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A CONNECTIONIST ILLUSTRATION OF PRE-LITERATE ADULT IMMIGRANTS' LANGUAGE ACQUISTION - EXEMPLIFIED BY ARABIC-ENGLISH CROSS-LANGUAGE COMPARISONS

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1 Introduction

During the last two decades, connectionist reading theory has gained acknowledgement and importance within the study of reading processes and reading acquisition. In this paper, a connectionist word recognition model freely adopted from Seidenberg & McClelland (1989) is adjusted and expanded to encompass reading related cognitive resources not considered in their original model in order to include both more general aspects of language and comprehension as well as language specific aspects such as letter detection. The model is then explained and exemplified through cross-language comparisons between English and Arabic, and within this framework of cognitive linkages between language and literacy, the connectionist model is used to explain why pre-literate adult immigrants tend to display remarkably poor results in acquisition of the L2. Finally, educational implications are briefly discussed.

2 A connectionist word recognition model

For many years, the theoretical discussion about word recognition focused on the extent to which readers rely on phonological vs. lexical 'routes' to the mental lexicon. The impetus was linguistic descriptions of the correspondence between letters and sounds in English words which were categorised as either regularly or irregularly spelled. Psychologists argued that significant differences in subjects' reading speed when decoding regular and irregular words respectively imply that the two types of words are processed differently (Henderson 1984). The findings were explained by a 'dual route model' (see Figure 1): Besides the phonological decoding of letters into sounds which leads to recognition of the word and its meaning, there had to be an alternative, more direct route to the lexicon, by which words are recognised as lexical entities. While regular words could be recognised through both routes, recognition of irregular words had to be a product of the lexical route, as rule-based letter-to-sound correspondences do not apply; moreover, reading of pseudo-words must be a product of the rule-based phonological decoding, as they are not recognisable, lexical units (Henderson 1982;1984).

Since the 1990s, the dual route model has been under still heavier critique and new theories of word recognition have been gaining ground. Some researchers are advocating a modified and more flexible type of word recognition model, in which phonological and orthographic processes are more integrated (Seidenberg 1992;

Foorman 1994;1995; Vellutino et al. 1995), just as other aspects of linguistic competences are also included (Norris 1990; Sharkey 1990).

In a broader theoretical context, the basic critique of the dual route model is coherent with the general development in modern cognition research, in which nativism, in linguistics represented by generative linguistics, since the mid 1980s have been challenged by a new line of thought based on connectionism (or *parallel distributed processing* or *network theory*) (Ravn 1992; Ramsey 1999; Smolensky 1999). Like the development of rationalism, including generative linguistics, which was linked to the invention of computers for processing data, connectionism is closely linked to the research in and development of artificial intelligence. Connectionist theory strives, like generative linguistics, to internalise language. This is in opposition to structuralism's externalisation of and focus on language as system, where language is perceived as manifestation of cognitive processes in general. But while Chomsky perceives linguistic competence as an innate set of syntactic structures as an independent module in the brain, connectionists see language/linguistic competence as experience-based, operating as part of the general cognition. (Ravn 1992; McClelland 1999; Ramsey 1999; Smolensky 1999; Garson 2002).[15] This difference seems to mirror the difference between the classic computer and the new so-called neuro-computers which are biological neural networks. The classic computer runs a programme which is, in fact, a list of instructions for how various 'knowledge elements' in a carefully controlled order are to be combined in order to produce the right output. In contrast, the neuro-

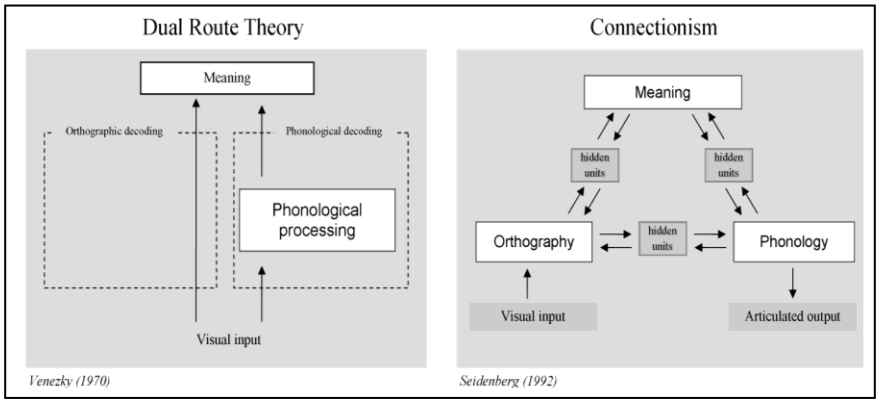

Figure 1: Word Recognition: Dual Route vs. Connectionist reading model

computer is a network of units (similar to the brain's synapses), typically grouped in input-units and output-units and between these one or several layers of 'hidden units'. The units are combined in a network of connections, and information is spread from the input-units to the rest of the network through a pattern controlled by the weights of the relevant connections. Thus, information (in practice electric power) is weighed against the information which is already stored in the network as different weights within the connections, and the network is 'trained' by adjustments of the weights when the output is wrong. In this way, the network

[15] However, some do accentuate connectionism as a bridge between nativism and empiricism, as the theory at the same time accepts that our perception depends on a set of innate sensors and that knowledge is based on experience (e.g. Adams 1990).

acquires 'experience' which can be used to generalise based on input it has never encountered during its 'training' (Ravn 1992; McClelland 1999; Garson 2002).

Connectionism has been used as a theoretical basis for a new word recognition model which, thus, rejects the mechanism of a dual phonological and/or lexical processing of words. In the connectionist word recognition model, all resources are applied in one process. All relevant knowledge is stored as weights within the connections, so there is no 'mental lexicon'; thus, there is no lexical route to word recognition. Rather, orthographic, phonological and semantic codes are connected within a complete process. Seidenberg, one of the predominant connectionists dealing with word recognition, describes the difference as follows:

> *According to this theory, codes are not accessed, they are computed; semantic activation accrues over time, and there can be partial activation from both orthographic and phonological sources. So, for example, whereas in the standard dual-route model, 'phonological mediation' required deriving the complete phonological code for a word and using it to search lexical memory, in the present framework there can be partial activation of phonology from orthography, or of meaning from phonology. Thus, the meaning of a word is built up by means of activation from both routes, […] rather than accessed by means of whatever route wins the race.* (Seidenberg 1992:105)

So, word recognition is still a matter of processing phonological and lexical material, but rather than running through separate routes to a mental lexicon, the information is gathered in a melting pot, where this – together with other kinds of text relevant experiences – creates meaning: Letter combinations give hints about known phonological patterns; phonological constellations provide semantic association, etc. Becoming a proficient reader is a matter of gradually adjusting the connections' weights based on frequency and consistency in the relations between lexical and phonetic units. Grapheme-to-phoneme correspondences are still essential, however, not as isolated rules but rather as characteristic spelling patterns which are gradually recognised when they have been encountered several times.

An interesting and compelling aspect of the theory is that it explains the complexity of the reading process and handles the processing of different resources in a more integrated way than the traditional interactive reading models are able to do: It embraces a very broadly interpreted version of schema theory, as all sorts of knowledge affect the process, while at the same time it includes the smallest components of phonemes and graphemes – even letter segments. So despite the fact that proficient readers recognise words rapidly without relying on phonological decoding, and despite such readers' ability to make use of the holistic form of single words in the word recognition process, this does not mean that words are recognised as wholes. Despite the fact that context influences decoding, it does not mean that reading is based on continuous, context-reliant testing of hypotheses. On the contrary, proficient readers visually process every single letter – but not in isolation from its surroundings:

> *Even while the individual letters of the text are the basic perceptual data of reading, they are not perceived one by one, independently of each other. Instead,*

> *their efficient and productive perception depends additionally on ready knowledge of words – their spellings, meanings, and pronunciations – and on consideration of the context in which they occur. In the mind of the skillful reader, each such type of knowledge is represented by constellations of elementary units, connected in specific, learned relation to each other: Simple patterns are represented by interrelated clusters of units, more complex patterns of clusters of clusters of units, and so on such that the whole of any percept or idea is defined, at core, by the particular relations that hold among its parts.* (Adams 1990:14-15)

Hence, meaning is constructed through connections of segments at several levels: Letters are representations of interconnected visual components, just like words are representations of interconnected letter combinations. Similarly, the pronunciation of a word corresponds with a complex of phonemes just like its meaning is related to interconnected elements of meaning (Adams 1990:15). Thus, word recognition (and reading comprehension) is a multidimensional puzzle of experience-based elements of knowledge which are put into play and connected to each other. A connectionist reading model, taking both the lower level of letter detection and the broader aspects related to comprehension into account, is presented in Figure 2. In

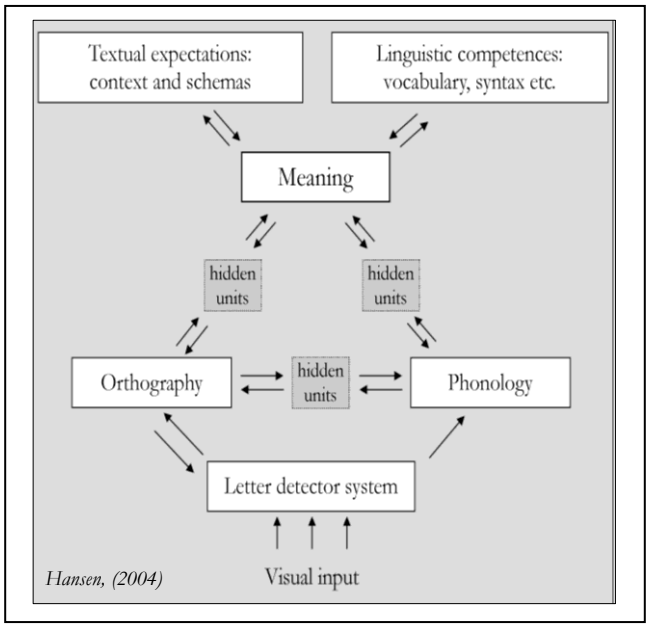

Figure 2: Connectionist reading model

contrast to the original model by Seidenberg & McClelland (1989), which is the primary source of inspiration behind it, this model retains an element of sequential progression with letter recognition as an independent part of the process. However, this is purely a matter of illustration to highlight the fact that letters are not necessarily the ones used for writing in English. The letter detector box, just like the boxes illustrating linguistic knowledge and general knowledge of the world, should of course not be seen as a static element but as a system within which

information is similarly processed in networks of units which are all part of the greater cognitive network.

3 Cross-language comparisons

In order to thoroughly illustrate how language specific features are stored in the word recognition system and to what extent the word recognition network is shaped by language, this section gives a range of examples of word recognition processes in English and Arabic. The Arabic writing system and morphological structure is first briefly introduced to readers who are not familiar with Arabic.

3.1 A Brief Introduction to Arabic Script and Morphology

Arabic script is written from right to left. The alphabet consists of 28 letters. The script is cursive, and most letters take slightly different forms depending on their position within words (initial, medial, final). All letters of the Arabic alphabet are consonants and the writing system is primarily consonantal, which is conveyed in the practice of only consonants and long vowels being represented by letters, while short vowels can be marked by diacritics. Diacritics can also be used to mark pronunciation clues such as case endings and consonant doublings. The diacritics take the form of minor strokes or curls which are placed above or beneath the letters, and, compared to the letters, their graphic significance is modest (see Figure 3). Diacritics – including short vowels – are normally omitted, except in some religious and poetic texts and literature for children and beginning readers. In Arabic-speaking countries, children are slowly introduced to texts without vowels from the third grade, and, from around sixth grade, the bulk of texts children read in school is without diacritics. In any kind of text, isolated diacritics can be applied when meaning could otherwise be ambiguous and the ambiguity is not directly clarified by the context.

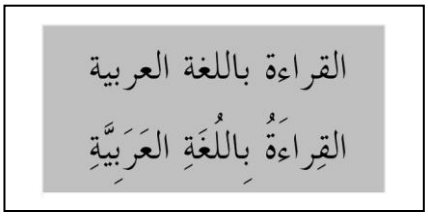

Figure 3: Unvoweled and Voweled Arabic (/al-qira'a bi-al-logha al-'arabiyya/, 'reading in arabic')

Compared to the Roman alphabet, the letter architecture in Arabic is more uniform, and precise number and placement of dots are crucial to letter identification. From a connectionist point of view, experience with letter forms and letter component constellations shape the reader's letter detection process - just as experience with both whole words and letters shape the word recognition process; thus, reading in Arabic prompts very different scanning strategies than reading in English. Even at this basic level, experience is the key to automatic word

recognition, and, therefore, learning to read a second language writing system based on individual letter recognition alone can be a serious challenge.

Arabic morphology is a three-consonantal, root-based system which is unique for the Semitic languages. The bulk of Arabic words are constructed by (at least) two morphological entities: a root consisting of three consonants carrying a 'core meaning' of action and a limited number of sets of pre- in- and suffixes, called patterns. In verbs, 10-12 patterns provide information on different aspects such as causal or reflexive aspects. Within the remaining word classes the system is further elaborated. Obviously, one root is never represented in all these sets of patterns, and in relation to the semantic value of these morphemic constituents, the system is far from consistent. However, it is sufficiently coherent to enable Arabic-speakers to make use of it as an analytical and directional tool e.g. for retrieving the

الجذْر root	فَعَلَ [faʕala] basic form of verb	اسم الفاعل [faaʕil] 'the actor'	اسم المكان [maffal] place of the action
ك ت ب [k-t-b]	كَتَبَ [kataba] (he wrote)	كاتِب [kaatib] (writer)	مَكْتَب [maktab] (office)
ش ه د [ʃ-h-d]	شَهِدَ [ʃahida] (he looked)	شاهِد [ʃaahid] (spectator/witness)	مَشْهَد [maʃhad] (view)
ع م ل [ʕ-m-l]	عَمِلَ [ʕamila] (he worked)	عامِل [ʕaamil] (worker)	مَعْمَل [maʕmal] (factory)

Figure 4: Word Formation in Arabic: Three roots and three patterns

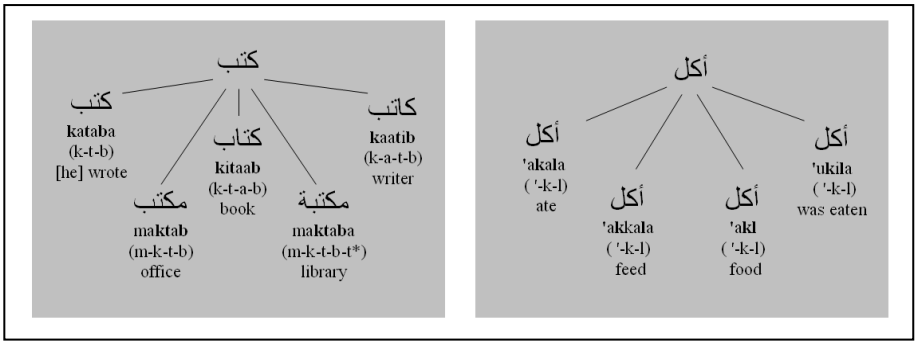

Figure 5: Words Derived from كتب *and Example of Homographic Vocabulary in Arabic*

meaning of an unknown word.

As some of the word patterns differ only in the short vowels, unvoweled text is plentiful in homographs. A simple example of this rather frequent occurrence of Arabic homographs is shown in Figure 5. Also, Arabic words are often very

information-dense, as articles, prepositions and pronouns are often internalised as affixes while subjects are often implicit in verbal conjugations.

3.2 Word recognition in English and Arabic

Considering the differences between the English and Arabic writing systems and morphological structures, it becomes quite clear that the dual route model does not sufficiently explain word recognition. Orthography and phonology are of course at play in both languages, but the model is static, and it does not explain the effect of the different linguistic systems. On the other hand, connectionism, as in the model presented in Figure 2, allows a continuous interplay between orthographic and phonological processes - within which all kinds of relevant resources established by the reader through previous exposure to text are activated. and other cognitive resources relevant to the reading process can easily be incorporated as well. As for Arabic, the model explains how the system of roots and patterns influences the reading process – not only as part of the broader linguistic competence (at the top of the model) but also at the level of word recognition where the morphological structure probably plays a crucial role as a compensatory source of information when vowel diacritics are not included in a given written text. This does not necessarily function as a splitting of roots and patterns into independent morphemes (despite the fact that a number of studies do indicate that this is the case in Semitic languages, see review in Hansen 2008), but as a result of frequency: The limited number of possible patterns leaves the reader with a limited number of possible word structures stored in the hidden units ready to guide the decoding process.

Based on these issues it is possible to list a range of examples of how word recognition in Arabic differs from equivalent processing in English:

In general it seems that phonological processing during reading of unvoweled script is more modest in Arabic. While phonological processes are crucial in word recognition in English just as phonological awareness is "*inescapably required*" (Adams 1990:305) in order to achieve good reading skills, this is to a lesser extent the case in Arabic, where, on the contrary, orthographic and morphological processes play a more prominent role, simply because the phonology provided in normal text is more scarce (Hansen 2008:27). These orthographic and morphological processes are not explicit in the model but internalised in the hidden units, where the reader's experience with linguistic structures is stored.

This process explains both *word frequency effect:* high-frequency words are recognised faster than low-frequency words (Monsell et al. 1989), *word regularity effect:* words with regular spelling and pronunciation are recognised faster than irregular words (Metsala et al. 1998) – and the interplay between these two phenomena, *neighbour-frequency effect* (Grainger 1992): word-frequency for neighbours (words with shared letter combinations) influence word recognition speed, so if a word and its neighbours are regularly spelled (e.g. gave, save and shave) the effect is positive and a frequent word increases the speed of recognition for less frequent neighbours. However, for irregular neighbours (e.g. have) the effect can be negative. This is the case for low-frequency words especially, as the effect of highly frequent neighbours

slows down their recognition, while frequency effects in highly experienced readers obliterates the negative effect for high-frequency words (Massaro et al. 1979; Seidenberg &McClelland 1989; Grainger 1992; Johnson 1992).

In English, high-frequency and low-frequency letter constellations are thus essential in this context, or as Adams (1990) puts it:

> *The nature of the stimulation passed along from a donating to a receiving letter depends on the frequency with which the two letters have occurred together in the reader's lifetime of reading experience. Letters that have often been seen with the donating letter will receive positive excitation; the more often they have been seen together, the stronger this positive excitation will be. Conversely letters that have rarely been seen with the donating letter will receive negative excitation, or inhibition, that is proportionate to the rareness of their co-occurrence.* (Adams 1990:109)

These processes implicitly entail that we have a perceptual tendency to split long words into syllables automatically. If, for instance, the first letter of a word is a 'd', it is more probable that it is followed by a 'r' than by a 'n', thus 'dr' represent a well-known letter constellation while 'dn' would be less expected. While less frequent letter constellations often occur word-internally at the intersection of two syllables, as in 'midnight', the reader would – based on experience – be inclined to split the word at this very spot, if s/he fails to deal with the word as a whole (Adams 1990:116). This is of course very expedient when each syllable represents independent unities of meaning, and the strategy therefore represents yet another resource in the reading process. In other words, neighbour-frequency effect is a result of the reader's storage of syllabic and morphological information in the hidden units, where both orthographic and phonological elements play their part and result in different degrees of ortho- and phonotactic incentives or constraints.

In addition to this linear processing, as readers also rely on a more holistic visual perception of each word. Figure 6 illustrates how, in English, readers are able to achieve word recognition fairly quickly based on word length and a few letters in the right position, despite the fact that the written text triggers notable feedback of several uncommon or even unacceptable letter constellations.

This eamxlpe sohws taht wehn you raed fmailair wrods, it is not taht imtorpant taht all leterts are in the rihgt palce. If olny the frist and the lsat lerttes are in the rhigt pitosions, it mghit look srantge, but we wlil sitll be albe to raed it.

Figure 6: Holistic Word Recogntion

Hence, automatic word recognition, which is essential for good reading skills, relies very much on the perception of single words as wholes. However, the linear letter analysis is still activated (Adams 1990:111). Seidenberg & McClelland (1989) have shown that at least monosyllabic words are processed through a 'triple-letter-analysis' in which words are treated by the reader as a series of trigrams. For

instance, the word 'end' is processed as [en], [end], [nd]. This continuous (and overlapping) processing functions as an 'auxiliary engine' which supports the process by confirming the reader's perception of the holistic input, settles the question in matters of doubt, and 'cobbles the pieces together' when needed during the process. All this taken together enables the reader to attain fluency and increase his/her reading speed.

In Arabic it is a totally different matter; as noted above, the phonological information is in comparison scarce, and the morphological structure of the language very different: Since short vowels are not present, the reader does not have the same possibility of establishing a reaction to well-known or unaccustomed letter constellations, and thus it is not possible for there to be positive or negative feedback based on combinations like 'dr' and 'dn'. First of all, 'dr' could represent any of three short vowels in Arabic /dar/, /dur/, /dir/ or a sequence without a vowel: /dr/. Second, orthographic recognition heavily depends on the third consonant of the relevant root. Furthermore, letters which are part of a word's pattern hold fixed positions within the word, and there is no restriction on which consonant such a pattern-letter can be combined with. When it comes to holistic word processing, the information available is minimal, as the limited number of patterns results in a graphically more uniform vocabulary. In short, Arabic words do not look as diverse as English words. Because large groups of words are only distinguishable by the three consonants that make up the root, there is no basis for establishment of the mentioned positive and negative types of feedback based on letter constellations.

However, the tight morphological structure of Arabic provides other kinds of resources in comparison with English: Some prefixes, infixes and suffixes can – like word length – give feedback on which patterns are applicable to a given word. In practice, a prefix will sometimes reduce the number of possible pattern combinations to very few or even a single one. When the pattern is given, the vowels are, too. Recognition of a pattern is in other words essential, when a letter constellation like 'dr' is to be decoded, as it determines whether the reader is dealing with /dar/, /dur/, /dir/ or /dr/. Moreover, recognition of the root can be crucial as well since this recognition will reduce the number of applicable patterns.

Another example of the different kinds of morphological structures stored in the hidden units in English and Arabic, respectively, is that in English we are readily able to distinguish between pseudo-words (which are word-like), e.g. 'kriv' or 'flas' and non-words (which are not word-like), e.g. 'ikvr' or 'lfas': Pseudo-words consist of well-known letter constellations and represent possible phonological structures, and the linear letter analysis yields positive feedback even though they have no semantic value. The non-words, on the other hand, yield negative feedback because the unfamiliar letter constellations collide with the grapho- and phonotactic constraints that have been established within the word recognition system. In Arabic the difference between pseudo-words and non-words does not depend on letter constellations but on licit or illicit patterns based on Arabic morphology. If the pattern is licit, the 'word' will be perceived as word-like, and the difference between words and pseudo-words thus depends solely on whether or not the three root consonants construct a licit word in combination with the given pattern.

Construction of a non-word would demand a non-existent pattern.[16] Likewise, it would be impossible to construct an Arabic version of the example in Figure 6. A corresponding manipulation of Arabic words would have a totally different result. With three root consonants and an infix for example, it would sometimes be possible to create a range of licit words since interchange of root consonants would often result in another licit root, just as an infix in another position would sometimes result in another licit pattern.

In other words, according to connectionist theory, our experience with text is not just shaped by the word recognition system the word recognition system is also shaped by our experience with text. The system is completely dependent on the input it has experienced in its lifetime, and word recognition both feeds and is fed by the other reading-related resources: At the bottom of the model, we see that learning to recognise letters is learning to differentiate certain kinds of graphical input. At the top of the model we see how linguistic knowledge and general knowledge of the world helps reading comprehension, and how reading comprehension also shapes our linguistic knowledge and knowledge of the world in general – which leads us back to the main topic: Adult immigrants' language and literacy acquisition.

4. *Adult immigrants' language and literacy acquisition*

As illustrated above, the connections between language and reading are inseparable, even at the word recognition level. As a result, language skills and reading skills are closely intertwined. Obviously, people can master a language without being able to read it, but learning to read changes our awareness of language and shapes our awareness of words as abstract forms representing units of (spoken) language.

This has been consistently shown in research investigating pre-readers' awareness of words and their parts. Most of this research has been carried out with pre-literate children and has considered phonological awareness in particular. Such research shows that the ability to omit a word's initial consonant, to add an initial consonant, and to name words beginning with a specific phoneme correlate with children's reading skills in alphabetic scripts. It is often argued that this phonological awareness is linked to cognitive maturity and, thus, an expression of an ability to comprehend acoustic abstractions which is a prerequisite for 'normal' reading acquisition. We find a lack of such abilities in developmental dyslexics, and among the most prominent reading researchers, it is a widespread assumption that reading disability is caused by a defective or underdeveloped phonological 'component' in the cognitive system (e.g. Verhoeven 2002). However, researchers concerned with pre-literate or nonliterate adults have found that the ability to perform phonological segmentation as in the examples above is also lacking in these individuals (e.g. Morais et al. 1979; Morais et al. 1986; Van de Craats et al. 2006). Moreover, Kurvers et al. (2009) found that for print awareness, being able to read and write is more decisive than age for learning to read in a language such as

[16] Note that in both European and Semitic languages there are in fact words – especially loan-words – which are licit despite the fact that they violate established grapho- and phonotactic constraints, e.g. in Arabic ' ' (/dimuqratiyya/, 'democracy') and in English 'phthalates'.

Dutch. This could indicate that the ability to perform such linguistic abstractions does not emerge automatically as a result of maturation or age but as a result of reading acquisition. The sensible conclusion probably is that there is no clear-cut causal relationship, but that the competences are closely intertwined so that e.g. phonological awareness is not just a prerequisite for becoming a skilled reader – it is also an outcome of reading experience. In light of the connectionist reading model, this makes perfect sense: the model clearly illustrates how the network is trained through experience with text, and awareness of words' smallest phonological units is part of this experience and can subsequently be employed to optimise the reading process.

Similar phenomena are noticeable at the higher linguistic levels in morphological and morpho-syntactic awareness: The ability to recognise words' meaning parts and use them these units in different combinations support the reading process but is also established through reading experience, as the beginning reader gradually becomes aware of how word parts, e.g. roots and conjugation patterns, reappear in different combinations and create different patterns of meaning. At the more general level, experience with texts is crucial for our understanding of the whole idea of texts and reading and what they can be used for. Pre-literate adults, as well as children who have not yet learned to read, often lack awareness of what a word is and how writing is a graphic representation of spoken language (e.g. Olson 2002 on children; Kurvers et al. 2006 on adults). An example is that awareness of word length does not correlate with age and cognitive maturity but with reading ability. Pre-readers, children as well as adults, simply do not perceive word length because they are not familiar with the visual representation of words – irrespective of the fact that the word acoustically lasts longer (Kolinsky et al. 1987). Also, Dellatolas et al. (2003) have shown that pre-literate adults are not very skilled at repeating pseudo-words, and the implications of this are possibly important. Whether or not ability to repeat pseudo-words can be used as a measure of short term or working memory in general (see discussion in Juffs 2006), it may indicate ability in acquiring new vocabulary. Furthermore, vocabulary acquired during adulthood is generally expanded primarily through reading. This issue alone may have serious implications for pre-literate adults as they may not stand a very good chance of developing a rich and varied language. Moreover, Kurvers et al. (2006) found that adult pre-readers as well as children often fail to comprehend or accept abstractions and formal conditions not linked to their real life experiences.

Thus, learning to read not only contributes strongly to the development of linguistic or metalinguistic awareness; cognitive consequences of acquiring reading skills may reach much further. One very simple but very far-reaching implication of illiteracy is found in the top of the reading model in Figure 2: Reading processes are, at the same time, dependent on and influence our general world knowledge: More knowledge and better linguistic competence leads to better reading – and more reading leads to more knowledge and better linguistic competence. For successful readers, this creates a positive circular development. Compared to them, non-readers would fall behind because the circular development is negative.

All in all, pre-literate adults who are learning to read for the first time in an L2 with which they are not very familiar may experience shortcomings at many different

levels as they lack many of the relevant skills and resources. Looking again at the model in Figure 2, it becomes quite clear: All the boxes are empty. For this group of learners, letters and sounds, the relationship between them, and comprehension of single words do not bring them very far. In reality, they need to build totally new and very broad field of knowledge that not only involves communicative competence in the target language but also includes the whole sphere related to "the world of written" which to quite an extent involves abstractions – from phonological and morpho-syntactic rules, lexical units, formal sentence structures, written discourse, and other strategic and sociolinguistic competences as well as general understanding of the social practice related to the written world: Who writes what to whom and in which institutional, organisational, or political settings – and why?

5. Educational implications

If things are so complicated, should we then forget about teaching reading skills to pre-literate adult immigrants and focus solely on developing their oral skills in the target language? Maybe – but we should be very aware of the positive connections between reading and general language skills and the tight relationship between reading development and ability to comprehend linguistic (and possibly other kinds of) abstractions - skills which are indeed useful for second language acquisition at higher levels. In addition, we should not forget that we are educating these learners for a life in parts of the world where illiteracy is, in fact, a social disability. Written language is not only an access point to new knowledge and intellectual development but it is also a necessary prerequisite for managing daily life in the Western world. Based on this, one *could* argue that reading acquisition *should* be an educational objective regardless of whether the political agenda identifies L2 acquisition as a humanitarian educational project or a means of integration into the work force or society in general.

A possible way to start teaching reading in the L2 *could* be to teach pre-literate adults to read in the L1. After all, it has been consistently shown that using the L1 as a means of instruction helps language acquisition for very low educated learners (e.g. Condelli et al. 2003). Moreover, the reading model in Figure 2 definitely supports this approach at the theoretical level, as not all the boxes will then be totally empty: Learning to read demands a linguistic base to build on, and using the L1 as an entry *could* be the way to go. However, as the contrastive Arabic-English examples in Section 3 show, reading skills in one language are not necessarily transferable to another language – actually one could speculate that transfer *could* be negative if the two languages have very different structures and apply different writing systems.

The conclusion is – not surprisingly – that we need more research to shed light on linguistic and cognitive, as well as educational and sociological, aspects of assisting pre-literate adults in order to develop evidence-based recommendations for teaching this group of learners.

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