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Reading English Rates across Cultures : Differences according to L1, Gender, and Age

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ABSTRACT :

English-language-medium global distance education courses rely mainly on the student reading and writing text. The present study was designed to investigate the variance in reading rates according to the reader's first-language L1 and culture, gender, and age (over the range from 19 to 81 years old). About 850 persons were examined. Their various reading rates were compared between on-line (on a computer screen) and off-line (from a standard text-book). To accommodate the cultural and the gender differences in reading rates, implications and suggestions are given to improve both the on-line and off-line course design for lifelong learners. These include increasing the transactions with each reader's context through mathemagenic questions and activities, reducing the difficulty-level and content density and replace with some hypertext links to more examples/narratives on the one hand and other links to critical reasoning on the other hand, and choice in recommended books, to promote student autonomy, while increasing the complexity through tutor feedback and initiating the intrinsic motivations to learn. Wider implications include the correlation that slow readers were also slow writers. Further studies are proposed.

INTRODUCTION :

*“What barriers may inhibit successful course completion
- English as a second language ?”*

Woodley & Ashby (1994, p.20)

In open and distance education, the course workload need not be equivalent to the conventional campus-based course workload, since the course design and interaction variables are quite different. However, many distance students discover after enrolling that the required demands on their time are far greater than they had been led to believe : up to 50% more time has been reported to be needed, by Garg, Vijayshre & Panda (1992). Added to this, many conventional campus-based institutions of higher education worldwide are now adopting distance learning materials and methods (Selingo, 1998). When students cannot complete the required studying within the expected time, they feel overload and become at risk to dropping out. For this reason, it is good practice to determine accurately the time needed for completing a course and making this explicit at the outset. Moreover, technological advances in computer-mediated communications now require distance students to interact with the tutor, other students and internet resources in English-language-medium which is for many students a second-language, and the time needed for these interactions has not yet been factored into the calculations of course workload. Academic reading now entails both reading from texts off-line and reading from computer monitor on-line.

Reading rate varies according to the quality of the text and reading purpose. Also, the time needed to assimilate the intended meaning and rebuild one's personal understanding depends on the student's individual prior knowledge of cultural discourse schema and ways of thinking. Asians for example have been noted to be particularly slow at interacting in English-as-a-second-language by Mason (1998), and Japanese have also been found to be slow (Kawachi, 2000a). Chambers (1992) points out that sufficient time needs to be available for the student to employ a desirable deep approach to studying in which the student spends time to question and understand the content, relate new ideas to prior knowledge in a re-organisation of personal meaning, and relate this re-construction of knowledge to one's own context. A deep approach to reading involves the student adopting an aesthetic stance to transactions with the text. Most open and distance education courses mainly use print and text interactions for teaching and learning. Such text interactions with content and with other students and the tutor involve both on-line and off-line reading. Macdonald-Ross & Scott (1997, p.29) reported for course completion and achievement that “reading skill was the most important” for students in open and distance learning. An optimal approach is a flexible utilization of both deep and surface approaches according to the changing needs of the individual and the text.

The objectives of the present study were to measure the time needed for academic reading using English-as-a-second-language for students from different cultural backgrounds to discover any differences according to L1 first-language, culture, gender, and age. Native and non-native speakers of English were examined from different cultures since text is neurolinguistically processed in distinct ways by different cultures depending on their native first-language L1 (Kawachi, 2000a). Gender was investigated here since differences have been reported in off-line and on-line ways of interacting for learning (von Prümmer & Rossié, 2001). Age was investigated for promoting lifelong learning. The absolute number as well as the proportion of distance students who are old is increasing worldwide. In Japan, 25.40% of those engaging open and distance education at the University of the Air Japan are over 50 years old. While in Korea 5.78% at the Korean National Open University are over 45 years old. In the Singapore general population, there are now more than 21.7% over 45 years old – representing a ten percent increase in this age group in the past three years (Singapore, 2003). Globally, the percentage in the general population of those over 65 years old is expected to triple from 410 million in 1999 to over 1.2 billion in 2050 (Zhang & Ha, 2002). Old age does not necessarily bring a decrease in mental acuity or motivation to learn, and only physical conditions are expected to cause slower reading, while the cognitive condition of more prior experience could promote assimilation and faster reading rate (see Veith, 2000).

The actual process of reading shows wide individual variation but the process can be sub-classified according to the purpose for reading as shown in TABLE 1 below. A five-way taxonomy is also possible, to include R-2 non-academic browsing. The reading rate at R-2 may exceed several hundred words per minute, but the associated comprehension rate is relatively poor. The essential difference between reading at R-1 and reading at R-2 is that reading at R-1 is ‘public’ while reading at R-2 is ‘private’. When reading at R-1 for academic purposes there is reader expectation of some external assessment of the content to be recalled by the reader. This apprehension is expected to promote a purposive aesthetic stance in the reader to reach some level of understanding which has both personal meaning for the reader while at the same time including a sufficient assessable amount of the intended meaning of the author or education provider. The present study was concerned only with academic R-1 reading rates.

Reading rate also depends on the quality or readability of the text, and the various readability text types are summarised in TABLE 2 below. Reading rate and comprehension are concerned with the match between the reader variable (R-Pre-1, R-1a, R-1b, or R-1c) and the text variable (T-math, T-diff, T-fair, or T-easy). These variables of course change during the reading process. The present study investigates academic reading rate which is the R-1a (with flexible utilisation of R-1b and R-1c) reading rates for each of the English text types – T-diff, T-fair, and T-easy.

TABLE 1 : A Four-Way Taxonomy of Academic Reading Modes

INTENSIVE		EXTENSIVE	
CAREFUL		EXPEDITIOUS	
LOCAL	GLOBAL	GLOBAL	LOCAL
<p>Understanding syntactic structure of sentence and clause. Understanding lexical and / or grammatical cohesion. Understanding lexis / deducing meaning of lexical items from morphology and context.</p>	<p>Reading carefully to establish accurate comprehension of the explicitly stated main ideas the author wishes to convey ; propositional inferencing.</p>	<p>Skimming quickly to establish discourse topic and main ideas. Search reading to locate quickly and understand information relevant to predetermined needs.</p>	<p>Scanning to locate specific information ; symbol or group of symbols ; names, dates, figures or words.</p>
adapted from Urquhart and Weir 1998 p123			
FACTOR R-Pre-1	R-1a	R-1b	R-1c
prefix R = Reader			

TABLE 2 : The Readability Text Types

Mathematical Formula	English Text		
Difficult	Dense or Difficult	Fairly Straightforward	Easy
T-math	T-diff	T-fair	T-easy
prefix T = Text			

METHODS :

Various instruments were employed in these studies. The key instruments were three English texts : all authentic distance education texts. One was an email-text for measuring on-line reading of fairly-straightforward text, another was a book-text for measuring off-line reading of difficult text, and the other was web-text for measuring on-line reading of easy text and printed out and re-formatted for comparative off-line reading of easy text.

Other significant instruments were the 76-item Extended version of the Approaches to Studying Inventory (EASI) and the Japanese-language version (J-EASI) (previously developed - Kawachi, 2000a), an 89-item Questionnaire on Intrinsic Motivation in Teacher Development, and various related templates for structured interviews. These are available gratis from the author. These instruments were employed since reading mode varies during the reading task, depending on reading strategies and approaches to studying which can be identified using the EASI and J-EASI. These two instruments are extremely sensitive and can also detect overload. Data were subjected to Exploratory and Confirmatory Factor Analysis using SPSS software.

Each of the instruments was carefully piloted and modified for the context (for example removing apostrophes in the email for transmissibility to a computer with Japanese-language Operating System, and replacing the term 'reading speed' by 'reading rate' to avoid misunderstanding).

Several cohorts of subjects were investigated by surveys and interviews. Different cohorts were used to avoid a negative Hawthorne Effect. Much of the obtained reading rate data from young non-native-English subjects was unusable because many of them were below the English proficiency threshold and were reading at the R-Pre-1 level (see TABLE 1 above). So, high school and university teachers were also surveyed. In particular one cohort consisted of all the 68 teachers of English at one university, and other cohorts were surveyed as far as possible. Additionally some graduate students and semi-retired professors were also included. There was expressly no anonymity – since no anonymity was found to assure 100% response and return rates and properly valued and honoured the respondent's participation. Dates, name, birthdate, gender, telephone number and email address were meticulously recorded in a documentation system, according to Yin (1984). Ages were recorded in nearest number of months and expressed as years to two-decimal-places. In order to be able to estimate more accurately the workload especially of senior citizens who are expected to increasingly take up open and distance education in the near future, older persons were especially sought out and carefully interviewed. The age range of those in the present study was from 18.83 to 80.83 years old (to 76.50 for women).

Relevant Details of the Reading Instruments

Three English-language texts were separately applied (available gratis from the author).

The email-text was 220 words (at 17.8 words-per-sentence) written by this author from authentic personal feedback email received from an Open University on-line tutor while the author was a student, and the proportion of passive-verbs was 18%. The accompanying cover letter for the email-text had 0% passive. (More than 50% passive indicates a technical text.)

The book-text was 1034 words (at 22.8 words-per-sentence) taken largely verbatim from pages 77~84 of the post-level-1 introductory graduate-level book 'Foundations of Distance Education' by Keegan (1996), with 26% passive. A long text of 1000 words has higher validity, and can be used to investigate reading skills and strategies, which are not reachable using only short 100-word textlets, according to Alderson (2000). A longer passage is needed (of about 1000 words) because in long reading, the reader uses more accurate comprehension monitoring, than with a short text which incurs monitoring failure plus false high confidence in comprehension (Commander & Stanwyck, 1997). The book-text was prepared as a booklet to match the exact physical attributes of the actual book – with same font type (Times New Roman), size (11 point), line length (10.10 cm) and line spacing (10 lines per 4.20 cm), margins and page size (A5).

The web-text was 624 words (at 8.1 words-per-sentence) verbatim on-line about local history from [<http://www.japan-guide.com/e/e2132.html>] with 3% passive. This was also printed out and re-formatted for comparative off-line reading

The six common readability formulae (Dale-Chall, Flesch, Flesch-Kincaid, Fry, Gunning-Fog, and Raygor) have been found to give similar grade to first-year university foundational textbooks. The Flesch-Kincaid Grade Level was average for each of these texts ; 7.7 for the email-text, 12.0 for the book-text, and 10.0 for web-text. The Flesch Reading Ease was 71.3 for the email-text, 21.4 for the book-text, and 37.5 for the web-text (on a range 0-100, a higher score indicates an easier read).

Reading rate data were not adjusted to take account of variation in comprehension rate (which ranged between 60 and 100%). Other studies have suggested using a reading efficiency rate of wpm-times-comprehension (Carver, 1990). Carver (1990) also suggested to bring into account the general higher incidence of long words in difficult text compared to easy text and suggested using a 'standard-word' length of six character spaces (including spaces between words, and punctuation mark spaces). In the present study, the email-text was 209 standard-words, the book-text 1153 standard-words, and web-text 655 standard-words.

Accordingly, the email-text was classified as fairly-straightforward, the book-text as difficult, and the web-text as easy.

Other Methods Employed

Also their actual use and their feelings towards using English or their L1 native-language in on-line and off-line reading for academic purposes were investigated using self-report essays, open-response questionnaires and interviews.

Moreover, when the data suggested a peak R-1a reading rate was occurring at around 40 years old, an additional study was performed on another complete cohort of all 34 teachers of English at another university. The changing rate with age could be explained by an affective factor involving anxiety and / or motivation, or by a cognitive factor involving schema activation. The former was thought to be more plausible, and the second cohort of teachers was investigated concerning their intrinsic motivations and attitudes to English as being central to their continuing professional development. Details are given in the RESULTS section. The potential contribution from anxiety (especially towards computers and on-line reading English) was directly investigated by follow-up focused interviews, and in particular a gender difference was discovered, also described in the RESULTS below.

RESULTS :

*"In nature, individuals are nearly alike.
In practice, they are wide apart." - Confucius*

The approach to studying, motivations to reading and any possible overload were investigated using the EASI and J-EASI questionnaires. The results from the EASI and J-EASI were analysed by Exploratory Principal Component Analyses using SPSS software, and two significant Principal components were found. There being only two was confirmed using Cattell's Scree Test. Scale Reliability Analyses were performed using Cronbach's alpha coefficients to confirm the internal consistency of the responses on each subscale. (Full details of the statistics with graphs and tables are available gratis from the author.) The loadings on the two Factors from Quartimax oblique rotation are given in TABLE 3 below.

TABLE 3 : The Items with Significant Loadings on the only two Factors extracted by the Quartimax Method Oblique Rotation

EASI QUESTIONNAIRE ITEM		LOADINGS	
		FACTOR I	FACTOR II
MEANING ORIENTATION			
<i>Deep Approach</i>	DA1	0.34	0.22
	DA2	0.33	0.14
	DA3	0.50	- 0.02
	DA4	0.61	- 0.01
<i>Relating Ideas</i>	RI2	0.66	0.08
	RI3	0.48	- 0.04
	RI4	0.52	- 0.07
<i>Use of Evidence</i>	UE1	0.61	- 0.06
	UE3	0.52	0.11
	UE4	0.40	- 0.12
<i>Intrinsic Motivation</i>	IM1	0.52	0.03
	IM2	0.54	- 0.07
	IM3	0.26	- 0.09
	IM4	0.46	0.03
REPRODUCING ORIENTATION			
<i>Surface Approach</i>	SA1	0.22	0.00
	SA2	0.43	0.01
	SA3	0.29	0.23
<i>Syllabus-Boundness</i>	SB1	0.45	- 0.15
<i>Fear of Failure</i>	FF1	0.12	0.51
	FF2	0.05	0.26
	FF3	0.26	0.12
<i>Extrinsic Motivation</i>	EM1	0.37	- 0.21
	EM4	0.32	- 0.09
ACHIEVING ORIENTATION			
<i>Strategic Approach</i>	ST1	0.36	- 0.26
	ST3	0.27	0.00
	ST4	0.22	- 0.35
<i>Negative Attitudes to Studying</i>	NA3	0.26	- 0.13
	NA4	0.01	- 0.20
<i>Achievement Motivation</i>	AM2	0.49	0.08

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OF LEARNING

<i>Comprehension Learning</i>	CL2	0.34	0.02
	CL3	0.34	0.01
	CL4	0.38	0.05
<i>Globetrotting</i>	GT1	0.05	0.50
	GT2	0.30	- 0.10
<i>Operation Learning</i>	OL1	0.22	0.02
	OL3	0.60	- 0.05
	OL4	0.30	0.21
<i>Improvvidence</i>	IP1	- 0.07	0.69
	IP2	0.03	0.23
	IP3	- 0.02	0.23
	IP4	0.27	0.03

The Quartimax oblique rotation extracted only the two factors, and these two were confirmed to be independent by mutual correlation coefficient analysis – and the loadings greater than 0.2 on each factor are presented in FIGURE 1 below.

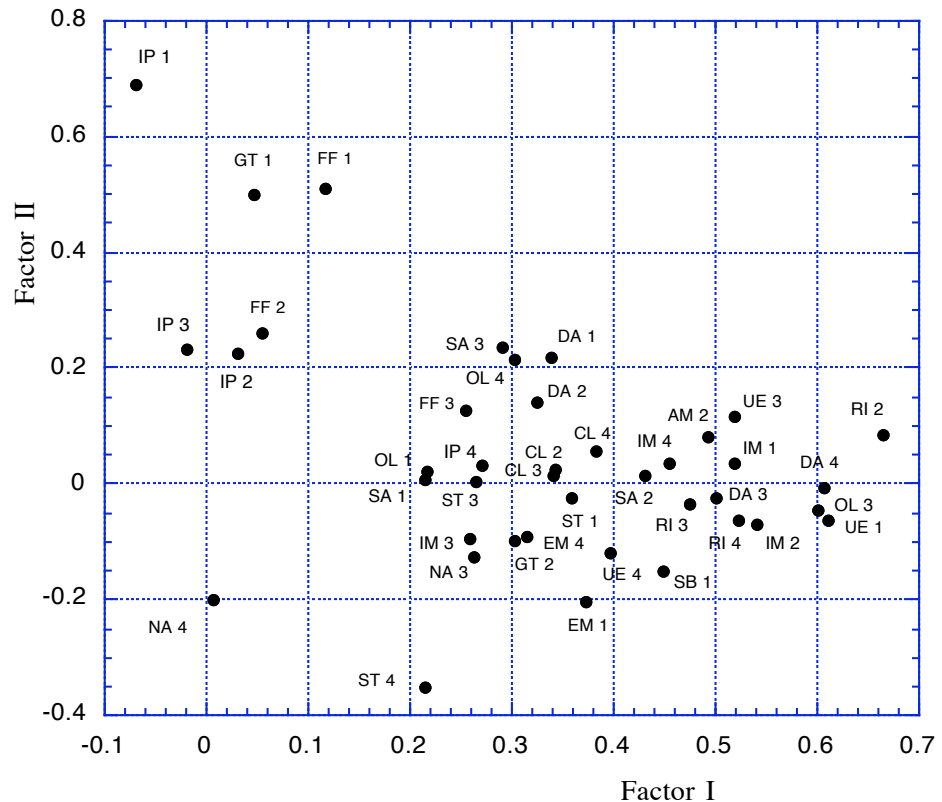


FIGURE 1 : Details of the two factors extracted by Factor Analyses

The resulting two Factors were interpreted as Factor I being ‘Purposeful’ and Factor II being ‘Overloaded’, and they are summarised in TABLE 4 below.

TABLE 4 : Summary of Results from Factor Analyses showing Overload

FACTOR	LOADING											ORIENTATION
I	DA	RI	UE	IM	SA	SB	EM	ST	AM	CL	OL	PURPOSEFUL
	.61	.66	.61	.54	.43	.45	.37	.36	.49	.38	.60	
II	FF	ST	GT	IP								OVERLOADED
	.51	-.35	.50	.69								

FF fear of failure, -ST neg strategic approach, GT globetrotting, IP improvidence

As a result, from the Factor Analyses, it was found that Japanese students expressed significant overload in their studying. This overload became more clearly expressed as the reading workload increased during the first few years of foundational knowledge acquisition. For example, the Deep Approach item DA2 in Factor I showed decrease during early years followed then by an increase (FIGURE 2). In contrast, native-English students show a monotonic steady increase.

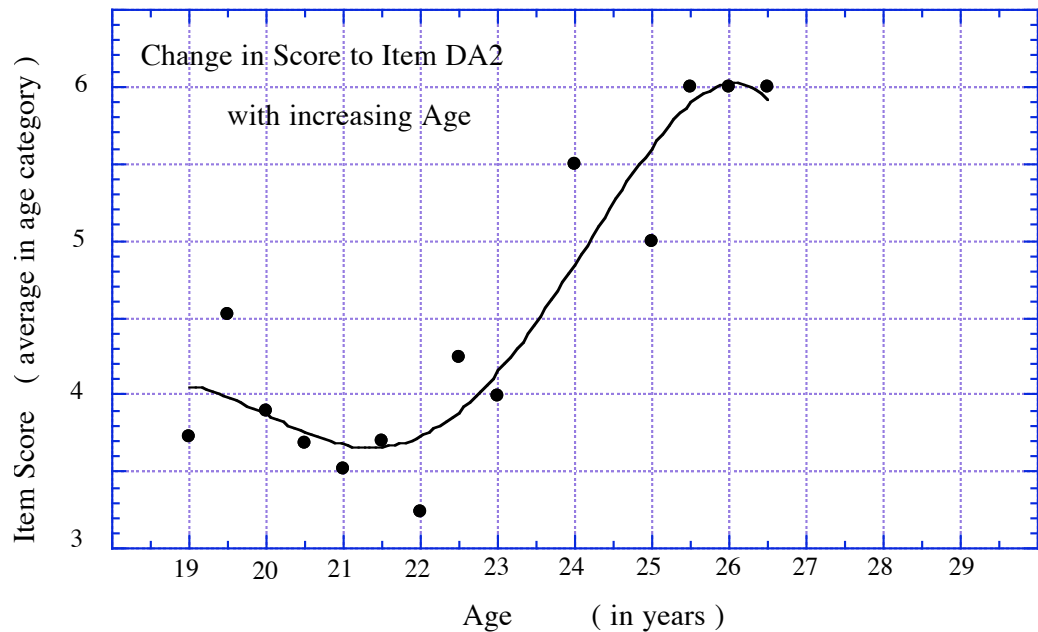


FIGURE 2 : Reading Overload demonstrated by Japanese Students

The results from the follow-up interviews showed that the more mature students employed various coping strategies acquired from earlier years of studying. These strategies included a deep and flexible approach to reading rather than a surface and serialist approach. The serialist approach was probably a carry-over from secondary education which in Japan elicits a Reproducing Orientation to studying.

Reading Rate Data

Reading rate data were collected from a wide range of respondents, over several cultures – mainly Japanese, Chinese (including Hong Kong, and also Taiwanese, but not yet Singaporean), English, and a few Indian. Their ethnicity, age (birthdate) and gender were recorded, and they were also asked about their ethnicity in detail in interviews, since for example a Japanese who was born in America and who grew up and has lived there for several decades may likely show native-English reading tendency different from Japanese born and bred in Japan and who have gone through the Japanese education system. The ethnicity of the English were also recorded in detail, and included a range from various English-speaking countries.

Data from those reading at the R-Pre-1 level below the proficiency threshold level were removed, together with the data from those with poor comprehension outcome who had been reading extensively in the R-2 browsing level. Those remaining included many who had employed skimming, but in combination with intensive careful global reading. In interviews immediately afterward, these students recalled that they moved up and down and across the text in their reading and did not proceed in a monotonous linear fashion. So while these readers included aspects of R1b and R1c in their reading, these data were taken as reading at R1a, and plotted in FIGURE 3 below. A few readers repeated the exercise. Some of these gave repeated performances showed an increased rate, and were going to be omitted, but other repeated performances showed a decreased rate. The increased rate was explained by familiarity and expectation, while the decreased rate was explained by more studious attentiveness and reported enhanced comprehension. So some data were included from repeated readings.

A binomial curve fit at $p < 0.001$ was obtained using SPSS software, together with a 98% confidence range shown in the plot as the upper and lower curves. The focus in this study here is on the lower limit to include all readers with 98% confidence – which is the lowest curve in FIGURE 3, and this is taken as representative of Japanese men. Full data are given in figures available gratis from the author, and the lower limit curve to include all the students with a 98% confidence is basically unchanged from that in FIGURE 3 below.

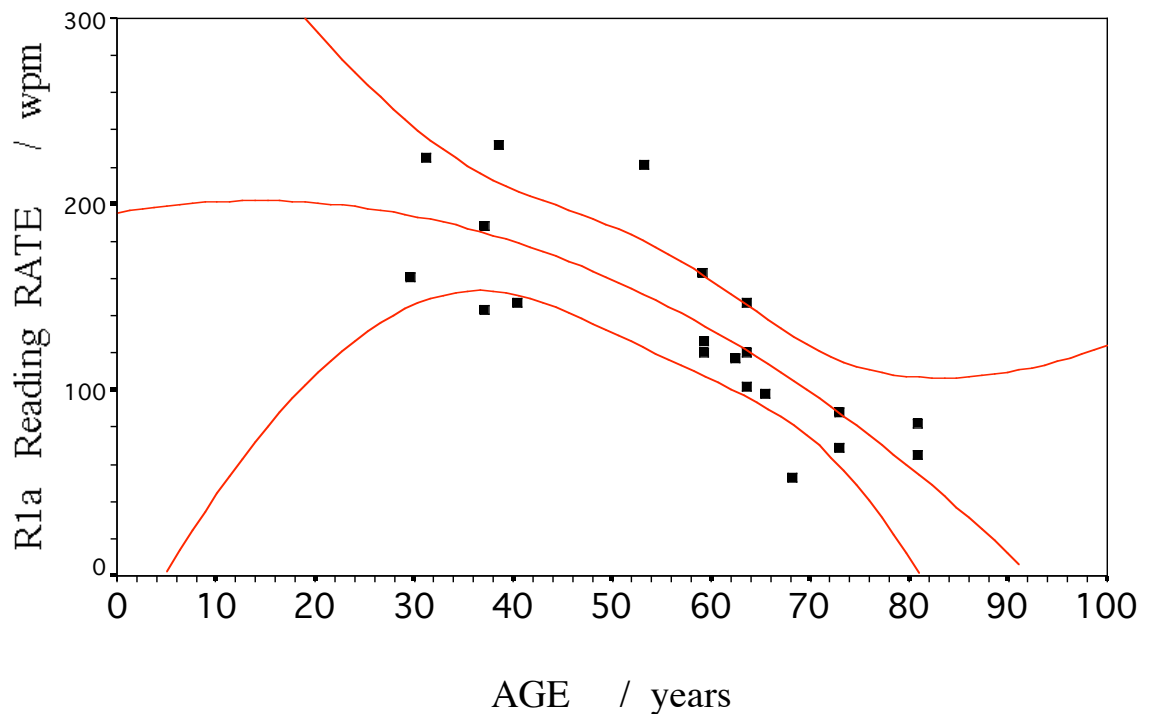


FIGURE 3 : The Japanese R-1a Reading Rate with Age

In using the lower curve of slowest reading speeds as the Reading Rate Curve to include all students with a 98% confidence, it should be noted that Chambers (1992 ; 1994), Garg, Tuimaleali'ifano & Sharma (1998), Garg, et al. (1992), Lockwood, Williams & Roberts (1988), Whalley (1982) were all aiming at the average student (at the average study reading rate) which of course means that 50% of the students are slower than their reading rate. The present study adopts a more inclusive determination of study reading rate.

When data for English native-speakers are plotted over the age range from 23.67 to 62.58 years, a best-fit binomial Curve through the data also gives a curve similar to the above lower curve for 98%-inclusion, with similar peak (but earlier at 32 years old, and higher, (this and the other Curves are available from the author). A wide variation in reading rate was seen in each cultural group examined. Nevertheless the mean rate was not used for comparing each culture and instead the 98%-inclusion Curves were used, and these are presented in FIGURE 4 below.

The R-1a reading rates for respective cultures were combined and are presented in FIGURE 4. These cultural differences were demonstrated despite the wide variation in individual differences. In this figure, data from Garg et al. (1992) and Lockwood et al. (1988) for adult students at the University of the South Pacific (USP, involving Fiji and surrounding countries) were added for comparative

purposes. Only few data have been collected from Vietnamese (to date) and these would appear uppermost in FIGURE 4. These data are being examined in more detail in an extended study (discussed below)

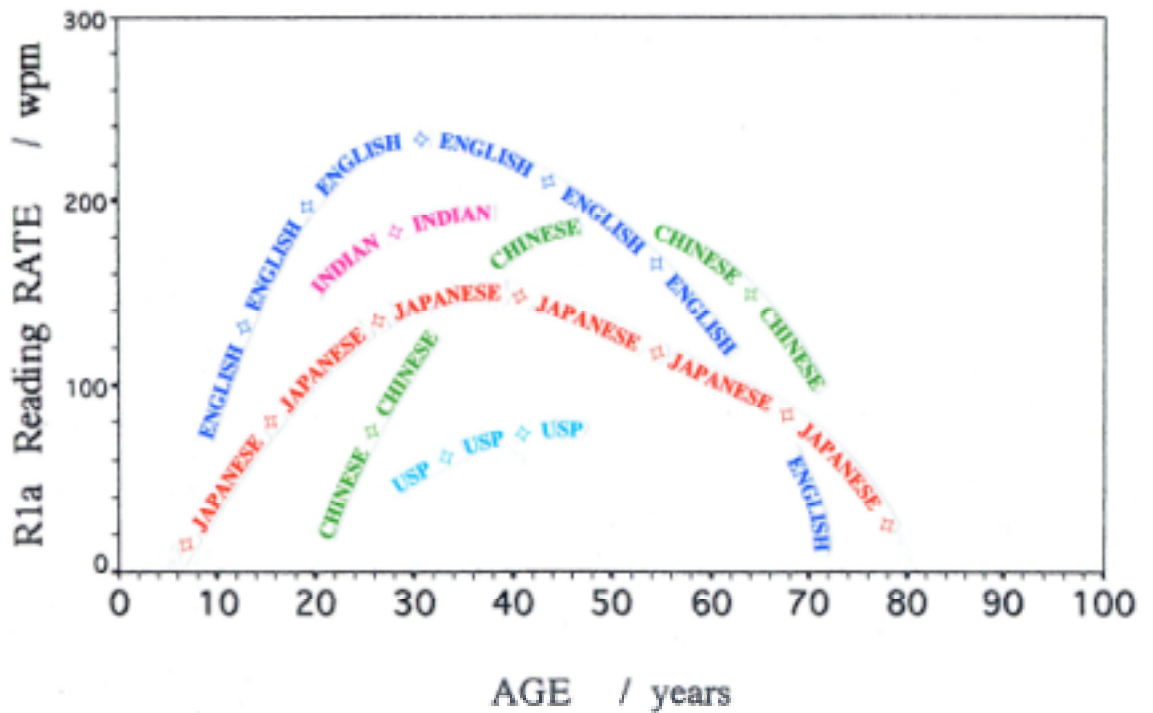


FIGURE 4 : Cultural R-1a Reading Rate Curves for Difficult English Text with Age

Of particular note in both FIGURE 3 and FIGURE 4 are the age statistically found for first reading (for example at about 5 years old for Japanese) and the characteristic curve shape with a peak at about 40 years old.

Concerning the Shape of the Reading Rate Curves

These Reading Rate Curves showed a general trend of a turn-around point at about 40 years old. As discussed in the METHODS above, this trend was further investigated. It was postulated that the student at about this age has reached a plateau in development, and thereafter showed some decline in motivation and attitude to English for academic purposes. All the 34 teachers of English at another university in Japan were surveyed to investigate their level of intrinsic motivation and explore their level of continuing professional development (CPD) to investigate any change with age.

Briefly, unstructured interviews and open-response questionnaires were used to elicit and identify items of concern to their CPD, and these items were

used to construct a detailed questionnaire asking how important they ranked each item (y-score) and how much in practice did they engage the particular item (x-score). From these data, modified z-scores were calculated (as the number of standard deviations their x-score was from the mean y-score – so as not to be comparing their activities against each other, but against their ideal standard). And these non-standard z-scores were plotted against age to discover a similar turn-around at about 40 years of age (actually at 43 years old), shown in FIGURE 5 below.

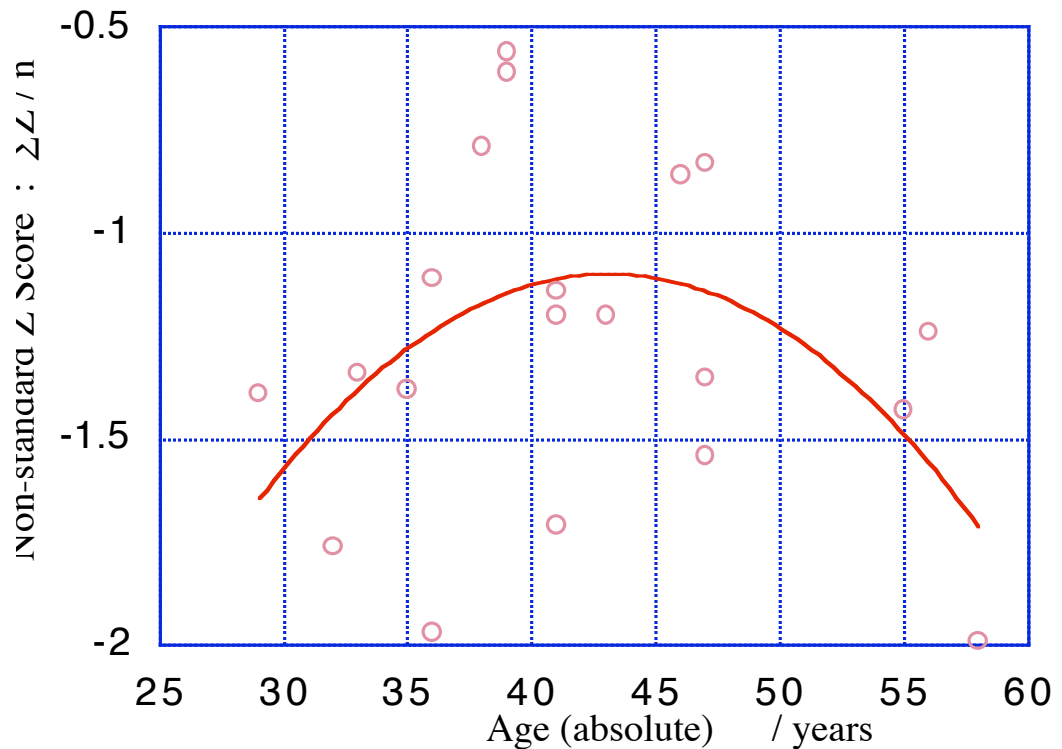


FIGURE 5 : The Turning-point In Continuing Professional Development

The questionnaire z-score findings were triangulated with follow-up focused interviews which asked whether they thought age was related to professional development activity level. Of the 23 who thought age was related to CPD level, 21 (91%) suggested there was a turning-point, and 15 of these gave a suggested age, shown in FIGURE 6 below. The average turning-point age was 41.23 (± 4.23) years.

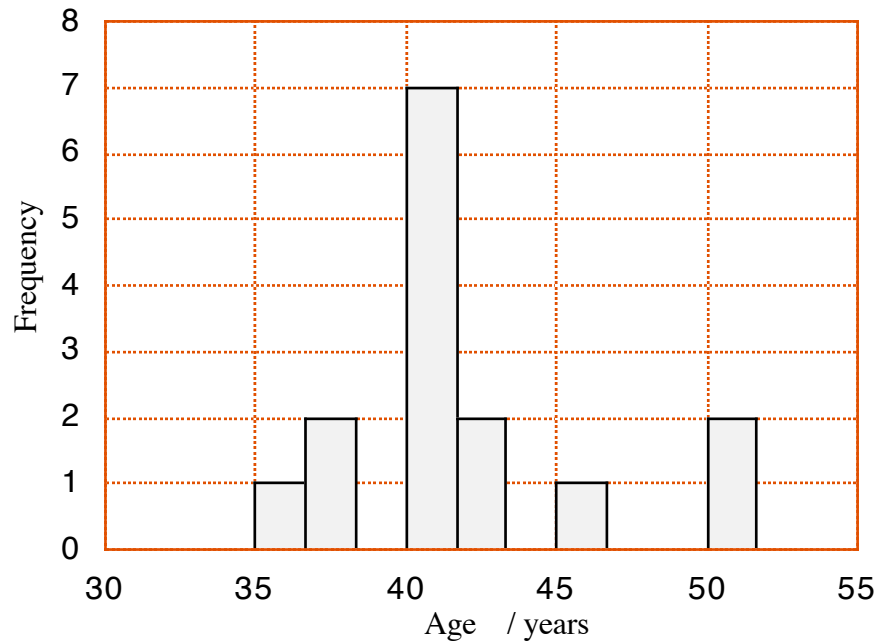


FIGURE 6 : The Turning-point Age in Motivation suggested in Interviews

There appears to be some motivational change away from academic pursuits at about 40 years old. Goodson (1991) reported his experience of meeting again his former teacher near retirement who had just voted unexpectedly against school reforms that he had advocated fervently during the peak of his career, when the older teacher said, “You don’t understand my relationship to the school and to teaching. My centre of gravity is not here at all. It’s in the community, in the home – that’s where I exist, that’s where I put my effort now. For me the school is nine to five, I go through the motions.” This term or concept of ‘centre of gravity’ can help explain why the reading rates slowed down after 40 years old.

There are also other literature data showing supporting evidence for a turning-point at about 40 years old. Sato & Ushiwata found development in secondary high school teachers in Japan increased until about 40 years old and then decreased thereafter with loss in centre of gravity. Day (1997) and Campbell & Neil (1994) have also found that teachers in schools and universities began after 40 years old to drift away from being academically focused to increasingly putting personal priorities on non-academic activities.

Students who are older than 40 years old can therefore be expected to show some decrease in their academic focus, academic motivation and academic study reading rates. The English reading rates in the present study showed a turning-point at around 40 years old, and this turning point was consistent with other findings of a peak in continuing professional development in similar subjects in Japan and in Western studies. Thus the Curves in the present study can be explained by a mental academic activity and motivation model.

Concerning any Gender Difference

Data were also recorded on the gender of the respondent. The following three figures show the gender differences at certain ages, according to reading on-line or off-line, and text difficulty level (FIGURES 7, 8, and 9). The Curve for the on-line reading of the easy text (not shown) was similar to that for the off-line Curve given in FIGURE 9. The asterisked differences in these figures are trends that might reach statistical significance if the numbers of cases were increased.

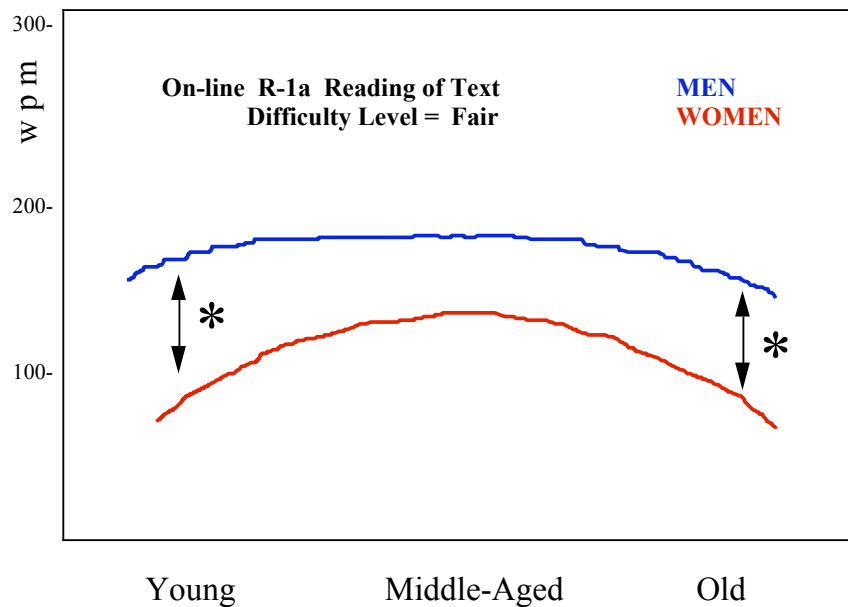


FIGURE 7 : Illustration of Gender Difference in On-line Reading Fair Text

There were gender differences at certain ages, according to the text type and reading purpose, such as ; young women were significantly slower (attributed here to the language threshold) in careful-global intensive reading of difficult text than young (or old) men, while middle-aged women were faster at expeditious-global extensive reading of easy text (attributed to acculturation or prior experience). In on-line reading, women showed distinct change with age (while men did not) more slowly in both careful-global and expeditious-global reading (attributed to perceived difficulty, not so perceived by men)) at young age and also at old age (due to anxiety, and motivation), with no gender differences at middle age

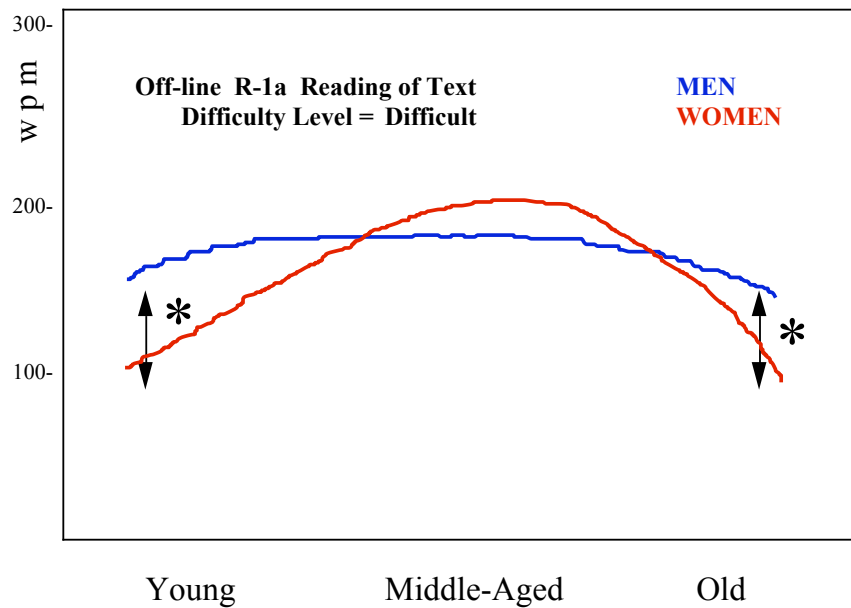


FIGURE 8 : Illustration of Gender Difference in Off-line Reading Difficult Text

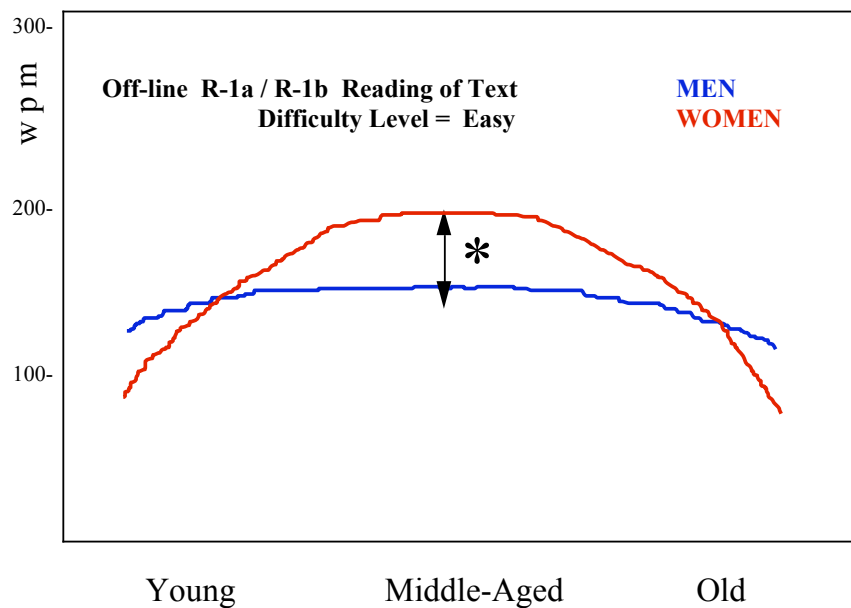


FIGURE 9 : Illustration of Gender Difference in Off-line Reading Easy Text

Reading On-line versus Off-line

Japanese students were surveyed using open-response questionnaires and interviewed about their reading English on-line, and their reading Japanese on-line. Data showed that reading English-language on-line was slower than reading Japanese-language on-line, and that their reading-English rate on-line was similar to that off-line, while their writing rate was slower on-line (being more diligent to produce denser English to appear more-native-like for potential online strangers) than off-line. O'Hara and Sellen (1997) reported that native-English students read

on-line quite differently from off-line. However, the present study has found that Japanese read English on-line similar to how they read English off-line. Multi-streaming content with more use of hypertext links is suggested here as a viable solution : to reduce screen content yet provide context-on-demand.

DISCUSSION :

Reading in English, L1 readers have generally been found to read on average at 300-350 words / minute (with a range from 140 to 800 wpm) (Fry, 1963 ; Taylor, 1965 ; Carver, 1985 ; Haynes & Carr, 1990 ; Nuttall, 1996 ; Urquhart & Weir, 1998), though this average does not reveal the very relevant variations according to text type and reading purpose. Reading in English, L2 readers can be suspected to be slower than L1 readers. Garg et al. (1992 p23) pointed out that, “Even if we assume that an average IGNOU [Indian] undergraduate student would be at par in mental abilities with a UKOU student [English], the former would take longer time to study an English medium science text than the latter, because of English being the second language for most of them.” The slower reading rates of academic English by L2 readers are incurred through their longer fixation time (Haynes, 1993 ; Urquhart & Weir, 1998), and this longer time can be attributed to various affective and cognitive factors, which are discussed here. Affective factors are mainly related to the motivational and attitudinal bearing of the student, but also may include distractive aspects since it is known that though the reader is in the presence of a reading task, some time at least is not spent on task. Cognitive factors include the time to retrieve lexical meaning from memory or guess the meaning or use some coping strategy such as storing in short-term memory for later comprehension, and relevant schema activation. There have been only a very few studies reported in the world literature of non-native speakers R-1a reading English rate for academic difficult text. The following TABLE 5 translates and summarises what data have been reported to date.

TABLE 5 : The R-1a Reading Rate from Various Cultures

L1 / CULTURE (alphabetic order)	R-1a READING RATE for difficult text	AUTHOR
American	148 wpm	Steffensen et al 1979
Chinese	60 ~ 90 wpm	Urquhart & Weir 1998
English	40 wpm	Chambers 1992, 1994
Indian	82 wpm	Steffensen et al 1979
	25 wpm	Garg et al 1992
Japanese	58 wpm	Kamimoto 2001
USP (Fiji +)	20 wpm	Garg et al 1998
	40 wpm	Lockwood et al 1988

These literature data in TABLE 5 are briefly discussed.

Steffensen et al. (1979) reported the lengths of their text in number of idea units and a T-score of complexity. However it is cumbersome for distance education providers to apply these measures to all their texts. Moreover, distance education students must read authentic texts, and the simplest universal measure of length to determine time needed by the student is the number of words. Using the conversion rate for general English of 125 words has an average of 41 ideas according to Becker (1988), then Steffensen et al. found Americans (average over 10 women and 10 men at about 20 years old attending a campus university in Illinois, USA) showed a careful-global intensive reading speed of a 415-word easy text at 148 wpm, and Indians (average over 9 women and 10 men at about 20 years old attending a campus university in Maharashtra, India) read the same English text at 82 wpm.

Kamimoto (2001) found Japanese (averages over two groups each 36 students at about 19 years old attending a campus university in Kumamoto, Japan, no data on gender) showed a careful-global intensive reading speed of 233-word easy English text at 58 wpm, compared to the Japanese-translated text at 154 wpm.

Reading rates have been distinguished from the rate to assimilate – that is acquire the deep meaning from the text (for understanding and re-construction of personal meaning, in social constructivist theory). Chambers (1994) performed calculations of assimilation and study time to discover course workload using 100 wpm for an easy text, 70 wpm for a fairly-straightforward read, and 40 wpm for a difficult text (based on some experimental findings of Whalley, 1982, and Lockwood et al. 1988), and Rowntree (1999) borrowed similar figures. Chambers (1994) aimed at the ‘average’ student, and no consideration was included on the native-language or ethnicity, gender or age of the student (though it should be noted that the UKOU has recently begun to record such personal details on a voluntary basis).

Sun & Feng (1999) have reported that native Chinese-English bilinguals read English language at 255 wpm compared to Chinese language at 380 equivalent-words pm. So even bilingual non-native-English students can be expected to demonstrate an R-1a reading rate different from native-English students.

Other Considerations

Recent studies have confirmed that there is beneficial transfer of phonological processing skills from L1 to reading English L2 performance (Gottardo et al., 2001). However these have only involved transfer from L1 languages that have a similar number of phonemes or more phonemes than English, and there is no evidence in the case of L1 such as Japanese with fewer available phonemes. Research has shown transfer from reading skill and phonological awareness (but not oral proficiency) in Spanish to reading skills and phonological awareness in English L2 (Durgunoglu et al., 1993), and similarly from French (Comeau et al. 1999) – both involving transfer from an alphabetic L1. The first

reported research on transfer from a non-alphabetic L1 was from Chinese Cantonese which showed similar transfers (Gottardo et al., 2001). Apparently, Haynes & Carr (1990) did not examine transfer as such. Chinese L1 would provide these readers with a more-than sufficient range of phonology (1300 syllables or phonemes) to equip them for English phonology (300 phonemes), in contrast to the situation in Japanese in which the Japanese L1 phonology (71 murae phonemes) accounts for only 25% of the range needed for English proficiency.

Some Japanese at old age in the present study were discovered to read at a rate comparable with native-English readers. Since these Japanese were active teachers of English, fast schema activation was one contributing factor. Also, use of short-term memory as a coping strategy had likely become automatic : Koda (1987) has found that when incomprehensible words were inserted into English text, that Japanese read faster than did native-English readers. In his follow-up interviews, he discovered the Japanese readers stored the difficult word as an image in short-term memory as a strategy to avoid dealing with ambiguity. Japanese are known to show the highest ambiguity avoidance world-wide (Hofstede, 1980).

With respect to Chinese readers, the data in the present study were lower than expected from a preliminary study into native-language correlation with rate of expressing ideas (Kawachi, 2000b). With more phonemes available in Chinese (~1300) (Zhou, X., Shu, H. Bi, Y., & Shi, D., 1999) than in English (~300), Chinese requires fewer phonemes to distinguish ideas and so Chinese express more ideas per minute (at 75 ipm), compared with English native-speakers expressing ideas in English (at 40 ipm). (In comparison, Japanese has available only 71 phonemes and a rate of 25 ideas per minute (Kawachi, 2002b) Three examples are given here to illustrate this graphically (including cultural levels of formality) in TABLE 6 below. The trend in visual length of the utterances is marked, increasing from Chinese, through English, to Japanese, and would be more so when taking into consideration that the Chinese words are each monosyllabic.

TABLE 6 : Language-Specific Different Rates

CHINESE	1	“Wo chu yen hoi, ni chu ma ?”
ENGLISH	1	“I am going to the party, how about you ?”
JAPANESE	1	“Watashi-wa paarti-ni ikimasu ga, anata dou shimasu ka ?”
CHINESE	2	“Wo tsu tao Lee ze göuun.”
ENGLISH	2	“I know that Sally has met that man.”
JAPANESE	2	“Watashi-wa Satomi-ga ano-hito ni atta no o shite iru.”
CHINESE	3	“Wei, ni tjao !”
ENGLISH	3	“Good morning, Mr Thatcher !”
JAPANESE	3	“Fukuyama-san, o-haiyo gozaimasu !”

Consequently the Chinese Curve was expected to be somewhat above that of English and be highest during the middle-age range. Follow-up focused interviews with the Chinese and Taiwanese students in the present study have suggested that their self-perception of their English proficiency was not high, due in large part perhaps to the sampling of only Chinese students who were in Japan. Perhaps Chinese elsewhere for example in Hong Kong may demonstrate a highest Curve. Weak self-perception in English proficiency and associated anxiety were concluded to be responsible for the low reading rate of Chinese in the present study. Further data should be collected. Different anxieties towards English can explain some of the cultural differences in performance, and to a less extent gender differences in performance, according to Osborne (2001).

The data for Vietnamese are indicated in FIGURE 4, and are being investigated further with respect to context-independence. Compared to all other languages, Vietnamese has an outstanding number of phonemes. Modern Vietnamese has 3525 syllables (Nguyen Din Hoa, 1987, 1992). Of these, only 1310 are written in Sino-Vietnamese, which led to their need to develop indigenous vietographs from the available sinographs, to produce their Chu Nom script. Pre-historic Vietnamese had initial consonant clusters which have been lost, so early Vietnamese had more than 3525 syllables (Miyake, 2003). Language enculturation – especially during the thousand years of Chinese northern rule – led to a reduction in the number of sounds. The new Quoc Ngu alphabetic transcription attests to the difficulty of expressing their phonology requiring large alphabetic clusters and a large number of accents and diacritic marks to represent words which are all monosyllabic.

Another cognitive factor that appears to be little recognized is the efficiency of the inner-voice. In those with a wide range of sounds in L1, inner-voicing while reading English L2 may present no noticeable affect. However in Japanese with its limited number of available phonemes, more phonemes than in other languages are needed to differentiate ideas, so speaking ideas in Japanese requires more time than speaking the same ideas in English. Japanese manage to compensate for this slowness in voicing by using no inner-voice when reading Japanese, and this coping skill is transferred to their reading English. Using no inner-voice when reading English might require longer fixation to guess, work out, or recall from visual memory. Guessing might lead to miscomprehension. Working out meaning from looking back and forth across the text might take time. While recall from visual memory might be actually faster than one would expect. The overall effect from no inner-voice on reading efficiency (number of words per minute x comprehension rate) is unknown, though a slower reading rate and lower comprehension rate have been demonstrated. Japanese have attributed their slowness to lack in English vocabulary, though clearly there is also involved some factor of L1 to L2 transfer of no inner-voice.

CONCLUSION :

The R-1a reading rate for assimilation and studying in English-language varies across different cultures depending on their respective L1-native-language. The R-1a reading rate also varies with age, while differences according to gender are much less.

Various affective and cognitive factors differently influenced the R-1a reading rates for on-line and off-line texts.

For a 98%-inclusiveness, the R-1a reading rate averaged over the various cultures was concluded to be 110~225 wpm over the age range 18~60 years old, and decreasing to about 65 wpm for those older than 60 years old, for difficult English-text.

IMPLICATIONS :

The main implications from the present study are that both on-line and off-line course designs need to be improved to accommodate the cultural, gender, and age differences in reading rates, for lifelong open learners.

One suggestion is to increase the transactions with each reader's context through inserted mathemagenic questions and activities, since this could increase relevancy and therefore the assimilation rate. The tutor should strive to elicit and bring into the learning forum the relevant context of each faraway student. Rumelhart (1977) has proposed that if the context is familiar to the reader, then the reader would read faster than if the context was unfamiliar for example concerning a cultural event outside of the reader's experience and own culture, and the study by Steffensen et al.(1979) supported this. So bringing in the distance students' context not only promotes personally meaningful situated learning but also increases their reading rate – in the study by Steffensen et al. by a factor of 1.3 in the case of the Americans and 1.1 in the case of the Indians.

Another suggestion is to reduce the difficulty-level and content density of on-line content and replace with hypertext links – in particular links to more examples and narratives which promote cooperative group learning and other links to more reasoning and critical discussion which promote collaborative group learning. Women students have been reported to prefer cooperative connected learning, while men prefer collaborative learning (Lyons, Kysilka, & Pawlas, 1999). Adding these as hypertext links promotes student autonomy as well as reducing and uncluttering the on-line content. This can reduce the required core reading time, and can increase the perceived benefit from expended time and effort – both of which foster student retention.

Other suggestions include initiating the intrinsic motivations to learn through specific tutor interventions (Kawachi, 2003).

Another implication is that slow readers are also slow writers. In the past, correspondence schools and distance education providers paid little attention to the time students spent writing. However in synchronous and in asynchronous computer-mediated communications, writing time is more relevant as it directly impacts on the student's potential and capability to transact with others. In global online education, each student articulates his or her own understanding in collaborative group learning interacting with other students and with expert tutors through writing in what is now described as "conversation" in a learning community (Tait, 1996). So, writing rate is also an important factor and one that equally with reading relates to the perceived-benefit-to-expended-time ratio, the imposed workload, feelings of overload, slowing down, and dropping out.

FURTHER STUDIES :

The studies reported here have found that students in different cultures depending on their respective L1 native language consequently read English at different rates. Below the language threshold of adequate proficiency, the rate-determining process is the retrieval of lexical meaning and grammar. Once beyond the language threshold, the rate-determining cognitive process is the aesthetic transaction between the reader and the text to construct personal meaning. The intended meaning of the text must be decided through identifying correctly the discourse schema and through sufficient awareness of the relevant context. The reader retrieves relevant possible schema from memory and guesses what prior knowledge might connect to the new information of the text, and then learns through de-constructing own neural knowledge network and then reconstructing this with new links to assimilate the new information to produce new personal meaning and new knowledge. The difference in reading rate may be due to correctly guessing and retrieving the expected relevant schema – the matching of schema between the text and the reader, or to the willingness of the reader to de-construct prior knowledge and then incorporate foreign meaning into one's own personal culture. One or other may be dominant, or both of them may operate, and two hypotheses are accordingly proposed for further studies.

The first hypothesis is that schema matching is the rate-determining process. And the second hypothesis is that one or more of the intrinsic motivations to learn are the rate-determining process.

The first hypothesis can be operationalised by postulating that all readers will read each in their own L1 native language at the same rate, across different L1 and cultures. In such a design, schema matching might be optimal, and foreign schema might be absent. Reading rate must be re-appraised to be the number of ideas per minute, and not wpm, since different languages utilise a different number of phonemes, morphemes and words to express a same idea. A standard basic textbook in medicine by Pocock & Richards (1999) has been identified, which is published in four different languages (English, Japanese, French, and Spanish), and

since it is a standard textbook, the number of ideas in Chapter One is expected to be the same across all four language versions. The first hypothesis is therefore that medical students each in their own native language will read Chapter One in the same time. If so, then differences in cross-cultural reading English rate can be related to schema activation.

The second hypothesis can be operationalised by designing a questionnaire to elicit a self-report of scoring items concerning the prevailing level of the intrinsic motivations to learn, and then applying factor analysis to identify the respective loadings on each intrinsic motivation factor. The correlation is then examined between reading rate and the specific loadings, to see if level of intrinsic motivation affects reading rate.

Further studies are underway, and of note, the above study is being extended to other cohorts of various cultures.

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