. The levels are equivalent to the first and second year of a UK General Certificate of Secondary Education (GCSE) qualification. The aims of the courses were (Council for the Advancement of Communication with Deaf People,[2], 2005; CACDP): Level 1: To enable candidates to communicate with Deaf people in BSL about familiar, day-to-day topics and activities; Level 2: Develop an ability to communicate with Deaf people using BSL in a range of familiar contexts, participating in longer and more open-ended exchanges than at Level 1. Third, information was collected on some variables which had not been tested before in a L2 sign language learning context, for example, self-reported visual thinking style.

Method

Data collection

Data were collected from BSL classes in three further education colleges in the UK. These will be referred to as Centres 1, 2 and 3. The data were collected over three years. Each Centre had two Level 1 classes and one Level 2 class. All courses were one year in length except for Centre 2, whose Level 2 course ran over 2 years. All courses were offered to adult learners, had two hours a week of class contact time, followed CACDP syllabi and were taught by deaf tutors. All classes used broadly similar teaching methods such as sign language production through storytelling from pictures and sign language reception through the watching of signed videos. However, Centre 1 ran several additional initiatives which had the potential to enhance the student experience. These included, before starting Level 1, all students took a six week long deaf awareness and communication tactics course. Before starting Level 2 most students took an extra ten week long summer preparatory course. During the sign language courses the class tutor ran an extra conversational practice session one evening a week that was open to all students, but primarily aimed at Level 2 students. Also, in Level 2 classes, the lead tutor regularly had additional support from a second tutor who was hearing and had learned BSL as a L2, but who did not use their voice in class. The differences in the delivery of courses at the three centres are summarised in Table 1. The courses were assessed by a CACDP exam which tested productive, receptive and conversational skills. At both levels, production was assessed by giving the candidate a series of pictures shortly before the exam and requiring them to generate a story from them. Reception was assessed by the examiner signing a story to the candidate followed by questions to test their comprehension. Conversational skills were assessed through a short conversation between the examiner and the candidate. Level 2 examinations involved longer, more in-depth and open-ended exchanges across a wider range of contexts than at Level 1, without the candidate showing misunderstanding or requiring frequent repetition or clarification.

Table 1
Summary of differences in the delivery of courses at the three teaching centres

Level	Centre	Length of course in years	Deaf awareness course	Summer preparatory course	Extra input from second tutor	Extra conversational practice available each week
1	1	1	Yes	No	No	Yes
	2	1	No	No	No	No
	3	1	No	No	No	No
2	1	1	No	Yes	Yes	Yes
	2	1	No	No	No	No
	3	2	No	No	No	No

Data were collected in the first half of the one-year courses in the period from September to December by the class tutors. For the two-year Level 2 course at Centre 3, data were collected in the first half of the second year of the course also between September and December. End of course status was measured as either exam pass, failure or withdrawal from the course.

Participants

There were 235 participants, of these 198 were women. Participants had a mean age of 36.4 (SD 11.6). Two hundred and twenty two described themselves as ‘hearing’, 3 as ‘deaf’ and 8 as ‘hard of hearing’. There were 146 participants studying at Level 1 and 89 studying Level 2. Twenty-five participants were retaking their current course having either failed or withdrawn from it in a previous year. The response rate was 35%.

Questionnaire

The areas sampled by the questionnaire were generated from a consideration of Segalowitz’s (1997) review of the spoken L2 literature and the L2 sign language literature.The questionnaire included questions with both closed and open-ended response formats. Participants were asked about: 1) Background characteristics - age, sex, hearing status, highest level of education studied, 2) Previous experience of studying spoken foreign languages – whether they had studied a foreign language before; 3) Motivation for taking their course written in their own words,4) Personality – extraversion, 5) Beliefs about language learning – the relative difficulty of spoken and signed languages; 6) Other psychological variables - confidence, visual thinking style, and 7) Current and past contact with deaf or hearing signers through family, friends, work, visiting a deaf club, deaf TV written in their own words.

Coding of open-ended response items

Participants’ responses on motivation and contact with deaf signers were content analysed. Participants’ explanations of their motivations for taking their course were explored inductively for recurring

categories of response. Potential categories were generated by two people working independently. Then codes were compared and discrepancies discussed to reach agreement. This process produced several categories and sub-categories (see Table 2).

Table 2
Motivational categories and their descriptions

Category	Description
Desire to communicate with deaf person(s) in personal life	Wants to communicate with deaf person(s) in personal life. Sub-categories include: Partner / spouse, guardian, offspring, sibling, other relative, and friend.
Deaf / hard of hearing person wanting to join deaf community	A deaf or hard of hearing person who wants to learn sign language to be able to join the deaf community.
Desire to communicate with deaf person(s) within current work situation	Wants to communicate with deaf person(s) in a work context. Sub-categories include: Current or anticipated contact with deaf person at work; expresses concern over deaf rights; has services they wish to offer to the deaf e.g. acupuncture; has deaf work colleagues.
Desire to work with deaf people	Wants to work with deaf people in future or is currently working with the deaf in a specific deaf role / job.
Desire to work with deaf people phrased in instrumental / career terms	Wants to work with deaf in future but phrases the desire in instrumental terms e.g. just says ‘career’, job prospects’.
Desire to communicate with deaf person(s) non-specific	Wants to communicate with deaf people in general.
Personal instrumental	Wants to learn something new, or is seeking personal benefits of some kind. Subcategories include: Has a desire to learn something new, or is seeking personal benefits such as increased self-confidence or wants to teach signs to their offspring.
Prompted or encouraged	Prompted or encouraged to learn sign by someone else such as their boss or a friend.
General interest	Has a ‘general interest’ in learning sign language.

In our data analysis, only the main categories were used and each type of motivation was scored independently of the others. Because participants gave open-ended responses that could mention more than one motivation, it was possible for them to score in more than one category.

Sign language contact with deaf signers was coded separately for contact with deaf people via family and friends, work and through the deaf club. Past research has shown that learning a L2 is not easy,

therefore, contact was only counted if it was judged to be a sufficient level which might imply 'regular and sustained contact'. The exact criteria for these judgements varied across contact sources as described below:

1) Sign language contact through family or friends: If participants reported having contact with at least one deaf signer through their partner, immediate family or their friendships.
2) Sign language contact through work: If participants reported having contact with at least one deaf signer through their work that could be inferred to be regular and sustained, for example because they worked in a deaf specialist role e.g. communication support worker with deaf people.
3) Sign language contact through deaf club: If participants reported having visited a deaf club more than once at the time of completing the questionnaire. This was taken as indicating someone who had a high probability of experiencing contact with deaf signers in this setting in the future.
4) Sign language contact through watching deaf TV: If participants reported watching adult deaf TV or signed hearing programmes at least once every two weeks.

As the frequencies of participants scoring on the sign language contact measures were sometimes low, scores on the first three measures were also combined into a single overall measure of 'combined first-hand sign language contact outside of class'. Participants scored on this variable if they met any of the criteria for family and friends, work or deaf club contact.

The reliability of the coding of the categories was checked by an independent coder. For the motivation variables the Kappas ranged from 1.00 to .82 and had a mean value of .99. For the sign language contact variables the Kappas ranged from 1.00 to .78 and had a mean value of .87. Using criteria given in Viera and Garrett (2005), all Kappa values would be described as at least 'substantial'.

Rating scales

Confidence in passing the course was measured using a single item asking participants how confident they felt about passing their course. Responses were made on a five point rating scale ranging from 5 (very confident) to 1 (very unconfident).

Extraversion was measured by asking participants to choose six personality traits from a list of 12 that best characterised how they were most of the time. Eysenck (1985) reported six of these traits to load in a positive direction on an extraversion factor (impulsive, optimistic, active, sociable, outgoing, talkative), and six load in a negative direction (reserved, unsociable, quiet, passive, careful, thoughtful). An extraversion score was determined by adding up the number of extravert traits chosen so that higher scores indicated higher extraversion. The scale characteristics were tested on a separate sample of 102 psychology degree students. Test-retest reliability, measured over two weeks by correlation coefficients, was r=+.86, and convergent validity measured against the NEO-PI-R extraversion scale (Costa & McCrae 1985) was r=+.71. Thus the scale showed adequate test-retest reliability and convergent validity for research purposes (Coolican, 2014).

Visual thinking style was measured using Cohen and Saslona's (1990) Imagery Habit Scale which is a 13-item self-report measure of visual thinking style. An example item is: 'My thinking often consists of

mental pictures or images'. Responses are made on a five point Likert scale with higher scores indicating a greater tendency to use a visual thinking style.

Results

The answers from the questionnaire were analysed for Level 1 and 2 separately because of the differences in course learning outcomes, and analyses were conducted separately for teaching centres with different teaching provisions. Thus the organisation of the results section is as follows: comparison of participants' end of course status at Level 1 and 2, comparison of end of course status across the three centres and finally analysis of factors associated with exam success at Level 1 and 2.

The statistical tests used were the chi-square test of association, the point-biserial correlation and logistic regression. Effect size measures and assessments of their sizes followed Cohen (1988), while assumption testing and corrections followed procedures outlined in Field (2013).

For some categorical variables, it was impossible to carry out statistical analyses because there were insufficient participants at some of their levels. For Level 1, the variables affected were: hearing status, whether participants watched deaf TV and the motivational categories deaf / hard of hearing person wanting to join deaf community, and prompted or encouraged to learn sign language. For Level 2, hearing status was affected and the same motivational categories as for Level 1.

1) Comparison of participants' end of course status at Level 1 and 2

Three 2x3 chi-square tests were run to compare participants' end of course status at Level 1 compared to Level 2 for each of the three teaching centres (see Table 3). Exam success rates were significantly higher at Level 1 than Level 2 for all three centres. In absolute terms, for all three centres at Level 1, most participants passed the course, while at Level 2 most did not. The standardised residuals show significant differences between Level 1 and 2 in the pass category for all three centres, and for the failed and withdrew categories for two of the three centres. Thus the level differences were most consistent across centres in terms of the percentage of students passing the exam.

Table 3
Comparison of the end of course status frequencies for level 1 and 2 for the three teaching centres

Centre	Level	End of course status			Chi-square result			
		Passed exam	Failed exam	Withdrew	χ^2	df	Prob 2-tailed	Effect size (Cramer's V)
1	1	42 (88%)$^{4.6}$	2 (4%)$^{-4.1}$	4 (8%)	22.521	2	<.001	.487
	2	20 (43%)$^{-4.6}$	18 (38%)$^{4.1}$	9 (19%)				(medium)
2	1	23 (58%)$^{4.6}$	7 (17%)$^{-2.0}$	10 (25%)$^{-2.7}$	20.976	2	<.001	.555
	2	1 (4%)$^{-4.6}$	11 (39%)$^{2.0}$	16 (57%)$^{2.7}$				(large)

3	1	30 (59%)$^{3.4}$	7 (14%)	14 (27%)$^{-2.6}$	11.794	2	.003	.426
	2	1 (7%)$^{-3.4}$	4 (29%)	9 (64%)$^{2.6}$				(medium)
Overall	1	95 (68%)	16 (12%)	28 (20%)				
	2	22 (25%)	33 (37%)	34 (38%)				

Note 1: For all tables, observed frequencies are shown outside of brackets, percentages inside brackets and standardised adjusted residuals that reached significance as superscript.

Note 2: Seven participants from the Level 1 data were not used in these chi-square tests because they went on to study at Level 2 and also appear in the Level 2 data. Removal of this data has the effect of reducing the pass rate slightly at Level 1 and so producing a more conservative estimate of the differences between the levels.

2) Comparison of participants' end of course status across the centres for Level 1 and 2

Two 3x3 chi-square tests compared participants' end of course status at the three teaching centres for Level 1 and then for Level 2 (see Table 4). At Level 1, the participants' end of course status differed significantly between the three centres. Residuals suggest the main contributor to the effect was the better performance in Centre 1, particularly the higher pass rate, but also the lower failure and lower withdrawal rates compared to Centres 2 and 3. At Level 2, the end of course status also differed significantly between the three centres. Residuals suggest the main contributor to the effect again was the higher performance in Centre 1, specifically the higher pass rate and lower withdrawal rate compared to Centres 2 and 3.

Table 4

Comparison of participants' end of course status for the three teaching centres for Level 1 and 2

Level	Centre	End of course status			Chi-square result			
		Passed exam	Failed exam	Withdrew	χ^2	df	Prob 2-tailed	Effect size (Cramer's V)
1	1	46 (88%)$^{3.6}$	2 (4%)$^{-2.0}$	4 (8%)$^{-2.6}$	13.618	4	.009	.216
	2	25 (59%)	7 (17%)	10 (24%)				(medium)
	3	31 (60%)$^{-2.0}$	7 (13%)	14 (27%)				
	Overall	102 (70%)	16 (11%)	28 (19%)				
2	1	20 (43%)$^{4.1}$	18 (38%)	9 (19%)$^{-3.9}$	22.781	4	<.001	.358
	2	1 (4%)$^{-3.1}$	11 (39%)	16 (57%)$^{2.5}$				(large)
	3	1 (7%)	4 (29%)	9(64%)$^{2.2}$				

Overall	22 (25%)	33 (37%)	34 (38%)

3) Learner factors associated with exam success at Level 1

A series of analyses were run to investigate which learner factors were associated with exam success at Level 1. The data from Centre 1 were analysed separately because it used additional learning initiatives which were likely to make the learning experience different from that at the other two centres. The data from Centres 2 and 3 were combined because they had similar provisions and pass rates. To further check whether this combination was appropriate we ran a series of chi-square tests and t-tests on their participants' end of course status, and their scores on all of the variables used in the study. No differences were seen between Centre 2 and 3 in any of these analyses.

A series of chi-square tests and point-biserial correlations were carried out on the Level 1 data. For brevity, only the results for significant effects are shown. Because of the limits of the sample size and data requirements of the tests involved, the remainder of the analysis compared students who had passed their exam against all other students combined together i.e. both students who had attempted but failed their exam combined with students who had withdrawn from their course before attempting their exam.

Centre 1

The analysis for Centre 1 indicated one variable that was associated with exam success (see Table 5). There was a trend for participants who did not mention 'general interest' as all or part of the reason for taking the course to be significantly more likely to pass the course than those who did.

Table 5
Variables significantly associated with exam success for Level 1 at Centre 1

Variable	Categories	End of course status		Chi-square result			
		Passed exam	Failed exam or withdrew	χ^2	df	Prob 2-tailed	Effect size (Cramer's V)
Whether mentioned general interest	Yes	16 (76%)$^{-2.3}$	5 (24%)$^{2.3}$	5.197	1	.034	.316 (medium)
	No	30 (97%)$^{2.3}$	1 (3%)$^{-2.3}$				

Centres 2 and 3 combined

The analysis for Centres 2 and 3 combined found two variables that were associated with exam success (see Table 6). There was a trend for higher levels of education to be associated with higher success rates, although the residuals show that only the difference between school and university education reached

significance. There was also a significantly greater tendency for participants who had previously studied a foreign language to pass Level 1.

Table 6

Variables significantly associated with exam success for Level 1 at Centres 2 and 3 combined

Variable	Categories	End of course status		Chi-square result			
		Passed exam	Failed exam or withdrew	χ^2	df	Prob 2-tailed	Effect size (Cramer's V)
Highest level of education attended	School	9 (39%)$^{-2.3}$	14 (61%)$^{2.3}$	7.340	2	.029	.279 (small)
	College	29 (60%)	19 (40%)				
	University	18 (78%)$^{2.1}$	5 (22%)$^{-2.1}$				
Whether had previously studied a foreign language	Yes	33 (72%)$^{2.4}$	13 (28%)$^{-2.4}$	5.285	1	.022	.237 (small)
	No	23 (48%)$^{-2.4}$	25 (52%)$^{2.4}$				

Note: In the United Kingdom, 'College', refers to the further education college level.

In order to explore the two significant effects further, a standard logistic regression was conducted with all predictor variables entered in one step (see Table 7). Level of education was coded into two dummy variables with school as the reference category: school versus college and school versus university. For the variable 'whether had studied a foreign language before', 'had not studied a foreign language' was the reference category. The criterion variable was pass versus fail and withdrew, with the latter category as the reference category. Screening of the data for the regression showed an issue with overdispersion so the analysis was carried out with a deviance dispersion parameter used to rescale the standard errors and confidence intervals.

Table 7

Results of logistic regression for Level 1 predictors at Centres 2 and 3

Included	B	SE	Wald	Prob	Odds ratio	95% CI lower	95% CI upper
Constant	-0.527	0.743					
School versus college	0.634	0.940	0.674	.500	1.884	0.298	11.904
School versus university	1.336	1.238	1.079	.280	3.805	0.336	43.074
Foreign language	0.626	0.832	0.752	.452	1.870	0.366	9.550

Note: Nagelkerke R^2 = .126 , model $\chi^2(3)$ = 9.180, p=.027.

The model correctly predicted category membership for 89% of the participants who passed, 37% who failed or withdrew, and 68% overall. The school versus university dummy variable showed the largest effect. However, none of the predictors contributed significant unique variance to the explanation of the exam success variable, suggesting that both predictors were explaining mostly the same variance in the exam success variable.

4) Learner factors associated with exam success at Level 2

Finally, a series of analyses were run to investigate which learner factors were associated with exam success at Level 2. These analyses were run using the same approach as for Level 1.

Centre 1

The categorical variables which showed significant relationships with exam success at Centre 1 are shown in Table 8. There was a greater tendency for students who showed a desire to work with deaf people to pass. There was also a greater tendency for students who had significant first hand contact with deaf signers outside class to pass. Analysis of the sign language contact sub-categories using Fisher's exacts tests showed that the sign language effect came primarily from visits to the deaf club, and to a lesser degree from work contact.

Table 8
Categorical variables significantly associated with exam success for Level 2

Variable	Categories	End of course status		Chi-square			
		Passed exam	Failed exam or withdrew	χ^2	df	Prob 2-tailed	Effect size (Cramer's V)
Desire to work with deaf people	Yes	12 (67%)$^{2.6}$	6 (33%)$^{-2.6}$	6.939	1	.015	.384 (medium)
	No	8 (28%)$^{-2.6}$	21 (72%)$^{2.6}$				
Combined significant first-hand sign language contact outside of class	Yes	11 (79%)$^{3.3}$	3 (21%)$^{-3.3}$	10.582	1	.001	.474 (medium)
	No	9 (27%)$^{-3.3}$	24 (73%)$^{3.3}$				
Sub-categories							
Whether has visited a deaf club more than once	Yes	7 (88%)$^{2.8}$	1 (12%)$^{-2.8}$	7.968	1	.007	.411 (medium)
	No	13 (33%)$^{-2.8}$	26 (67%)$^{2.8}$				

Sign language contact through work	Yes	5 (83%)$^{2.2}$	1 (17%)$^{-2.2}$	4.679	1	.070	.316 (medium)
	No	15 (37%)$^{-2.2}$	26 (63%)$^{2.2}$				

For the continuous data, the personality variable, extraversion, showed a significant relationship with exam success. Data screening showed significant negative skew in the extraversion scores. This was corrected by reflection and square root transformation. The data were then reflected back to make interpretation of extraversion results more straightforward. A point biserial correlation showed that level of extraversion correlated positively with course progression, $r_{pb}(45)=+.306$, $p=.037$, 2-tailed. This showed a medium effect size, with higher levels of extraversion associated with passing the exam. To explore this effect further, scores on each of the extraversion trait items were tested against exam success using chi-square tests. The Cramer's V effect sizes from these tests listed in order of size were: sociable (.329), outgoing (.312), talkative (.278), active (.164), optimistic (.095), and impulsive (-.035), indicating that the significant correlation between extraversion and exam success was driven primarily by the traits that related to social interaction and communication.

In order to explore the three significant effects further, a standard logistic regression was conducted following the approach for the Level 1 regression, with all predictor variables entered in one step (see Table 9). For the two categorical predictor variables, the 'No' response was set as the reference category, and for the criterion variable 'fail and withdrew' was the reference category.

Table 9

Results of logistic regression for Level 2 predictors at Centre 1

Included	B	SE	Wald	Prob	Odds ratio	95% CI lower	95% CI upper
Constant	-4.625	1.581					
Desire to work with deaf people	2.244	0.860	2.609	.009	9.427	1.747	50.863
Combined significant first hand sign language contact outside of class	2.408	0.915	2.633	.008	11.113	1.850	66.738
Extraversion	1.637	0.765	2.140	.032	5.140	1.148	23.020

Note: Nagelkerke $R^2 = .508$, model $\chi^2(4) = 22.321$, $p<.001$.

The model correctly predicted category membership for 80% of the participants who passed, 78% who failed or withdrew, and 79% overall. All of the predictors contributed significant levels of unique variance in explaining the exam success variable.

Centres 2 and 3 combined

No statistical analyses were possible for Centres 2 and 3 because the exam pass rates were so low.

Discussion

The study investigated educational provision and learner self-report factors associated with success in adult L2 learners of BSL. Success rates were compared at Levels 1 and 2, and at teaching centres that differed in their mode of delivery. The relationship between a range of personal variables and success on the course was also examined.

The end of course statuses differed significantly between Level 1 and 2 for all three centres and with either medium or large effect sizes. The overall pass rate for Level 1 across the three centres was 68% and for Level 2 was 25%. This reflects the much greater difficulty of the Level 2 course. For BSL, Level 2 marks a point where learners move from an introduction to the language, its basic features and a focus on learning basic signs, to engage more fully with the complexity of the sign language such as learning aspects of its unique and 'alien' visuo-spatial grammar and Deaf culture.[3] Level 2 may also mark the point in sign language learning where the beginning of a lifestyle change is required to support their language learning, whereby learners require the commitment to enter deaf environments outside class and develop relationships with Deaf people (Jacobs 1996). As such, it would seem likely that students progressing from a Level 1 course to a Level 2 course would have a much more challenging learning experience at Level 2.

Data were collected from three teaching centres which differed in aspects of their mode of delivery. Centre 1 included several initiatives in their provision which were not typical including: a deaf awareness course before staring Level 1, a summer preparatory course prior to Level 2, input from a hearing tutor and additional weekly conversational classes practice. Centres 2 and 3 offered provision that was typical in the UK sector, a single weekly class. The data showed higher exam success rates at Centre 1 and lower withdrawal rates compared to Centres 2 and 3 at Levels 1 and 2, with a medium effect size seen at Level 1 and a large effect size seen at Level 2. Because these initiatives were delivered together, it is not possible to say with certainly which were influential. Equally, it is possible that other factors which were not measured, such as tutor motivation and initiative, contributed to the higher pass rate. However, we would speculate that the extra conversational practice was at least a contributory element to the large effect size seen at Level 2, because of its frequency, duration and the fact that conversation formed part of the course assessment. Kyle et al. (1981) and Kyle and Woll (1985) observed in their study that greater frequency of classes was associated with greater ability to translate signed videotapes, thus it is possible that the better performance at Centre 1 was influenced by the greater frequency of the 'classes'. It is also informative to note that the Centre 3 Level 2 course, which ran over two years, did not lead to a higher exam success rate than the other two centres. This suggests that simply increasing the duration of the Level 2 course in this way was not effective.

The influential individual factors associated with exam success varied across Levels 1 and 2, and between centres with different provisions. Statistically significant results showed either small or medium effect sizes. At Level 1 in Centre 1, participants who did not use the term 'general interest' as a reason for taking their course were more likely to pass. It would appear that the more specific purposes expressed by participants' who did not use this term translated into better performance on their course. At Level 1, for Centres 2 and 3, there was a trend for increasing levels of education and previous experience of studying a foreign language to be associated with exam success. A regression analysis found these two variables explained mostly the same variance in the exam success variable. It is not possible to say with certainty

exactly what underlay the relationships between the educational variables and exam success. However, the fact that level of education (school versus university) explained the most unique variance in the regression, is suggestive of a more general effect of level of education. Given this, it may be that a factor associated with academic success, or a combination of them, could underlie the effect. Possible underlying factors include variables such as intelligence, conscientiousness and internal motivation (Kappe & van der Flier, 2012).

At Level 2 in Centre 1, three variables predicted unique aspects of exam success. First, participants who expressed the desire to work with deaf people in non-instrumental terms as a reason for taking the course were more likely to pass the course. In contrast, participants who expressed this desire in instrumental terms, for example by mentioning the terms 'career' or 'job prospects' in their answer, were not more likely to pass the course. In terms of its emphasis on integrative motivation, this finding is broadly in line with Lang et al. (1996) who observed a significant positive relationship between a global measure of the integrative motivation and sign proficiency.

Second, participants who reported having significant contact with deaf signers outside class were also more likely to pass the course. Analysis of the sign language contact sub-categories showed that the effect came primarily from visits to the deaf club, and to a lesser degree from work contact. The effect is likely to reflect the signing practice this contact provided. Kyle and Woll (1985) have argued that language immersion opportunities with deaf people are important for developing good signing skills and overcoming problems such as transfer to L2 from a person's first language, while Quinto-Pozos (2011) notes that visiting deaf clubs can enhance hearing signers' cultural knowledge. Contact with signers may also increase student motivation to learn sign language because of the need to communicate with the signer. However, as Pivac (2014) notes, interaction between hearing sign language learners and deaf signers is interdependent in nature. Different learning centres vary in their access to deaf signers and the willingness of deaf community members to accept and interact with hearing learner signers may depend on their attitudes towards hearing people and experiences of them.

Third, participants who had higher levels of extraversion, particularly in terms of social interaction and communication, were more likely to pass the course. Higher levels of extraversion may have helped participants in several ways. For example, L2 learning requires more interaction with tutors and other students than other subject areas (Pfanner 2000). Further, producing sign language is analogous to performance where the signer becomes the centre of attention (McKee 1992). Having higher levels of extraversion may help with the performance elements of signing in class such as this, and in the conversational elements of the exam. Equally, outside of class, being more extravert may help to create a willingness to communicate with other signers and visit deaf clubs. Such contact with signers is likely to be to the learners' benefit. Gomez et al. (2007) tested the relationship between five aspects of personality (social introversion, self-strength, dependence, dominance and social responsibility) and success at learning LSE and found that only dominance was related to success.

Taken overall, the variables that were related to exam success at Level 2 appear to be greater in number than those at Level 1. In keeping with the higher level of the Level 2 course, the variables also appear more specifically related to sign language and the need to actively engage with it. For example, both extraversion and contact with deaf signers only showed a significant relationship with exam success at Level 2.

Because of space limits, we have concentrated on the variables that showed significant relationships with exam success, however, it is also important to consider the variables that did not show a relationship.

Some significant effects seen in past studies were not replicated in this study. These include effects of age (Bergfield-Mills & Jorden 1980) and visual processing (Gomez et al. 2007; Kyle & Woll 1985; Kyle et al., 1981). Further, given that Pfanner (2000) observed a significant correlation between L2 anxiety and end of course grade, it is surprising that in the current study confidence levels in passing the course did not show a significant relationship with exam success. The differences in results may stem from factors such as differences in the way the concepts were operationalised in the studies, the timing of the measures, the samples, or in the specific sign language being tested. For example, past studies used objective measures of visual processing, whereas our study used a self-report measure of visual thinking style. Also, whereas Pfanner measured 'anxiety' from the middle of their sign language courses, our study measured 'confidence' in the first half of the courses. Futhermore, Peterson (2009) has argued persuasively that beliefs about sign language learning may affect success at learning ASL. However, our single item test of beliefs about the difficulty of learning signed versus spoken language, showed no significant relationship with exam success.

The study had some limitations that should be borne in mind when interpreting its results. These include the fact that because Centre 1 used multiple initiatives simultaneously, it was not possible to 'unpack' exactly which of these underlay its higher success rates. Also the study's quasi-experimental / correlational design limits the inferences that can be made about causality and the exact nature of some of the significant relationships that were observed. Despite having advantages, the use of only self-report measures limited the range of possible variables the study could assess, and how constructs were assessed. Thus, for example, variables such as intelligence could not be studied. Also, the accuracy of self-report responses can be influenced by factors such as introspective ability, memory, image management, interpretation or understanding of questions, and responses biases such as the acquiescence effect (Paulhus & Vazire, 2007). Exam success was only measured as pass versus fail and withdrawal combined in some analyses, this was because of the limits of the sample size and data requirements of the tests involved. However, it is possible that the reasons for a student's withdrawal from a course may be of a different nature to those underlying a student's failure of an exam. Multiple statistical tests were carried out, so it is possible that some of the effects observed were due to chance. Despite the relatively large sample size, it was still not possible to adequately assess some of the variables, and when the data were broken down by level and centre sample sizes became smaller than we would have wished. Also, since the data were collected some aspects of the CACDP approach have changed. For example, their courses have now become split into modules whose exams are smaller, taken at points through the academic year and can be retaken multiple times. Nonetheless, the study explored several aspects of sign language learning that have not been explored before, and despite the limitations of the study, meaningful and important relationships were seen, some of which showed large effect sizes.

Future work could build on this study by repeating it in the context of the current modular course. A wider range of variables could be tested and objective measures of variables such as IQ included. Quinto-Pozos (2005) distinguished between factors influencing the learning of sign language which are changeable and some that are unchangeable, research which provides information on factors that are open to change would seem particularly valuable.

Conclusions

The Level 1 and 2 courses differed markedly in difficulty. For BSL, Level 2 appears to mark a point where learners move from an introduction to the language to engage more fully with the complexity of the sign language. Enhancements to educational provision, such as the use of extra conversational classes, appeared to play a role in increasing exam success rates and when combined, generated medium or large effect sizes. The individual variables associated with exam success varied between levels, and between centres that differed in their course provision, and at Level 2 were more numerous, and more specifically related to the learning of sign language and the need to actively engage with it. In our study influential individual variables generated small or medium sized effects. These results offer insights into the factors that affect the success rates of people learning sign language.

End notes

1. Sign languages are different languages in the same way that spoken languages are different languages. This is true even when they share a similar surrounding spoken language such as is the case for ASL and BSL, because each has a unique history of development. Here we review the findings from empirical studies that have investigated the factors that affect learning a sign language from BSL, ASL and LSE as a whole. This is done because of their shared modality and their shared use of a visuo- gestural grammar.

2. In 2009 CACDP changed its name to ‘Signature’.

3. We follow the convention established by Woodward (1972) to use ‘D’ to refer to deaf people who identify with a sociocultural understanding of deafness, and ‘d’ to refer to deaf people who identify with a medical understanding of deafness or when talking about deafness in a general context.

References

Bergfield-Mills, C. and Jorden, K. 1980. Timing sensitivity and age as predictors of sign language learning. *Sign Language Studies 26*(3): 15-28. DOI: 10.1353/sls.1980.0011

Buisson, G. J. 2007. Using online glossing lessons for accelerated instruction in ASL for preservice deaf education majors. *American Annals of the Deaf, 152*(3), 331-43. http://dx.doi.org/10.1353/aad.2007.0025

Cohen, B. H., and Saslona, M. 1990. The advantage of being an habitual visualiser. *Journal of Mental Imagery*, *14*(3-4): 101-112.

Cohen, J. 1988. *Statistical Power Analysis for the Behavioural Sciences*. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Assoc.

Coolican, H. 2014. *Research Methods and Statistics in Psychology* 6th edition. Hove, United Kingdom: Psychology Press.

Costa, P. T., Jr., and McCrae, R. R. 1985. *The NEO Personality Inventory manual.* Odessa, FL: Psychological Assessment Resources.

Council for the Advancement of Communication with Deaf People. n.d. *CACDP Qualifications*. Retrieved from www.cacdp.org.uk. Accessed 20/06/05.

Dörnyei, Z. 2005. *The psychology of the language learner: Individual differences in second language acquisition*. Mahwah, NJ: Lawrence Erlbaum.

Eysenck, H. J. and Eysenck, M. W. 1985. *Personality and individual differences*. New York, NY: Plenum Press.

Field, A. 2013. *Discovering statistics using IBM SPSS statistics.* 4th ed. London: Sage.

Furman, N., Goldberg, D. and Lusin, N. 2010. *Enrolments in languages other than English in United States institutions of higher education, Fall 2010*. Retrieved from http://mla.org/2009_enrolementsurvey

Gardner, R. C. 2001. Integrative motivation and second language acquisition. In *Motivation and second language acquisition*, eds. Z. Dörnyei and R. Schmidt, 1-19. Honolulu: University of Hawaii, Second Language Teaching & Curriculum Center.

Gomez, M. J. L., Molina, T. B., Benitez, P. P., and de Torres, J. S. 2007. Predicting proficiency in signed language interpreting: A preliminary study*. Interpreting 9*(1): 71-93. http://dx.doi.org/10.1075/intp.9.1.05lop

Hathaway, S. R. and McKinley, J. C. 1971. *Cuestionario de personalidad MMPI.* 6th ed. Madrid, Spain: TEA Ediciones.

Horwitz, E.K. 1996. Preliminary evidence for the reliability and validity of a foreign language anxiety scale. *TESOL Quarterly*, *20*(4), 559-562. http://dx.doi.org/10.2307/3586302

Jacobs, R. 1996. Just how hard is it to learn ASL? The case for ASL as a truly foreign language. In *Multicultural aspects of sociolinguistics in deaf communities series, vol 2*, ed. C. Lucus, 183-226. Washington, DC: Gallaudet University Press.

Kappe, R. & van der Flier, H. 2012. Predicting academic success in higher education: what's more important than being smart? *European Journal of Psychology of Education, 27*(4), 605-619. http://dx.doi.org/10.1007/s10212-011-0099-9

Kaul, T., Griebel, R. & Kaufman, E. 2014. Transcription as a tool for increasing metalinguistic awareness in learners of German Sign Language as a second language. In *Teaching and learning signed*

languages: International perspectives and practise. Eds. D. McKee, R. S. Rosen and R. McKee, 119-144. Basingstoke, United Kingdom: Palgrave Macmillan.

Kemp, M. 1998. Why is American Sign Language a challenge? *American Annals of the Deaf, 143*(3): 255-259.

Kyle, J. G. and Woll, B. 1985. *Sign language: The study of deaf people and their language.* Cambridge, UK: Cambridge University Press.

Kyle, J. G., Woll, B. and Llewellyn-Jones, P. 1981. Learning and using British Sign Language: Current skills and training of hearing professionals. *Sign Language Studies, 31*(4): 155-178. DOI: 10.1353/sls.1982.0010

Lang, H. G., Foster, S., Gustina, D., Mowl, G. and Liu, Y. 1996. Motivational and attitudinal orientations in learning American Sign Language. *Journal of Deaf Studies and Deaf Education, 1*(2): 137-144. http://dx.doi.org/10.1093/oxfordjournals.deafed.a014287

McKee, D., Rosen, R. S. & McKee, R. 2014. Introduction. In *Teaching and learning signed languages: International perspectives and practise*. Eds. D. McKee, R. S. Rosen and R. McKee, 1-7. Basingstoke, United Kingdom: Palgrave Macmillan.

McKee, R. L. and McKee, D. 1992. What's so hard about learning ASL?: Students and teachers' perceptions. *Sign Language Studies, 75*(4) 129-157. DOI: 10.1353/sls.1992.0000

Pivac, L. 2014. Learner autonomy in New Zealand sign language interpreting students. In *Teaching and learning signed languages: International perspectives and practise*. Eds. D. McKee, R. S. Rosen and R. McKee, 197-221. Basingstoke, United Kingdom: Palgrave Macmillan.

Paulhus, D. L. & Vazire, S. 2007. The self-report method. Robins, R. W., Fraley, R. C., & Krueger, R. F. (Eds.), *Handbook of research methods in personality psychology,* 224-239. New York, NY, US: Guilford Press.

Peterson, R. 2009. *The unlearning curve: Learning to learn American Sign Language*. Silver Spring, MD: Linstock Press.

Pfanner, N. 2000. *Anxiety in the American Sign Language student*. Proceedings of the 13th National Convention Conference of Interpreter Trainers, Portland, Oregon, 76-88. Silver Spring, MD: RID Publications.

Quinto-Pozos, D. 2005. Factors that influence the acquisition of ASL for interpreting students. In *Sign language interpreting and interpreter education: Directions for research and practice*, eds. M. Marschark, R. Peterson, and E. A. Winston, 159-187. New York, NY: Oxford University Press.

Quinto-Pozos, D. 2011. Teaching American Sign Language to hearing adult learners. *Annual Review of Applied Linguistics, 31*: 137-158. http://dx.doi.org/10.1017/S0267190511000195

Segalowitz, N. 1997. Individual Differences in Second Language Acquisition. In *Tutorials in bilingualism: Psycholinguistic perspectives*, eds. A. M. B. de Groot, and J. F. Kroll. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Slike, S. B., Chiavacci, J. P. & Hobbis, D. H. 1989. The efficiency and effectiveness of an interactive videodisc system to teach sign language vocabulary. *American Annals of the Deaf, 134 (*4): 288-290. http://dx.doi.org/10.1353/aad.2012.0694

Thoryk, R. 2010. A Call for Improvement: The Need for Research-Based Materials in American Sign Language Education. *Sign Language Studies 11*(1), 100-119. http://dx.doi.org/10.1353/sls.2010.0002

Viera, A. J. and Garrett, J. M. 2005. Understanding interobserver agreement: The Kappa statistic. *Family Medicine, 37*(5): 360-363.

Wechsler, D. 1995. *Escala de inteligencia para adultos (WAIS).* 10th ed. Madrid, Spain: TEA Ediciones.

Woodward, J. C. 1972. Implications for sociolinguistic research among the deaf. *Sign Language Studies, 1*: 1-7. http://dx.doi.org/10.1353/sls.1972.0004

Witkin, H. A. 1950. Individual differences in ease of perception of embedded figures. *Journal of Personality, 19*(1): 1-15. http://dx.doi.org/10.1111/j.1467-6494.1950.tb01084.x