On the Potential for Television to Improve Listening Comprehension

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Abstract

Many consider extensive reading to be a viable method to increase student's language abilities, but what of extensive listening? This paper aims to shed light on what role television or film can play in language acquisition, and what potential it has to improve listening proficiency. The advantages and disadvantages of using video in the English classroom are reviewed, and negative points are addressed through a research experiment which proved that specialized software and a unique subtitle training approach can result in improvements in listening comprehension. This experiment showed that students had great difficulty hearing the actual words spoken at natural speeds, even when supported by subtitles, but could catch more words spoken when the speed of the video was modified. Furthermore, it was shown that aural practice with a unique subtitle training method can result in improvements in listening ability. This study also showed that a careful selection of video can result in an increase in motivation.

Keywords

subtitles, listening comprehension, television, software, motivation

Introduction

Horst, Cobb, and Meara (1998) stated that "it is well established that reading is one of the main ways of learning words" (p. 207). However, what of television viewing? In 2007, the average Japanese watched 3.75 hours worth of television per day (OECD, 2007). At that rate, a student could be exposed to over 19,500,000 tokens (words) per year. If one is to agree with Cobb's (2008) study on how much students can read, then this amount of television viewing (1,368 hours/year) is very close to what he believed students can realistically read (1,518 hours/year). Furthermore, statistics show that people "spend a much larger amount of time watching television than they do reading" (Webb & Rodgers, 2009b, p. 336).

Just as Cobb (2008) criticized McQuillan & Krashen's (2008) estimates on how much students can comprehensibly read, this research paper takes the stance that authentic video alone may be way beyond what a typical second language learner can handle without captions,

subtitles, specific strategies, supplementary materials, preparatory pre-teaching, or teacher guidance.

Overview of issues related to the use of video in the language classroom

Advantages to using video

Smith and Rawley (1997) stated that the use of authentic video is more and more prevalent in classrooms because it "offers students opportunities to hear language intended for native speakers" (p. 1). Cakir (2006) believed that "it is obvious that the use of video is a great help for foreign language teachers" (p. 1). Television and movies may be preferable to students who are weary of reading. Decure (1994) stated that students subconsciously think that watching video "is not work" (p. 27). Neuman and Koskinen (1992) pointed out that "the entertaining qualities of television make it a relatively 'easier' medium to access than text" (p. 6). In addition, the current trend of highly addictive television dramas which week after week end in cliffhangers, such as *24, Lost, Prison Break* and *Heroes,* makes these ideal choices for increasing motivation.

The visual images that video provides can also aid students in comparison with simple listening activities. Neuman and Koskinen (1992) stated that in their research project that "the visual representation of words in video form appeared to be an important contributor to students' increased word knowledge" (p. 21). In addition, students are also exposed to facial expressions and body language to aid understanding (Burt, 1999, p. 1).

Furthermore, video is an opportunity for students to learn culture. "Video shows them how people behave in the culture whose language they are learning" (Cakir 2006, p. 2). Thus, the potential for video to teach is multi-faceted, and should be considered.

Disadvantages to using video

However, there are potential disadvantages to using video. Burt (1999), a proponent of using videos, believed that the "use of authentic video is challenging" (p. 2). There have been numerous studies that indicate the addition of either closed-captioning or subtitles increases learning, such as Neuman & Koskinen (1992), and Markham (1999). However, the use of captions was admitted to be "a challenge to even the most accomplished developing readers (Spache, 1981, as cited in Neuman and Koskinen, 1992, p. 25). Danan (2004) also agreed that "captioning may not be suitable for all materials and viewers at all levels of language proficiency"

(p. 72). For example, the news video *Ins and Outs* used in Decure's (1994) study was actually an oralization of a written text and is thus obviously on the higher end of rate of words per minute (wpm) at 350. Neuman and Koskinen's (1992) use of the 8-12 year old children geared show *3-2-1 Contact* came in at the lower end at 120 wpm. An examination of the script for episode 1 of *Heroes*, the television drama used in this research project, resulted in an average of 240 wpm. So, this begs the question: How much of the language can students comprehend at this rate with the aid of subtitles, training, and specialized software.

In Decure's (1994) study, it actually took 30 minutes for full comprehension of a mere 2 minutes of video (p. 29). If reading becomes arduous and comprehension suffers "when unknown word densities exceed 5%" (Cobb, 2008, p. 113), what of authentic video where even when supplanted with subtitles the comprehension rate averaged around 30-40%, as was in this project? At what point do students simply 'shut off' and just read the subtitles alone at these rates?

Cakir (2006) stated that video can have a positive contribution as long as it is "used at the right time, in the right place" (p. 1). Neuman and Koskinen (1992) also pointed out that some researchers question the ability of students to handle the task load of having to comprehend visual, written, and auditory stimuli at the same time, but their experiment proved this to be a non-issue. Krashen's (1985) comprehensible input hypothesis may be coming into play in that there may be a minimum proficiency needed for students to be able to comprehend the materials. Neuman and Koskinen (1992) agreed in that "without direct teacher intervention, input alone is not sufficient for those who are below a threshold of linguistic competence" (p. 28). Danan (2004) also pointed to research which suggest a "minimum language competency threshold for learners to derive benefits from captioning" (p. 73). In these cases where student proficiency levels are not sufficient for beneficial use of captioning, teachers may opt to use subtitles as an alternative. Danan also pointed out that simple unfamiliarity with the use of subtitles as a learning tool may lead to poor gains, but over time, practice should lead students to "develop strategies to process subtitles efficiently and derive the most benefits from them" (p. 76).

However, while reverence for intensive/extensive reading is almost a given in any ESL program, the same cannot always be said for the intensive/extensive use of film, which can be viewed by some as "mere entertainment" (Cakir, 2006). The same can be said for television, which is surely lower in the echelon of what is considered appropriate materials for the ESL

classroom. Even within society itself, the viewing of the television cannot compete with the image of prestige that reading fine literature conjures. Apart from being held in this regard, many informed teachers view video to be a "powerful, instructional tool known to have a motivational, attentional, and affective impact on viewers" (Danan, 2004, p. 2). Neuman and Koskinen (1992) pointed out that "it is probably a serious oversight to discount television as a medium for word learning" (p. 27).

Furthermore, even if the use of video is accepted, the use of subtitles may be discouraged. It is true that this can lead to students only paying attention to their mother tongue, or it may even foster what some could consider to be "a form of laziness bordering on cheating" (Danan, 2004). Danan also mentioned how some foreign language methodologies have tended "to discourage any use of the first language" (p. 73).

Generally speaking, teachers play "a key role in using the video as an aid for language teaching for s/he has the prime responsibility for creating a successful language learning environment" (Cakir, 2006, p. 2). Thus, teachers need to be prudent in their approach to the video-aided language lesson. Neuman and Koskinen (1992) insisted that specific instructional strategies that cater to the differences in learner levels always be used when working with video. Danan (2004) also agreed that "learners often need to be trained to develop active viewing strategies for an efficient use of captioned and subtitled material" (p. 67). Captioning or subtitles may even be viewed as being crucial, in that "without the availability of captions and subtitles, the complexity and transient nature of the audiovisual input often make it difficult for language learners to truly comprehend foreign utterances" (p. 77).

One of the aims of this research paper was to disprove the notion of "exclusive subtitle orientation" (Danan, 2004, p. 74), or the idea students are unable to process both the auditory and written input simultaneously, when provided with comprehensible input. While it is true that the speed of television and film may lead students to rely solely on subtitles, if students are provided with comprehensible input they should be able to process both input modes and make gains in language learning.

Software

Cakir (2006) mentioned that "teachers need technologies relevant to the teaching-learning situation" (p. 1). One piece of software that is extremely useful for helping second language

learners increase their listening comprehension is *VLC Media Player* (2001). This free software mainly serves to playback videos on a computer, but it also has a special function which enables the player to subtly adjust the speed of the video while not modifying the pitch of the audio. This function can be found on the bottom right hand side of the playback window once you start to play a video. Thus, a video can be slowed down to 90% of its regular speed which increases the potential for students to catch what is said, but does not impede on the overall watchability of the video or distort the audio. Cakir (2006) mentions playing video "in slow motion or at half speed or without sound" (p. 2), but *VLC Media Player* (2001) can subtly adjust the speed, include sound and keep it at a natural pitch. Therefore, it's perfect for language learners who cannot handle the speed of natural speech in a video.

Video selection

Choosing either a television series or a movie series is a difficult decision for a language teacher. Webb and Rodgers' (2009a & 2009b) research found that knowledge of 3,000 word families was needed for both movies and television when proper nouns and marginal words were included. This similarity supports the use of either medium; however, a specific type of television series may be preferable for a number of reasons. A television series with a continuous storyline is ideal in that students would be able to use their background knowledge of previously viewed episodes to help aid comprehension. In addition, a series with multiple seasons is also ideal in that highly motivated students could continue to watch on their own even after the semester has ended. The same could be said for a movie series, but the breakdown of television into 45 or 60 minute episodes make it ideal for a typical class that lasts for 60 or 90 minutes.

Research Questions

This paper will address the following research questions:

    1. To what extent can the target students catch the natural speed of a television show?

    2. Can software help aid students in listening?

    3. Can training using subtitles result in increased listening skills?

    4. Can the use of television in the language classroom result in increased motivation?

Methodology

Materials

First, a television series was selected. The highly addictive nature of recent popular television shows such as *Heroes, Lost, 24*, and *Prison Break* made them strong candidates. *Lost*, although known for its addictive quality, has a quite complex and confusing storyline and therefore was not considered. Out of the last three, *Heroes* was chosen because of its use of light humor and the fact that one of its main characters is actually Japanese and sometimes speaks Japanese within the show itself. It was also considered that this factor may have an effect of easing the anxiety of Japanese students of watching an authentic video each week.

Procedure

Subtitles were used instead of captioning because of the students' level. Subjects involved in this study were all Japanese university freshmen, and were from the third band on a 1-5 level banding system which banded students by Benesse Corporation's GTEC (Global Test of English Communication) (2004). Students assigned to the level three band had a GTEC score within the range of 172-209 points. While a level one class may be able to benefit from using captioning, at level three it was assumed that using subtitles would be necessary for overall comprehension of the story.

Cakir (2006) advised that teachers "encourage the learners to watch the films actively, by using the supplementary materials" (p. 5). It is not enough to simply provide comprehensible input, and expect incidental learning to occur. Thus, a handout (see Appendix A for an example) containing specially chosen phrases from the subtitles was specifically used to train students to comprehend both the auditory and written input simultaneously. Each was written in the students mother tongue, Japanese, and ranged from 7-10 separate phrases per 45 minutes of video. The total number of tokens for each lesson was approximately 50.

The selected phrases ranged from 5-15 words long, and only those with an average amount of difficulty were chosen. Phrases that were said too slowly were avoided, as well as phrases that were said quickly. An attempt was made to choose phrases which only included familiar vocabulary, and an effort was also made to avoid choosing phrases which occurred with a large amount of background noise. In addition, phrases whose subtitle was a direct translation were avoided to circumvent guessing. For example, '*Nondemo ii*' was used, and the actual

English spoken was '*Are you sure this is ok?*'. A direct translation of the actual Japanese would be something akin to '*Is it ok to drink?*'. All of the selected phrases were spaced evenly throughout the 45 minutes as well. Each week, students were given the handouts and given five minutes to review them to prepare. When the phrase occurred in the video, the video was paused for about ten seconds to give students a chance to write what they heard while the subtitle was displayed on the screen.

Pilot Study

A pilot was first conducted to test the validity of the instrument with two university freshmen level three classes. One class acted as the control group and watched the video at normal speed, while the other watched it at 90% of normal speed with *VLC Media Player*'s (2001) speed adjustment feature. Each class had 27 students. The Rasch model was used for person and item analysis to establish the construct validity of the instrument.

Experiment

Once the instrument was modified according to the results of the pilot and deemed acceptable, the same experiment was conducted again, this time with two level three Japanese university freshmen classes from the same university as the students in the preliminary study. One class had 18 students and the other had 20.

Questionnaire

To gauge whether the treatments had any motivating effect on the students, a questionnaire was administered to determine whether they actually enjoyed studying in this way. A one to ten Likert scale was used to rate how much they enjoyed this aspect of the course, with ten being the highest score. Students were also asked if they would like to watch more of the television show, and if they had a chance, would they watch it on their own.

Results

Results of the pilot study

In the pilot, a thorough Rasch-based item analysis was conducted to remove items found to be *misfitting*, or in other words, not adhering to the expected ability/difficulty pattern (Bond and

Fox, 2007). Out of 499 items, this analysis resulted in 124 items being flagged as misfitting. Again, as with the person analysis, items only went beyond the acceptable parameters in the outfit category. Differently from the person analysis, though, was the fact that some items overfit the model. Nevertheless, most underfit the model.

Through a series of reiterative analyses, outliers and misfitting data were deleted. In total, eight separate item analysis were run. By the seventh analysis, person separation dropped from 5.34 to 5.33 and by the eighth run, person separation dropped again (5.33 to 5.32), item separation dropped (2.93 to 2.91) and item reliability dropped (.90 to .89). Therefore, it was deemed that the 6th analysis resulted in the best fit for the data. It had good person separation (5.34), good person reliability (.97), good item separation (2.93), and good item reliability (.90). The nine misfitting items in the seventh and eighth analysis were just on the edges of the parameters (for example, 1.31, .73) and the subsequent drops in reliability and separation that occurred led the 6th analysis to be judged the best fit for the model (see Appendix B).

Results of the experiment

The experiment was conducted with the modified instrument and through an iterative analysis, 11 persons were flagged as misfitting and were deleted. An initial analysis of data identified six misfits being found. Repeating the same method resulted in an additional two being deemed as misfitting. A third and final analysis resulted in the identification of a further three persons, bringing the total to 11 misfits (see Appendix C).

Analyzing mean square fit statistics with the parameters for identifying misfits at above 1.3 and below .75 (Bond and Fox, 2007, p. 240) resulted only in persons underfitting the model in the outfit category. Throughout each analysis, there were no individuals who overfit the model, in either the infit or outfit categories. Thus, the tendency to underfit shows that certain students tended to have too much variation and/or were unpredictable in their answers.

The results of the main experiment can be seen in Table 1 and 2 below. This is after two 45 minute viewings to get students acclimated and eight sessions of training.

Table 1. *Control Group Results*

Class	1	2	3	4	5	6	7	8	Mean Averages
Student									
1	30	32	42	50	46	52	44	54	44
2	34	38	42		40		38	40	39
3	28	38		58	52	40	50	58	46
4		34		50	52	52	46	54	48
5	28	34		38	32	34	38	40	35
6	30	38	30	40	44	44		48	39
7	22	36	28	42	36	38	40	42	36
8	26		32	34	30	34	40	42	34
9	30	30	36	48		40	46	46	39
10	26	34	20	32	26	32	34	34	30
11	16	32	36	50	40	50	52		39
12		42	36	52	52	48	48	54	47
13	10	44	44	48	46	50	48	58	44
14	22	30	32	44	46	38	40	42	37
15		22	26	36	28	30	38	40	31
16	12	28		42	40	42	48	54	38
17	24	30	24	34	30	32	30	32	30
18	*8*		26	28	26	28	34	30	*26*
19		40	30	52	54	58	50		47
20	32	44	56	58	54	62	64	<u>72</u>	<u>55</u>
Averages	*24*	35	34	44	41	42	44	<u>47</u>	39

Table 2. *Experimental Group Results*

Class	1	2	3	4	5	6	7	8	Mean Averages
Student									
1	44	38	30	32	40	48	54	52	42
2	36	32	30	44	40	42	46	44	*39*
3	40	44	50	50	48	58	50	60	50
4	50	44	54	64	62	68	60	68	59
5	42	46	52	46	48	40	50	52	47
6		34	34	50	44	56	60	62	49
7	40	40	32	50	54		56	54	47
8	32	34	32	42	44	40	46	44	*39*
9	40	46	36	46	42	48	50	54	45
10		40	36	48	50	50	58	64	49
11	46	54	60	58	64		48		55
12	48	52	70	70	68	72	78	<u>82</u>	<u>68</u>
13		46	62	54	58	62	62	66	59
14	46	48	66	76		70	78	78	66
15	*26*		42		44	48	46	50	43
16	32	26	20	46	44	48	52	56	41
17	44	44		48	46	50		52	47
18	42	38	38	44	40	46	42	48	42
Averages	*41*	42	44	51	49	53	55	<u>58</u>	49

Note. All scores represent percentages correct. Italics mean low percentages. Underlining means high percentages. Blank cells indicate the student was absent.

The experimental group's overall average percentage of correct answers was approximately 10% higher than the control group. The average correct for the control group was approximately 39% while the average correct for the experimental group was approximately 49%. The experimental group's students' averages for each particular class also outperformed the control group's scores.

The experimental group also outperformed the control group in per class low and high scores. The lowest percentage for the experimental group for any particular student for a particular class was 26%. The control group's lowest percentage was 8%. Furthermore, the

highest percentage recorded for the experimental group was 82%, while for the control group it was 72%.

Results of the questionnaire

The results of the questionnaire showed that every student rated watching *Heroes* at ten out of ten on a Likert scale with ten being the highest. Every student surveyed also answered yes to whether they would like to study in this way again and if they would watch *Heroes* again if they had the chance on their own.

Discussion

The results of this study show that the students tested had great difficulty with the natural speed of authentic materials. Even the experimental group only could catch on average 49% of the words being said, and at most 58% at the end of eight classes of training. This pales in comparison to the need for 98% of words in a text being understood for unaided comprehension to occur in reading (Nation, 2006). Therefore, the answer to the first research question, to what extent can the target students catch the natural speed of a television show, is that students miss much of what is being spoken in a television show played at natural speed. In such a case, teachers need to employ supplementary measures to help students fully comprehend such materials.

With the experimental group outperforming the control group on average 10%, and outperforming them in every single class as well, it is clear that the use of the *VLC Media Player's* (2001) speed adjustment feature resulted in increased listening ability, and therefore the answer to the second research question, whether software can help aid students in listening, is affirmative. Such software should thus be considered by teachers as an essential tool to aiding students' comprehension of authentic materials when it is needed.

The answer to the third research question, whether training using subtitles can result in increased listening skills, is also affirmative. In both control and experimental groups, students were able to improve on their ability to catch what was being said. These results point to the value of such a method in increasing listening ability.

Finally, the answer to the fourth research question, whether the use of television in the language classroom results in increased motivation, is again affirmative. Every student involved

in this study rated this method of studying ten out of ten, and not only said yes to whether they would like to study in this way again, but also that they would watch the television show on their own if they had a chance. Thus, such authentic materials obviously have the potential to increase motivation and create more autonomous learners.

Conclusion

The results of this study showed that the speed of authentic video was challenging enough for the students tested to necessitate additional measures if comprehension is expected, and that the use of software which alters the speed of speech can result in more words being caught. This study also highlighted how training using subtitles is a viable approach which can result in increased listening skills, and finally that the use of television in the language classroom can result in increased motivation.

The gains in learning achieved through the unique method of subtitle training with the use of the aforementioned supplementary materials, in addition to the use of the software should thus be taken as a serious approach to listening comprehension training.

Burt (1999) states that "videos are a powerful tool in helping English language learners improve their language skills" (p. 9). Burt later states that "teacher's guidance is key in facilitating this medium to improve adult English language learner's communication skills..." (p. 9). This study has shown that these two quotes are fully dependent on each other. They should rather be reworded to emphasize how videos can be a powerful tool for very advanced students, but that teacher guidance is essential to making them truly useful, especially in regards to lower and intermediate level students.

This study has shown that television viewing, paired with careful selection, teacher guidance, and training has the potential to aid language learning just as much as McQuillan and Krashen (2008) believe reading can. Its high motivational properties, its ability to teach culture, gestures, etc. and its accessibility are also key aspects to this potential. Such a method should thus be considered as a viable and legitimate approach to listening comprehension training and vocabulary building.

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Appendix A

A sample of a lesson's target subtitle phrases

1．今日はここまで　(8 words)

I'm sorry. I'm out of time.

2．またガス止められた　(9 words)

That's why they turned off our gas again.

3．親父は死んだ忘れろよ　(7 words)

Dad's gone. Just get over it.

4．お金なら返すわ　(7 words)

Please, I can get you the money.

5．１０分で行くよ　(7 words)

I can be there in ten minutes.

6．ここで降ろして　(6 words)

I'll hop out here please.

7．君の名だ　許可証にある　(6 words)

Your name, on your license there.

Appendix B

Final Item Fit Analysis Results

Per. Total	Items	Per. Real Sep.	Rel.	Item Real Sep.	Rel.
28	499	5.34	0.97	2.93	0.9

Entry Num.	Mea.	Model S.E.	Infit MNSQ	Infit ZSTD	Outfit MNSQ	Outfit ZSTD	Pt.Me. Corr.
127	0.91	0.42	1.18	1.1	1.31	1.4	A 0.11
241	-0.61	0.43	0.97	-0.1	1.31	1.2	B 0.29
278	3.86	1.04	1.09	0.4	1.3	0.7	C 0.01
279	3.86	1.04	1.09	0.4	1.3	0.7	D 0.01
280	-0.26	0.41	1.26	1.8	1.3	1.4	E 0.03
139	-1.75	0.56	1.19	0.6	1.29	0.7	F 0
301	0.57	0.41	1.11	0.8	1.29	1.5	G 0.18
343	2.26	0.57	1.08	0.3	1.29	0.7	H 0.15
299	0.91	0.42	1.16	1	1.29	1.3	I 0.14
88	-0.09	0.41	1.13	1	1.29	1.5	J 0.16
31	1.71	0.49	1.22	0.8	1.28	0.8	K 0.06
229	2.26	0.57	0.93	-0.1	1.28	0.7	L 0.3
364	0.24	0.4	1.14	1.1	1.27	1.6	M 0.15
67	2.26	0.57	1.08	0.3	1.27	0.6	N 0.14
319	1.09	0.43	1.26	1.3	1.27	1.1	O 0.05
304	1.09	0.43	1.21	1.1	1.26	1.1	P 0.1
73	-0.43	0.42	1.18	1.2	1.25	1.1	Q 0.1
12	2.62	0.64	1.2	0.6	1.25	0.6	R 0.03
345	-0.8	0.44	1.18	0.9	1.24	0.8	S 0.09
27	-3.32	1.03	1.06	0.4	1.24	0.6	T 0.01
184	-3.32	1.03	1.06	0.4	1.24	0.6	U 0.01
168	1.71	0.49	1.24	0.9	1.13	0.5	V 0.1

267	3.1	0.76	1.07	0.3	1.24	0.5	W 0.13
114	-1.75	0.56	1.16	0.5	1.23	0.6	X 0.04
85	-1	0.46	1.14	0.7	1.23	0.7	Y 0.11
188	-1.75	0.56	1.16	0.5	1.23	0.6	Z 0.05

Better Fitting Omitted

50	-0.8	0.44	0.88	-0.5	0.77	-0.7	z 0.47
213	-1.47	0.51	0.88	-0.3	0.87	-0.1	y 0.38
341	1.49	0.46	0.88	-0.4	0.81	-0.5	x 0.47
269	0.4	0.4	0.88	-0.9	0.83	-1	w 0.5
105	-0.09	0.41	0.88	-0.9	0.83	-0.9	v 0.49
322	-1.47	0.51	0.88	-0.3	0.84	-0.2	u 0.39
84	-1.75	0.56	0.88	-0.2	0.84	-0.1	t 0.37
90	-1	0.46	0.88	-0.5	0.84	-0.4	s 0.43
119	-0.61	0.43	0.88	-0.7	0.81	-0.7	r 0.47
311	1.71	0.49	0.87	-0.4	0.77	-0.5	q 0.48
161	-1.75	0.56	0.87	-0.3	0.73	-0.3	p 0.4
162	1.49	0.46	0.87	-0.5	0.81	-0.5	o 0.49
215	0.07	0.4	0.86	-1.1	0.8	-1.2	n 0.52
208	0.24	0.4	0.86	-1.1	0.83	-1	m 0.51
363	1.97	0.52	0.81	-0.5	0.86	-0.2	l 0.49
106	-0.61	0.43	0.85	-0.8	0.75	-0.9	k 0.51
354	1.28	0.45	0.85	-0.7	0.74	-0.9	j 0.53
290	-0.43	0.42	0.84	-1	0.79	-0.9	i 0.52
202	-0.43	0.42	0.84	-1.1	0.77	-1	h 0.53
149	1.97	0.52	0.84	-0.4	0.81	-0.3	g 0.47
9	1.28	0.45	0.83	-0.8	0.75	-0.8	f 0.54
24	-1	0.46	0.83	-0.7	0.76	-0.7	e 0.49
102	0.73	0.41	0.83	-1.2	0.83	-0.9	d 0.54
49	0.4	0.4	0.83	-1.4	0.78	-1.3	c 0.56
362	1.97	0.52	0.77	-0.7	0.83	-0.2	b 0.53
10	0.91	0.42	0.83	-1.1	0.75	-1.2	a 0.57

Mean	-0.08	0.73	1.01	0.1	0.94	0.1
S.D.	2.46	0.47	0.09	0.5	0.19	0.5

Appendix C

Final Person Fit Analysis Results

Per. Total	Items	Per. Real Sep.	Rel.	Item Real Sep.	Rel.
28	499	5.1	0.96	2.92	0.89

Entry Num.	Mea.	Model S.E.	Infit MNSQ	Infit ZSTD	Outfit MNSQ	Outfit ZSTD	Pt.Me. Corr.
19	-0.33	0.12	1.12	2	1.26	1.9	A .61
14	1.57	0.13	1.24	3.2	1.17	0.9	B .56
11	0.72	0.12	1.14	2.1	1.2	1.4	C .60
18	0.04	0.12	1.07	1.1	1.18	1.5	D .63
16	0.14	0.12	1.01	0.2	1.14	1.1	E .64
28	-1.19	0.13	1.13	2	0.98	0	F .60
2	0.58	0.12	1.08	1.3	0.97	-0.2	G .63
22	-0.84	0.12	1.06	1.1	1	0.1	H .62
9	-0.15	0.12	1.02	0.4	1.06	0.5	I .64
12	0.1	0.12	1.03	0.6	1.04	0.4	J .64
27	-0.01	0.12	1.01	0.1	1.04	0.4	K .65
5	1.61	0.13	1.01	0.2	1.03	0.2	L .62
15	0.61	0.12	1.02	0.4	1.01	0.2	M .64
8	-0.3	0.12	1.02	0.3	0.98	-0.1	N .65
6	1.24	0.13	1.02	0.3	0.89	-0.6	n .63
21	0.17	0.12	1	0.1	0.99	-0.1	m .65

13	-0.48	0.12	1	0	0.94	-0.4	l .65
7	-0.05	0.12	0.98	-0.3	0.89	-0.9	k .66
25	0.41	0.12	0.94	-1	0.93	-0.5	j .67
23	0.64	0.12	0.94	-1	0.88	-0.9	i .67
1	0.35	0.12	0.93	-1.2	0.86	-1.1	h .67
10	-0.12	0.12	0.92	-1.4	0.81	-1.6	g .68
17	-0.91	0.12	0.92	-1.4	0.79	-1.4	f .67
3	0.47	0.12	0.91	-1.5	0.81	-1.5	e .68
4	-0.17	0.12	0.91	-1.6	0.9	-0.8	d .68
24	0.26	0.12	0.9	-1.7	0.9	-0.8	c .68
20	0.26	0.12	0.89	-1.8	0.77	-2	b .69
26	0.82	0.13	0.89	-1.7	0.78	-1.6	a .68
Mean	0.19	0.12	1	0	0.97	-0.2	
S.D.	0.65	0	0.09	1.3	0.13	1	

Author Bio

James Rogers is an assistant professor at Kansai Gaidai University. He is currently pursuing a PhD in applied linguistics examining the high frequency collocations of English. In addition to corpus linguistics, his other research interests include C.A.L.L. and vocabulary acquisition. James is also a developer of educational smartphone apps.