COGNITIVE DIFFERENCES IN SECOND LANGUAGE LEARNERS AND THE CRITICAL PERIOD EFFECTS

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Abstract. Research has shown a strong association between psychological, affective, neurological and learning variables, related also with age and gender factors, in the process of acquisition and/or learning of a second language. However, there is a theoretical controversy concerning the way the critical period may affect different aspects of language competence. We developed an assessment instrument to test the phonological awareness and general cognitive achievement in L2, for application in L2 learners and also in monolinguals (natives). The goal is to predict the dimension of age (chronological age, age of acquisition, age of arrival) in the L2 literacy skills development. The data collected pertains to the first phase of a larger study and includes 64 students with migratory experience, acquiring Portuguese as L2. Findings in what concerns the decoding competence and the first language transference will be discussed, regarding particularly the results from some of the tests: alphabetic ordinance, phonemic blending, alliteration judgement and dichotic hearing The achievement observed shows that children present lower levels of accuracy in L2 context than expected, not regarding the positive levels at the alliteration judgment task, which is not an evidence of phonological awareness (in the consciousness sense). Alliteration, and rhyme judgments are symptoms of normative phonological knowledge, which is not necessarily phonological awareness, and is based on the imitation ability toward verbal stimuli. The age factor remains as the main predictor of skill and ability and the mastery exhibited by the adult learners on particular levels of L2 phonology decoding does not confirm the critical period hypothesis, which calls for its revision and for new insights related to education orientations.

Key words: critical period effects; lateralization; mother tongue interference; phonological awareness; second language acquisition.

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Chinese
[Translation Shek Kam Tse]
二语学习者认知差异与临界期作用

摘要：研究显示在习得或学得一门二语的过程中，心理，情感，神经与学习变量之间有很强的联系，相关的还有年龄和性别因素。然而，在临界期如何影响语言能力的各个方面上存在着理论争论。本研究开发一项测试的二语的语音意识和语言总体认知工具，提供给二语和母语（本土的）学习者，目的在于预示二语读写能力技巧发展中的年龄维度（时间顺序的年龄，习得年龄，到达的年龄）。收集到的资料符合一项大型研究的第一阶段情况，包括64名葡萄牙语作为二语的有移民经历的学生。文章将讨论有关解码能力以及母语迁移等相关问题的研究发现，尤其是一些测试的结果：字母规则，因素混合，头韵判断，二重听觉等。观察到的成果显示儿童在二语情境的准确率水平比期望中的情况低，不考虑头韵判断任务的正面作用，因为它不是语音意识（有意识的感觉）的证据。头韵，脚韵判断是规范的语音学知识征兆，基于语言刺激的模仿能力，而不一定是音位学意识。年龄因素继续作为技巧与能力的预示因子，由成人学习者对二语音位解码的某个水平展示出的掌握，不能证实从临界期假设的理论，这也产生了对有关理论修正和教育方向相关的新理解的研究兴趣。

关键词：临界期作用；侧面化；母语干扰；音位学意识；二语习得

Dutch
[Translation Tanja Janssen]
TITEL. Cognitieve verschillen tussen tweedetaalleerders en de effecten van de kritieke periode

SAMENVATTING. Onderzoek heeft een sterk verband aangetoond tussen psychologische, affectieve, neurologische en leervariabelen, ook verband houdend met leeftijd en geslacht, in het proces van het verwerven en/of leren van een tweede taal. De manier waarop de kritieke periode van invloed kan zijn op verschillende aspecten van talige competentie is echter een theoretisch twistpunt. Wij ontwikkelden een meetinstrument om het fonologisch bewustzijn en de algemene cognitieve prestaties in L2 vast te stellen, bedoeld voor toepassing bij tweedetaalleerders maar ook bij eentaligen (autochtonen). Het doel is om de dimensie 'leeftijd' te voorspellen (chronologische leeftijd, leeftijd van verwerving, leeftijd van aankomst) in de ontwikkeling van taalvaardigheden in L2. De dataverzameling maakt deel uit van de eerste fase van een omvangrijker onderzoek en omvat 64 leerlingen met ervaring met migratie, die Portugees als tweede taal verwerven. Bevindingen met betrekking tot vaardigheid in het decoderen en transfer vanuit de eerste taal zullen worden besproken. We gaan daarbij met name in op de resultaten van enkele toetsen: alfabetische rangschikking, fonemen mengen, alliteratie beoordelen en 'dichotic' horen. Prestaties laten zien dat kinderen lagere niveaus van accuraatheid in L2 laten zien dan verwacht. Op de alliteratietaak scoorden kinderen goed, maar dit is geen aanwijzing dat zij over fonologisch bewustzijn beschikten. Alliteratie, rijm en rijm beoordelen zijn tekenen van normatief fonologische kennis, die niet noodzakelijk duidt op fonologisch bewustzijn en gebaseerd is op imitatievaardigheid met betrekking tot verbale stimuli. De leeftijdsfactor blijft de belangrijkste voorspeller van vaardigheid en de beheersing die volwassen leerders tonen op bepaalde niveaus van fonologisch decoderen in L2 vormt geen ondersteuning van de 'kritieke periode hypothese'. Dit genereert belangstelling voor het herzien van de theorie en nieuwe inzichten gerelateerd aan onderwijskundige orientaties.
TREFWOORDEN: effecten van kritische periode, lateralisatie, inferentie van de moedertaal, fonologisch bewustzijn, tweedetaalverwerving.

Finnish
[Translation Katri Sarmavuori]
TITTELI. KOGNITIIVISET EROT TOISEN KIELEN OPPIJOILLA JA KRIITTISEN VAIHEEN VAIKUTUKSET

ABSTRAKTI. Tutkimus on näyttänyt vahvan yhteyden psykologisten, affektiivisten, neurologisten ja oppimismuuttujien välillä, joilla on yhteys myös ikään ja sukupuoleen

toisen kielen oppimisessa ja/tai omaksumisessa. Kriittisen periodin vaikutuksista kielellisen kompetenssin aspekteihin on kuitenkin teoreettinen ristiriita. Kehitimme arviointi-istrumentin fonologisen tietoisuuden ja yleisen kognitiivisen suoriutumisen testaamiseen L2:ssa sovellettaviksi L2-oppijoille ja myös yksikielisille (natiiveille). Päämääränä on ennustaa ikädimensio (kronologinen ikä, omaksumisikä ja saavutusikä) L2:n lukutaitokehityksessä. Kerätyt tiedot kuuluvat laajemman tutkimuksen ensimmäiseen vaiheeseen ja sisältävät 64 oppilasta ja heidän siirtolaiskokemuksensa portugali L2:n oppimisessa. Tuloksista, dekoodauskompetenssista ja ensimmäisen kielen transferenssista keskustellaan, varsinkin muutamista testin tuloksista: aakkosjärjestys, foneeminen sekoittuminen, alkusointuarvio ja dikoottinen kuuleminen. Observoidut tulokset näyttävät, että lapsilla on alhaisempi tarkkuustaso L2-kontekstissa kuin luullaan, paitsi alkusointuarviotestin positiivisia tasoja, mikä ei ole fonologisen tietoisuuden evidenssi (tietoisessa mielessä). Alkusointu, riimi ja rytmiarviot ovat symptomeja normatiivisesta fonologisesta tiedosta, mikä ei ole välttämättä fonologista tietoisuutta ja perustuu verbaalisten ärsykkeiden jäljittelykykyyn. Ikäfaktori pysyy taidon ja kyvyn pääennustajana ja aikuisten oppijoiden fonologisen dekoodauksen taso L2:ssa ei vahvista teoreettista kriittisen periodin hypoteesia, mikä tuottaa tutkimusintressin teorian muokkaukseen ja uusiin näkemyksiin suhteessa kasvatuksellisiin suuntautumisiin.
AVAINSANAT: Kriittisen vaiheen vaikutukset; lateralisaatio; äidinkielen interferenssi; fonologinen tietoisuus, toisen kielen oppiminen.

French

[Translation Laurence Pasa]

TITRE. DIFFÉRENCES COGNITIVES CHEZ LES APPRENANTS EN LANGUE SECONDE DE ET LES EFFETS DE LA PÉRIODE CRITIQUE

RÉSUMÉ. La recherche a montré l'existence d'une relation forte entre les variables psychologiques, affectives, neurologiques et d'apprentissage, également associées à l'âge et le genre, dans le processus d'acquisition et/ou d'apprentissage d'une deuxième langue. Cependant, il y a une controverse théorique concernant la manière dont la période critique peut affecter les différents aspects des compétences linguistiques. Nous avons développé un outil d'évaluation pour tester la conscience phonologique et la performance en L2 d'un point de vue cognitif général, chez les apprenants de L2 et les monolingues (d'une langue maternelle). Le but est de prédire le développement des compétences en L2 à partir de l'âge (âge chronologique, âge d'acquisition…). Les données recueillies font partie de la première phase d'une étude plus vaste et concernent 64 élèves apprenant le portugais comme L2. Les résultats relatifs aux compétences en décodage et l'influence de la première langue sont discutés, en particulier à partir des données de certains tests : l'ordre alphabétique, les assemblages phonologiques, le jugement d'allitération et l'écoute dichotique. Les scores obtenus montrent que les enfants ont des niveaux en L2 inférieurs à ceux attendus, même si la tâche de jugement des allitérations est globalement réussie, ce qui rend compte d'une certaine sensibilité phonologique davantage que de la conscience phonologique. Les jugements d'allitération et de rime illustrent les connaissances phonologiques normatives, qui n'impliquent pas nécessairement la conscience phonologique mais reposent sur la capacité à imiter des stimuli verbaux. L'âge reste le facteur prédictif principal de la compétence et de la performance et la maîtrise qu'ont les apprenants adultes de certains niveaux de décodage phonologique en L2 ne confirment pas l'hypothèse relative à la période critique, qui suscite l'intérêt des recherches et de nouvelles perspectives quant aux orientations éducatives.
MOTS-CLÉS : effets de la période critique, latéralisation, interférence de la langue maternelle, conscience phonologique, acquisition d'une langue seconde

German

[Translation Ulrike Bohle]

TITEL. Kognitive Unterschiede zwischen Zweitsprachenlernern und Effekte der kritischen Periode

ZUSAMMENFASSUNG. Die Forschung belegt starke Zusammenhänge zwischen psychologischen, affektiven, neurologischen und Lern-Variablen, die wiederum mit dem Alter und Geschlecht zusammenhängen, im Prozess des Zweitspracherwerbs bzw. Zweitsprachenlernens. Theoretisch kontrovers diskutiert wird jedoch der Einfluss der kritischen Periode auf verschiedene Aspekte der Sprachkompetenz. Um die phonologische Bewusstheit und allgemeine kognitive Leistungen in der Zweitsprache zu testen, wurde ein Überprüfungsinstrument entwickelt, das bei Zweitsprachenlernern ebenso wie bei Einsprachigen (Muttersprachlern) eingesetzt werden kann. Ziel ist es, die Dimension des Alters (Lebensalter, Spracherwerbsalter, Einreisealter) in der Entwicklung der schriftlichen Fertigkeiten vorherzusagen. Die Daten entstammen der ersten Phase einer größeren Studie und umfassen 64 Schüler

mit Migrationshintergrund, die Portugiesisch als Zweitsprache lernen. Ergebnisse hinsichtlich der Dekodierfähigkeit und des Transfers aus der Erstsprache werden diskutiert, besonders berücksichtigt werden Ergebnisse einiger Tests: alphabetische Ordinanz, phonemische Mischungen, Urteile zu Alliterationen und dichotisches Hören. Die beobachteten Leistungen zeigen geringere als angenommene Genauigkeit in der Zweitsprache, trotz der Leistungen bei der Beurteilung von Alliterationen, die keine Evidenz für phonologische Bewusstheit (im Sinne von Bewusstsein) liefert. Urteile zu Alliteration und Reim sind Anzeichen für normatives phonologisches Wissen – und nicht unbedingt für phonologische Bewusstheit – und beruhen auf der Fähigkeit, verbale Stimuli nachzuahmen. Der Altersfaktor bleibt der beste Prädiktor für Fähigkeiten und Fertigkeiten, und die Sprachbeherrschung, die erwachsene Sprachlerner in verschiedenen Bereichen der Dekodierung der zweitsprachlichen Phonologie zeigen, bestätigt nicht die Hypothese der Kritischen Periode, was das Forschungsinteresse an einer theoretischen Neuorientierung weckt und neue Einsichten hinsichtlich der Ausrichtung des Unterrichts liefert.
SCHLAGWÖRTER: Effekte der kritischen Periode, Lateralisierung, muttersprachliche Interferenzen, phonologische Bewusstheit, Zweitspracherwerb

Greek

[Translation Panatoya Papoulia Tzelepi]

Τίτλος. Γνωστικές διαφορές σε μαθητές δεύτερης γλώσσας και τα αποτελέσματα της κρίσιμης περιόδου

Περίληψη. Η έρευνα έδειξε ισχυρή σχέση μεταξύ ψυχολογικών, συναισθηματικών, νευρολογικών και μαθησιακών μεταβλητών που σχετίζονται επίσης με την ηλικία και το φύλο, κατά τη διαδικασία της απόκτησης ή/και μάθησης μιας δεύτερης γλώσσας. Εντούτοις υπάρχει θεωρητική διαμάχη που αφορά στον τρόπο με τον οποίο η κρίσιμη περίοδος μπορεί να επηρεάσει διαφορετικές όψεις της γλωσσικής ικανότητας. Αναπτύξαμε ένα εργαλείο αξιολόγησης για να μετρήσουμε την φωνολογική επίγνωση και τη γενική γνωστική επίδοση στη δεύτερη γλώσσα για χρήση μαθητών δεύτερης γλώσσας αλλά και γηγενών ομιλητών. Ο στόχος είναι να προβλέψει τη διάσταση της ηλικίας (χρονολογική ηλικία, ηλικία απόκτησης, ηλικία άφιξης) στην ανάπτυξη δεξιοτήτων γραμματισμού στη δεύτερη γλώσσα. Τα δεδομένα που συλλέχτηκαν αναφέρονται στην πρώτη φάση μιας ευρύτερης μελέτης και περιλαμβάνουν 64 μαθητές με εμπειρία μετακίνησης, που μάθαιναν τα Πορτογαλικά ως δεύτερη γλώσσα. Ευρήματα που αφορούν την ικανότητα αποκωδικοποίησης και τη μεταφορά της πρώτης γλώσσας θα συζητηθούν, εξετάζοντας ειδικότερα τα αποτελέσματα κάποιων τεστ, όπως αλφαβητική σειρά, φωνημική μίξη, κρίση για παρήχηση και διχωτική ακοή. Η επίδοση που παρατηρήθηκε δείχνει ότι τα παιδιά δείχνουν χαμηλότερα επίπεδα ακρίβειας στην δεύτερη γλώσσα από το αναμενόμενο, μη λαμβάνοντας υπόψη τα θετικά επίπεδα του τεστ παρήχησης, που δεν είναι απόδειξη φωνολογικής επίγνωσης (με την έννοια της συνειδητότητας). Παρήχηση και ομοιοκαταληξία είναι συμπτώματα κατανόησης φωνολογικής γνώσης η οποία δεν είναι αναγκαστικά φωνολογική επίγνωση και βασίζονται στην ικανότητα μίμησης όταν υπάρχει λεκτικό ερέθισμα. Ο παράγων της ηλικίας παραμένει η κύρια πρόβλεψη δεξιότητας και ικανότητας και η ευχέρεια που φαίνεται από τους ενηλίκους μαθητές σε ειδικά επίπεδα αποκωδικοποίησης στη φωνολογία της δεύτερης γλώσσας δεν επιβεβαιώνει τη θεωρία για την σημασία της κρίσιμης περιόδου, πράγμα που γεννά το ερευνητικό ενδιαφέρον για την αναθεώρηση της θεωρίας και για νέες απόψεις σχετικά με τον προσανατολισμό της εκπαίδευσης.
Λέξεις κλειδιά: κρίσιμη περίοδος, πλευρίωση, επίδρασης της μητρικής γλώσσας, φωνολογική επίγνωση, απόκτηση δεύτερης γλώσσας

Italian

[Translation Manuela Delfino, Francesco Caviglia]

TITOLO. Differenze cognitive in persone che imparano una seconda lingua e effetti del periodo critico

SOMMARIO. La ricerca ha mostrato una forte associazione tra variabili psicologiche, affettive, neurologiche e di apprendimento, connesse anche con fattori di età e di genere, nel processo di acquisizione e/o apprendimento di una seconda lingua. Tuttavia, vi è una controversia teorica relativa al modo in cui il periodo critico può influenzare diversi aspetti della competenza linguistica. Abbiamo sviluppato uno strumento di valutazione per verificare la consapevolezza fonologica e il raggiungimento di traguardi cognitivi generali nella L2, da utilizzare con apprendenti della L2 e anche in monolingui (nativi). L'obiettivo è quello di prevedere la dimensione cronologica (età cronologica, età di acquisizione, età di arrivo) nello sviluppo di competenze di literacy in L2. I dati raccolti riguardano la prima fase di uno studio più ampio e coinvolge 64 studenti, con esperienza di migrazione, che stanno acquisendo il portoghese come L2. Vengono discussi i risultati per quanto riguarda la competenza di decodifica e il trasferimento dalla prima lingua, con particolare attenzione ai risultati emersi da alcuni dei test: ordine alfabetico, fusione di

fonemi, riconoscimento di allitterazione e test nei quali il soggetto riceve stimoli diversi nei due orecchi. auditivi.
Il risultato osservato dimostra che i bambini presentano nell'ambito della L2 livelli di accuratezza inferiori a quanto previsto, tranne che nel compito relativo al riconoscimento di allitterazione, che non è una prova di consapevolezza fonologica (a livello cosciente). La capacità di riconoscere allitterazioni e rime sillabiche e poetiche è sintomo di una conoscenza fonologica normativa, che non è necessariamente consapevolezza fonologica, e che si basa sulla capacità di imitare stimoli verbali. L'età rimane il principale fattore predittivo di abilità e capacità, mentre la padronanza mostrata dai discenti adulti su particolari livelli di decodifica della fonologia della L2 non conferma l'ipotesi teorica del periodo critico; questo risultato genera un interesse di ricerca per la revisione della teoria e per lo sviluppo di nuove conoscenze relative agli orientamenti educativi.
PAROLE CHAIVE: effetti del periodo critico; lateralizzazione; interferenza della lingua madre; consapevolezza fonologica; acquisizione della seconda lingua

Polish

[Translation Elżbieta Awramiuk]

TITUŁ. Różnice poznawcze wśród uczących się języka obcego a efekty okresu krytycznego

STRESZCZENIE. Badania wykazują silny wpływ zmiennych psychologicznych, uczuciowych, neurologicznych oraz okoliczności uczenia się, powiązanych także z czynnikami takimi jak wiek i płeć, na proces przyswajania i/lub uczenia się języka obcego. Istnieje jednak teoretyczna kontrowersja dotycząca sposobu, w jaki okres krytyczny może wpływać na różne aspekty kompetencji językowej. Stworzyliśmy narzędzie do testowania świadomości fonologicznej i ogólnych osiągnięć poznawczych w języku obcym osób uczących się L2, a także native speakerów. Jego celem jest określenie wymiaru wieku (wiek chronologiczny, wiek przyswajania, wiek osiągnięć) w rozwoju umiejętności czytania i pisania w L2. Zebrane dane dotyczą pierwszego etapu większych badań i obejmują 64 uczniów z migracyjnymi doświadczeniami, przyswajającymi portugalski jako L2. Przedyskutujemy rezultaty dotyczące kompetencji w zakresie dekodowania i wpływu języka ojczystego, ze szczególnym uwzględnieniem wyników kilku testów: porządku alfabetycznego, fonemicznego przenikania, oceny aliteracji i dychotomicznego słyszenia. Uzyskane wyniki dowodzą, że dzieci reprezentują niższy poziom dokładności niż zakładano, poza dobrym poziomem w zadaniach oceniających aliteracje, co nie jest dowodem świadomości fonologicznej (w sensie samowiedzy). Aliteracja, rym i ocenianie rymu są symptomami normatywnej wiedzy fonologicznej, która nie jest niezbędnym elementem świadomości fonologicznej, i bazują na umiejętności naśladowania reakcji na bodźce słowne. Czynnik wieku pozostaje głównym predyktorem umiejętności i sprawności. Poziom osiągany przez dorosłych uczących się fonologicznego dekodowania L2 nie potwierdza hipotezy okresu krytycznego, która skupia zainteresowania badaczy wokół rewizji teorii i nowego spojrzenia na edukacyjne orientacje.
SLOWA-KLUCZE: efekty okresu krytycznego; lateralizacja; interferencja języka ojczystego; świadomość fonologiczna; przyswajanie języka obcego

Portuguese

[Translation Sara Leite]

TITULO. Diferenças cognitivas entre alunos aprendentes de lingua segunda e efeitos do período crítico

RESUMO. A investigação tem demonstrado que existe uma forte ligação entre variáveis psicológicas, afectivas, neurológicas e de aprendizagem, relacionadas também com a idade e o sexo, no processo de aquisição e/ou aprendizagem de uma segunda língua. Contudo, existe uma controvérsia teórica no que respeita à forma como o período crítico pode afectar os diferentes aspectos da competência linguística. Desenvolvemos um instrumento de diagnóstico para testar a consciência fonológica e o desempenho cognitivo geral em L2, para aplicação em alunos aprendentes de Português, bem como em alunos monolingues (nativos portugueses). O objectivo é prever a dimensão da idade (idade cronológica, idade de aquisição, idade de chegada) no desenvolvimento de competências de literacia em L2. Os dados recolhidos pertencem à primeira fase de um estudo mais abrangente, e incluem 64 alunos com experiência migratória que adquiriam a língua portuguesa como L2. Serão discutidas as conclusões relativas à competência de descodificação e à transferência da primeira língua, em particular à luz dos resultados de determinados testes: ordenação alfabética, síntese fonémica, análise de aliterações e audição dicótica. Observou-se que as crianças apresentam níveis mais baixos de exactidão em contextos de L2 do que seria de esperar, independentemente dos níveis positivos na tarefa de análise de aliterações, o que não evidencia consciência fonológica. A aliteração e a rima constituem sinais de conhecimento fonológico

normativo, o que não corresponde necessariamente à consciência fonológica, baseando-se na capacidade de imitação de estímulos verbais. O factor idade continua a ser o principal indicador da habilidade e competência, e o domínio demonstrado por alunos adultos em níveis particulares de descodificação fonológica em L2 não confirma a hipótese do período crítico que aponta para a preparação mais favorável (do ponto de vista neurobiológico) dos infantes na aquisição de uma L2. A teoria referida e os resultados particulares da nossa investigação sugerem um conflito que motiva a revisão teórica e apela ao interesse de novas perspectivas relacionadas com orientações educativas.
PALAVRAS-CHAVE: efeitos do período crítico; lateralização; interferência da língua materna; consciência fonológica; aquisição de segunda língua.

Spanish

[Translation Ingrid Marquez]

TÍTULO. Diferencias cognitivas entre los estudiantes de lengua extranjera y los efectos del período crítico

RESUMEN. Las investigaciones han mostrado una fuerte relación entre las variables psicológicas, afectivas, neurológicas y de aprendizaje asociadas también con la edad y género, en un proceso de adquisición y/o aprendizaje de un idioma extranjero. Sin embargo, existe una controversia teórica acerca de la manera en que el período crítico afecta diferentes aspectos de la competencia en un idioma. Desarrollamos un instrumento de evaluación para probar la conciencia fonológica y los logros cognitivos en general en un segundo idioma (L2), para aplicar tanto en estudiantes de L2 como en nativos monolingües. La meta fue predecir la dimensión de la edad (edad cronológica, edad de la adquisición, edad de la llegada) en el desarrollo de habilidades de lecto-escritura en una lengua extranjera. Los datos recopilados corresponden a la primera fase de un estudio más grande que incluye a 64 estudiantes con experiencia como migrantes, habiendo adquirido el portugués como L2. Se discutirán los resultados relacionados con la transferencia de la lengua materna, la habilidad de decodificar y la aptitud general en L2, con un enfoque especial en ciertos exámenes: el ordenar alfabéticamente, el mezclar fonemas, el reconocer la aliteración y oír dicotomías. Los resultados demuestran que los niños tienen un menor nivel de precisión en L2 del que se esperaba a pesar de un buen empeño en la actividad relacionada con la aliteración, que no prueba el conocimiento fonológico, cuando menos no a nivel conciente. La aliteración y la identificación de rimas dan un indicio de los conocimientos fonológicos normativos, pero no indican necesariamente el nivel de conciencia fonológica sino más bien la habilidad imitativa ante un estímulo oral. El factor de la edad permanence como el más útil para predecir la destreza y dominio de los estudiantes adultos, y la decodificación fonológica de L2 a diferentes niveles no confirma la hipótesis teórica del períodp crítica, generando gran interés investigador en revisar la teoría y buscar nuevas perspectivas para la concepción de orientaciones educativas.
PALABRAS CLAVE: Efectos del período crítico; lateralización, interferencia de la lengua materna; conciencia fonológica; adquisición de un idioma extranjero.

1. INTRODUCTION

It is widely accepted that children are better L2 learners than adults and adolescents. Human beings acquire language due to an innate language acquisition device (Chomsky, 1978). However, the potential of that device declines with age and this, in turn, explains the differences between children and older learners in the language learning situation. Children may be better able to reach native proficiency in certain language domains while adult learners have cognitive skills that can facilitate the language learning process making it possible for them to surpass the younger learners (Bialystok, 1999).

Concepts such as *Acquisition* and *Learning* and designations such as *Simultaneous* and *Sequential* Bilingualism are at the core of the explanations offered in the literature about the differences between adults and children learners. The distinction between the terms 'Acquisition' and 'Learning' was first established by Robert Calfee and Sarah Freedman (cited in McLaughlin, 1985). Acquisition refers to the natu-

ral assimilation of the language and its nuclear structures, mainly at the phonological and lexical level, until a certain age. The grammatical 'refinement' (syntax and morphology) is achieved with further learning. The period when the child normally learns to speak, write and read in a language, before 10/12 years old, is considered the 'language critical period', that is, the acquisition phase. Children acquire language naturally with the support of a universal neurobiological predisposition, as long as normal environmental conditions are present. Thus, the child naturally acquires language skills in growing complexity (syncretism -concept, Vygotsky, 2001), as long as he/she belongs to a linguistic environment that provides the correct input in language(s). Learning, on the other hand, refers to language learning after puberty, throughout life (although the question of the age delimitation is always controversial). Learning differs from acquisition because the first one implies instruction and a formal learning context to acquire language knowledge. In the case of a first language, after the acquisition period begins the learning phase that follows involves the internalization, in an explicit way, of language rules and sequences. Writing and reading are examples of learning processes that, without instruction, are not acquired through informal immersion in a literate culture.

Simultaneous bilingualism is, in general, the acquisition of two languages at the same time. Sequential bilingualism occurs when the learning of another (L2) language follows the acquisition of the mother tongue (L1). According to McLaughlin (1985), the acquisition is "simultaneous" if it occurs until two/three years of age, being after three years old 'successive' and not so 'productive'. However, the terminology developed by Lamendella (1977) and Paul (2001) in the scope of bilingualism studies, in the field of neurolinguistics, clarifies important distinctions. When a child learns another language before the age of five he or she acquires the language and when a child learns a language after the age of five, he or she is going to be faced with both acquiring and learning a language. Additionally, we must consider that the acquisition and/or learning of a foreign language may occur at any age when children are only exposed to that language in formal contexts, such as in school. The assumption that children are more proficient than older people in learning situations is related to the effect of the critical periods ('readiness') for specific acquisitions and skills that occur in certain human developmental stages.

From five years old onwards, language learning becomes a more rigid process both for monolinguals and for bilinguals. However, we cannot say that if a chid did not acquire language (s) during this period language acquisition is compromised. Instead, researchers now refer to a sensitive period rather than to a critical period within this window of opportunity. Several authors (e.g., Lenneberg, 1967; Newport 2002; Pinker, 1994; Scovel, 1988; Seliger, 1978) propose that it will be from puberty onwards (12/13 years old) that the critical period for language learning (readiness) has its decline. Long (1990) refer to a 'multiple critical period' and identifies four categories relating age and changes in L2 acquisition: "social, *input,* neurological and cognitive" (p.128). Other authors (Johnson & Newport, 1991) situate the end of this period around 7 years of age, considering that until there the L2 can be learned to a level that is grammatically indistinguishable from that of the native speaker. However, around 8 to 10 years of age it becomes difficult to completely master the grammar of a language.

At the semantic level, there appears to be no sensitive period for acquisition (Neville 1998; Stowe & Sabourin, 2005; cited by Uylings, 2006); it is a process that can be developed at any age: "Critical period effects thus appear to focus on the formal properties of language (phonology, morphology, and syntax) and not on the processing of meaning" (Newport, 2002, p.738). Conversely, the foreign accent in the speech of the child, adult or adolescent is, in fact, an effect of the sensitive period. With the advance in age, depending on the moment in which the individual starts acquiring L2, the accent could be foreign or native (Liu, Flege & Yeni-Komshian, 1997). Moreover, it will be more difficult to achieve a correct pronunciation, given that there is a negative correlation between age of acquisition and pronunciation in the L2, exactly after the bilingualism has been reached (in the sequential sense). However, phonetics knowledge, at the speech production level, does not predict phonological knowledge developement. Phonetics awareness, as also phonological awareness, is not necessarily conscious. Phonological awareness is a not perceived knowledge (Gillon, 2004) about the phonetic and phonological properties in a language, through an incidental acquisition conditioned by a favorable input; phonological consciousness is a high level that requires deliberation and control mechanisms depending on executive level. The experience in second language could contribute to develop and promote the growth of phonological awareness to the phonological consciousness level, and, considering "the malleability of phonological knowledge" (Darcy, PeperKamp & Dupoux , 2007, p. 6), the individual could develop a consciousness that implies more than one phonological system.

Depending on age and linguistic experience, there are neurophysiologic differences (according to hemodynamic studies) between phonologic and phonetic perception (Dorman & Sharma, 2000; Sereno, McCall, Jongman, Dijkstra & van Henven, 2002) and such perception becomes much more complex in the context of L2, than in the context of L1 (Tsukada, 1999). The learners in the beginning of the L2 acquisition process have the perception of the L2 in the same format of the L1, at the phonological level, depending on the 'native compensation pattern' for the two languages. The language learners that are more advanced in the process present already two separate systems for the phonological processing and they can coexist - flexibility (Darcy, Peperkamp & Dupoux, 2007a; 2007b).

The effects of the plasticity period, in the neuropsychological sense, mainly in early childhood, are mostly due to environmental influences. This does not mean that the external influence does not occur in the older language learners, only that the flexibility is reduced and the reaction is also less evident. Such influence is not visible for all cerebral areas and differs between males and females. The type and density of the learning not only influences the form and changes at the neurobiological level (Uylings, 2006), but also the other way around. Two questions arise from this research: does L2 acquisition lead to structural changes in the cerebral structure or can we talk about specific neuronal structures that facilitate the verbal language development? De Bot (2006) studied this question and showed that, given that the metabolic peak occurs around 2/3 years of age, the removal of the synapses is a natural process that will stabilize after some years. Therefore, whereas knowledge of various languages does not increase brain structures, monolingualism weakens them.

As De Bot (2006) states, "Bilingualism does not lead to expansion of gray matter, but monolingualism leads to extensive synaptic pruning" (p.130).

The question of the critical period must be explained in neurobiological terms in order to be clear that, for its existence, a cerebral structural net is necessary (the development of neurons and synapses). Moreover, approaching the end of the period and varying from individual to individual, there will be a reduction in the connections between nervous structures. For this reason, the acquisitions should occur on their own timing (as a biological clock), and the environmental influence has to exist and to activate the cerebral cellular structures. The fact that the biggest general cerebral activation occurs (metabolic peaks) between four and nine years of age (besides the peak that is around 2/3 years of age) contributes to justify the plasticity in the acquisition of languages, as well as in other learning contexts. The domain of more than one language implies that the individual becomes more careful in the information selection when processing it, to code and decode (Gullberg & Indefrey, 2006).

Individuals become prepared for inhibition strategies and develop control mechanisms that help to balance the self-linguistic system and to conciliate memory processes in one or another language (Levy, McVeigh, Marful & Anderson, 2007). However, authors such as Bialystok and Miller (1999) are very 'cautious' when considering the existence of a critical period in the L2 acquisition. They believe that three factors must be present when considering a critical period: declining proficiency after puberty, the influence of the Mother Language in L2 acquisition and the 'native-like competence'. The authors have tested these factors in a study with Chinese and Spanish speakers, as their first languages (two distinct groups), and they could not observe the three conditions that justify the existence of a critical period. Therefore, according to this research, they claim that "we see no reason to reject the null hypothesis that there is no critical period in the acquisition of L2" (Bialystok & Miller, 1999, p. 144).

On the other hand, other authors (e.g. Neville, 1998; Newport 2002; 1991; Pallier, Dehaene, Poline, & LeBihan, 2003; Patkowsky, 1990), strengthen the idea that there is enough evidence for the existence of a critical period. In fact, they maintain that age of acquisition is determinant in L2 Proficiency: "several studies have established that the acts of acquisition of first or L2 is the major determinant of ultimate proficiency" (Pallier et al., 2003, p. 1). The last authors speak about the 'crystallization hypothesis', whereby "the later a L2 is learned, the larger the differences between the cortical representations of the second and the first languages" (Pallier et al., 2003, p. 2). It is interesting to note that, when the individual stops speaking the First Language in infancy, to use exclusively L2, this overlaps, in terms of neurocortical structure, to L1. This replacement, however, may not be completely achieved (Pallier et al. 2003). With the advance in age, the processing rhythms slow down, the memory (declarative and working memory) deficits increase and selective attention declines (Rogers, 2000). This is not an abrupt stabilization, but gradual, in accordance with the neurobiological and environmental profile of the human being.

These changes are more visible in the context of the L2 than in the mother tongue context, given that the 'automaticity' level drastically diminishes in an adult, compared to a child. Processing rhythm, working memory, declarative memory, and attention are capacities involved in different stages of L2 acquisition that, with age

and language use, both first and L2s, change and decline. Regarding procedural memory, it declines with age, which is evident in the difficulty that the adults reveal in grammar learning. Complex forms and grammatical rules become more difficult to assimilate, due to the activity of the declarative memory (compensation) instead of the procedural one, which declines, generating dysfunction (Sanz, 2005).

According to Vihman (1996), in a study that deals with children and adults in the language learning situation, adults can discriminate non-native sounds, but they do not succeed so promptly. Thus, we should not talk about "loss" of capacity (the plasticity) but "attenuation" (Lenneberg, 1967; Bishop & Mogford, 2002) of the capacity that is fully activated during the period of plasticity. Children, however, pay more attention to the phonetic details (selective attention), but do not reach such accuracy for the sounds that are less significant to segment comprehension. It is even possible to observe mother tongue interference in the discrimination of sounds in foreign phonetic segments.

Therefore, experience with an L1, or other languages, contributes to the development of inhibition mechanisms, which affect discrimination. In the first years of life, such modification (ontogeny) did not yet have the chance to "grow" and perception is sharper. However, the neurosensorial capacity has not been lost, only the strategies of processing have been modified at this level (Werker & Tees, 1984). Noticeably, research has shown lower discrimination skills of non native sounds for older subjects, even though participants were just a few months older than the other comparison group (Vihman, 1996). It is believed (Vihman, 1996) that adults tend, when possible, to filter the non-familiar sounds in the phonologic system of their first language. Older people tend to rationalize more the discrimination process and present more dysfunction in the perception of sounds that are not familiar. We observe that adults find it easier to discriminate at the consonant level because the consonants are codified as a non- discursive event, implying here more activation of the two hemispheres and not only of the left hemisphere (Best, 1999). On the other hand, children need more acoustic information (input) to produce a successful output. For older people, the transference of the L1 to the L2 is more evident because it occurs in the formal context of the classroom. There is a larger deviation in the natural development of language in older people and the attitude and motivation factors seem to play a bigger role.

2. PURPOSE OF THE STUDY

The present study assesses phonological awareness of L2 learners in relation to the age factor. We assess two aspects of phonological knowledge (awareness and consciousness) at the syllabic, intra-syllabic and phonemic (or alphabetic) levels. All the tests were developed attending to these parameters. Our goal was to test the critical period hypothesis regarding individuals' language competence and performance and thus get a better understanding of the phonological routes they employ. There are very few studies that assess phonological awareness in a 'total' and 'real' perspective (Doughty & Long, 2005). The particular insight of those studies, often with separated goals and tests as instruments, could be an argument to explain the contro-

versy between their conclusions. The performance that could be revealed in one of these tests could not be a predictor of the same performance in other tests. For example, the selection of dichotic hearing test in this battery is due to the importance of this type of measure and its role on language lateralization which relates to L2 acquisition. Importantly, we sought to explain and predict language competence in Portuguese as a second language (L2). The battery of tests here presented could serve as an instrument that offers indicators of students' proficiency levels in Portuguese as a L2.

Specifically, we formulated the following hypothesis framework. Our main hypothesis is that younger participants exhibit more accurate language skills (phonological decoding: advantages on segmentation, phonemic blending, identification of alliteration, dichotic hearing and general auditory discrimination) than older ones in the second language context. From this general research hypothesis we formulate specific hypotheses:

1) Younger participants present higher discrimination than older ones in alphabetical organisation and phonemic blending situations, due to their selective attention to the lexicon.
2) The prosodic properties (the tonal identity of vocal phonemes in the alliteration context) are cues that help message decoding, for the younger participants mainly.
3) The younger participants might be able to show less left ear advantage and, consequently, more right ear advantage in the dichotic hearing task, when compared to older participants (adolescents and adults).
4) The younger participants convert with more frequency non-words in words (with similar phonetics) due to their "cognitive flexibility" and rudimentary knowledge of the lexicon, when compared to the older participants.

3. METHOD

3.1. Participants

The participants were 64 individuals with migratory experience, between the proficiency levels A2 and B2 (União Europeia, 2001), with different nationalities, different L1 languages, and without special needs that arrived in Portugal up to four years ago (most arrived during 2006). The sample was selected in order to integrate three age groups - children (7-12 years), adolescents (13-17 years) and adults (18-30 years). Within each of these groups there are sub-groups (7-9; 10-12; 13-15; 16-18; 19-23; 24-30). The individuals are students from Basic Education (all the cycles), High School and Higher Education.

3.2. Materials

A battery of tests was developed, in electronic support, and the programming work was carried out between October 2006 and January 2007. The format of the tests allows the effectiveness and organization of the data and task structure, as well as the control of the time spent on each task for each individual. The profile of the tests

provides dynamism to the electronic application. Moreover, it guarantees the precision of the sound and writing registers (when the individual makes a correction, the given mistake is recorded, for example) and avoids subjectivity in reporting and in analysing subjects' responses. This battery presents twelve tests: alphabetical ordinance (test 1), discrimination of sound segments 2), identification of minimum pairs (test 3), word spelling test and phoneme blending (test 4), attention test (test 5), alliteration judgment (test 6), rhyme, onset and syllable judgement (test 7), dichotic hearing (test 8), lexicon identification (test 9), grammatical judgement and syntactical awareness (test 10), reading and self-evaluation (test 11), and letter/sound perception (test 12). In this study we report some results of four tests: alphabetical ordinance, phoneme blending, alliteration judgement, and dichotic hearing. In the first test the subjects must fill in the blanks, according to alphabetical order, nine words that are presented in Portuguese. In the second test referred, the individual must listen and write four words, which are spelled as stimulus for decoding. The alliteration judgment test presents three sentences that the subjects must listen to and, then, write the sound (matching grapheme) most heard in each one. In the last test (dichotic hearing task) individuals are asked to listen to four words presented, at the same time, in each one of the ears (left and right input). Each input has two words and two pseudowords. The words are distinct and the subjects have to write the sequences that they can hear, words and/or pseudowords. Information about the existence of both words and non-words was intentionally not given. The time counter is running until the stop icon is solicited, in all tasks, making it possible to register time spans.

3.3. Procedures

The battery of tests was ran individually, each session taking, on average, 50 minutes. The tests were given to the subjects in their respective schools, with all the necessary conditions for the good accomplishment of the tasks, without disturbances. The same computer was always used and cases where students were not at ease with using the keyboard were taken into account, although these cases were rare. Besides the computer, headphones and a microphone were also used. All procedures were previously carried out to get the necessary authorizations from the schools, teachers and tutors of the students. In January 2007, the battery was applied to native children (cognitive debriefing study) in order to proceed to the correction and confirmation of the tests' functionality.

3.4. Data Analysis

We computed the Average, Standard Deviation, Frequencies, Percentages, Pearson Correlations, as well as Multivariate Analysis of variance (multi-way ANOVA) and Chi-Square tests, to describe and compare the responses given by participants in the 12 tests administered. Each group, determined by age, nationality, date of arrival and types of languages spoken, was assessed regarding their distribution (the criterion was the participants answers) along the tests. We also ran several tests to determine

non-random distribution (Chi-Square tests) between the independent variables (age, gender, nationality, mother tongue, date of arrival).

4. RESULTS

The results suggest that the older learners present, in general tasks, better performance than the younger ones, the ones classically considered better at mastering a second language. This seems in conflict with the theoretical view of the critical period hypothesis. However, all the tests reveal that individuals could succeed in one test but not in all others, showing different levels of knowledge in the L2 learners observed. In this way, the battery is considered useful as a "holistic instrument" as a phonological decoding skills assessment. Those levels of phonological knowledge justify the relation (ongoing analysis of variables prediction) between the tests, determining the test selection and the internal consistency of the battery. These results are from a preliminary study and the research is on course to accomplish all the investigation requirements.

According to the variables "Age" and *Alphabetic Organization* (Test 1), the participants distribution is not random (χ^2=12.158; *g*.l.=5; *p*=0.033; η=0.335). Regarding the differences in *Alphabetic Organisation* variable, between the categories of "Age", we find that 8 (72,7%) participants of the Group I (7-9 years old) present an incorrect answer and 3 (27,3%) exhibit a correct answer. The total number of participants in this group is 11. The next group with a higher number of incorrect answers is group III (13-15 years old) (64,7%: 11 of 17 subjects gave wrong answers). Group V (19-24 years old) leads (90,9%) in the correct answers category (Table1).

Table 1. Performance in the Alphabetic Ordinance Test

Answer	Age Groups						Total
	7-9	10-12	13-15	16-18	19-23	24-30	
Incorrect	8	4	11	3	1	3	30
Correct	3	5	6	4	10	6	34

The results for the distribution of the participants according to the "Age" and *Phonemic Blending* (test 4) variables, are not aleatory (χ^2=25.593; *g*.l.=15;*p*=0.043; η=0.327). Group IV (16-18 years old) presents more incorrect answers (14,3%), followed by group I (9,1%). The group with more positive answers is group V (10 of 11 subjects have correct answer 90,9%) (Table 2).

Table 2. Performance in Alphabetic Ordinance Test

	Age Groups						
Count	7-9	10-12	13-15	16-18	19-23	24-30	Total
0	1	0	0	1	0	0	2
1	4	1	1	0	0	3	9
2	4	3	8	2	1	1	19
3	2	5	7	4	10	5	33
Total	11	9	16	7	11	9	63

According to "Age" and *Vocalic Alliteration* (test 6), the participants' performance are not random (χ^2=22,828;*g*.l.=10; *p*=0.011; η=0.376). In the categories of different "Age Groups", group III leads with 3 reports of alliteration with vowel basis (100%), followed by group I (7-9 years old- 100%) with 2 reports of frequency. In a comparative analysis between tasks (levels), in the general Alliteration Identification Task, group III (13-15 years old) also shows the highest average with correct answers (Table 3).

Table 3. Performance in the Identification of Vocalic Alliteration Test

Age Groups	Identification of Vocalic alliteration (number of reports)		
	0	1	3
7-9	7	4	0
10-12	9	0	0
13-15	16	0	1
16-18	7	0	0
19-23	11	0	0
24-30	8	0	0
Total	58	4	1

Regarding the subjects' distribution in the statistical relation between "Age" and Identification Left Ear (task 8 of the test) variables, we found a non-random distribution (χ^2=28,710; df=15; p=0.018; η=0.210). Group IV (16-18 years old) presents more answers (more correct answers with 3 stimuli) to the left ear input, followed by group V (19-23 years old-50%) and II (10-12 years old-33,3%) with 2 answers. Groups III (13-15 years old- 31,6%) and V (21,1%) are the best among those that have one answer. Group I (7-9 years old- 24,2%) is the group with less identifications in this test (Table 4).

Table 4. Performance in the test of Identification of left ear input

Age groups	Identification of left ear input (number of answers)			
	0	1	2	3
7-9	8	2	0	0
10-12	5	2	2	0
13-15	10	6	1	0
16-18	3	2	0	2
19-23	2	4	3	0
24-30	5	3	0	0
Total	33	19	6	2

Respecting to the subjects organization between the "Age" and *Assimilation_ Left Ear* (test 8) variables, we find a non-random distribution (χ^2=29,069; df=10; p=0.001; η=0.302). Group IV (16-18 years old-100%) shows more assimilations (3), with words/pseudowords received in the left input, followed by the group V (19-23 years old- 36,8%) and III (13-15 years old-31,6%) with just one report. Group I (7-9 years old- 90%) had the lowest performance in this activity (Table 5).

Table 5. Conversion of pseudowords into words_ left ear input (test 8) and Age groups

Age groups	Conversion of pseudowords into words (Left Ear input number of reports)				
	0	1	2	3	Total
7-9	8	2	0	0	10
10-12	8	1	0	0	9
13-15	11	6	0	0	17
16-18	5	0	1	1	7
19-23	2	6	1	0	9
24-30	5	3	0	0	8
Total	39	18	2	1	60

Regarding the distribution of the sample according to the variables "Age" and Transformation in word Left Ear (test 8), we find an inconsistent distribution (χ^2=24,759;df=15; p=.05; η=.288). The differences in the variable "Transformation in word" (conversion), between the age categories, group IV (16-18 years old-100%) showed the highest answers (3 pseudowords converted in words phonologically similar) beginning with left ear stimuli, followed by group V (19-23 years old-

50%) and IV (16-18 years old-50%) with 2 answers, and the groups III (13-15 years old- 33,3%) and V (19-23 years old-33,3%) just with one answers report. Group III (13-15 years old- 28,2%) is the group with less activity at this level (Table 6).

Table 6. Assimilations left ear input

	Assimilation left ear input (number of answers)			
Age groups	0	1	3	Total
7-9	9	1	0	10
10-12	7	2	0	9
13-15	11	6	0	17
16-18	5	0	2	7
19-23	2	7	0	9
24-30	5	3	0	8
Total	39	19	2	60

5. DISCUSSION

Our hypothesis, based on previous research, younger children would perform better than older children and adults. However, this hypothesis was not confirmed. First, in the alphabetic ordinance test, children reveal negative performance, while adolescents, and mainly adults, show greater accuracy in this task (hypothesis 1). In this test, the participants must organize nine words, according to the alphabet (the words list as appears in the test:***Rita Escova Sangue Letra Quadro Impressora Fonte Ave Folha***; the correct answer must be: ***ave, escova, folha, fonte, impressora, letra, quadro, Rita, sangue).***We believe that this alphabetical level is still developing in younger individuals, while the syllabic and intra-syllabic levels have already been achieved. According to Walley's framework (1993), children develop phonological awareness beginning with holistic forms (as the rhyme) and progressively move to the discrimination of minimal units of sound – phonemes. Walley (1993) suggests three factors for the development of the minimal segments sensitivity: vocabulary growth, language play (rhyme and alliteration), and the knowledge of letter-sound correspondances. The child, in his/her process of phonological awareness development, remains in a dependence way (syncretism) because the "phonological awareness tasks is largely dependent on the status of their phonological representations" (Carroll and Snowling, 2001, p.328).

Phonemic blending is an ability achieved by six year-olds, but we found that age is not influencing the results in this task because the children show the most false answers while adults (19-24 years old) are more favorable to this level (hypothesis 1). The subjects must perform correctly this task listening to three sequences of sounds ([g]-[a]-[t]-[u]; [k]-[ɔ]-[p]-[u];[v]-[a]-[z]-[u]) to write the words spelled (gato; copo; vaso). This type of task requires abstraction strategies and we suggest

that adult learners developed them already. Although studies suggest that children are privileged by their selective attention (Bialystok, 2006), favored by an "emotional latency", the biggest dexterity that normally is attributed to the children, mainly to the L2 learners, at the phoneme discrimination and identification levels, becomes a controversy (Hollingsworth, 1983). The classic difficulties that the adults are supposed to find in L2 learning are not here, at least, compromising their ability in the specific level of phonemic blending. According to Yeni-Komshian (1968) and Maye (2002) there would be no reason to affirm that the children are better in the non-native sounds discrimination and production. Therefore, it maybe that the speech perception of children changes with semantic development, from puberty onwards (Maye, 2002). Cook (1986) states that the adults are experts in the L2 learning, also more successfully than children, because the child's native-like competence is surpassed by the speed with which the adult reaches L2 syntactical and morphological sensitivity. The test of phonemic blending demands a sensitive level that is beyond that of basic phonological knowledge (in the true sense of phonological awareness) which could be compromising the performance of the youngest participant. The request is to reflect about the minimal components and blend phonemes heard auditorily into a word. This implies consciousness and automaticity.

In task 6 of the test, subjects are asked to identify, after listening, three alliterations in three texts (sentence 1. "A Vânia vive numa vila verdadeiramente verde. As varandas das vizinhas têm vasos muito vivos"; sentence 2. "O rato roeu a rolha da garrafa de rum do rei rabugento da Rússia"; sentence 3 "A Sandra disse ao Sandro para irem ao cinema no sábado seguinte. Nesse dia sentaram-se ao lado do Simão".), respectively. The correct answer are three consonants ([v]-[r]-[s]), however vowels are also accepted, but initially not expected. Considering the vocalic alliteration results alone we have hypothesized that children would identify more alliteration, mainly vowel alliteration, due to the fact that the phonetic profile of vowels is more familiar to children. In the group of the younger participants (7-9 years old), four of them (total: 11) reported two alliteration with vowel basis (mainly the vowel /a/). Concerning the 7-8 year-old children, the alliteration task could be difficult but it is achievable; in fact a 6 year-old child showed awareness of onset and rimes-sound substitution, awareness of beginning, middle and ending sounds as also reveal skills at the phonemic blending. The children and all the participants were asked in the same manner about alliteration regarding the three mentioned sentences, and the resolution indicates a positive report concerning to the auditory discrimination and to the notion (awareness, maybe not consciousness at the younger participants) of "alliteration" that must be accomplished. In fact the instruction presented at the test is explicit to the children subjects (instruction in English: "Listen carefully the following texts and answer the questions, as can be seen in the following example. (…) Which is the sound/letter most heard?") once there is the direct explanation of what the test requires, joined to an example: the sound most heard must be reported in the correct place for it. Also the group of younger adolescents (13-15 years old) detects vowel alliteration, in parallel with the consonant basis alliteration. With empirical study, Rimol et. al (2006), in the dichotic hearing field, had detected that the sounds (sequences) with vocalic predominance were the ones that disclosed greater right ear advantage. Regarding research such as Best's (1999), it is suggested that adults

show easiness in the discrimination at the consonant level because the consonants sounds are codified as not speech event, applying the two hemispheres activation and not only from the left hemisphere. In fact, the vowel is more recognized as speech tone by the child, more than by the adult who follows more the consonantal trace (hypothesis 2). On the other hand, in the first development stages of the language, the child is attracted by phonemes with vowel characteristics and shows easiness with the detection of rhymes and alliteration. Bialystok (2006) states that the cognitive advantage of bilingual children when compared to monolinguals is on the general problem solving that requires attention and control face to specific aspects and "this advantage is not confined to language processing" (Bilaystok, 2006, p. 2). However, this becomes a controversy in theoretical and empirical terms when considering the results of our study. In the case of the test that we are analyzing, it is common that the vowels identity (in the Portuguese phonological system) becomes an advantage to the sonorous captation by the child who is attracted by acoustic signals with absence of blockage (typical in consonants articulation). According to Mackay and Imai study (2006) the phonetic categories "used to produce and perceive L1 vowels and consonants develop through childhood and into adolescence (…) they are more likely to subsume L2 phonetic categories" (p. 178), which results in a blockage of the natural development of novel phonetic categories, in the L2 context. On the other hand, authors such as Cassady and Lawrence (2004) suggest that vowels are more difficult to process by the pre-readers (vowel hypothesis, p. 262). However, this does not occur with our participants because the difficulty states on the consonantal alliteration identification, which is modified by children to the vowel level. Another argument is that there is less uniformity at the consonant level between the different phonological systems (Imsri & Idsardi, 2002).

The dichotic hearing task (8 of the test) presents eight words, in which four words had been distributed in each input: for left (*langa*, pato, jantar, *risga*) and right (bola, *leta*, jaula, *rusco*) ears. It was evidenced that (Hugdahl, Carlsson & Eichele, 2001) the right ear advantage, in speech understanding, changes as age advances, in much the same way as it happens with attention. In our study, in each set of the four words, we put two words and two pseudowords (mixed), in Portuguese. It is intentional that some of the words presented as input for the left ear, were stronger (words/pseudowords with more emphasis at tonal level) for the hearing but not with higher acoustic signal, balancing the ability of the two ears, in this way. The individual could hear the inputs and answer, during or after the listening, according to the personal reaction. Older individuals detect more stimuli regarding left input (the words identified have mistakes that were accepted for analysis of the register frequency). The children are the participants with more absence of responses in the reception and discrimination of this input (left). In the words assimilation plan (conducted by left ear), the older subjects, mainly the adolescents, presents the highest average and the children reveal the lowest performance. It is possible already to verify, from the analysis of the results, that the oldest students have an easier time identifying the sequence presented as input to the left ear. It was expected, according to the literature, that the input presented to the right ear, would be more easily registered by the children, but in fact this does not happen (hypothesis 3) because the youngest participants do not reach high discrimination for both inputs (right and

lefts ears). The results regarding the reports from the right ear input are not shown in this work (there is no report of significative differences between the age groups concerning to the detection of right ear input). In other frameworks, the speech sounds, are, in normative conditions, easier to decode when entering the right ear due to the direct linking between the sound-stimuli received and the left hemisphere, where we find the areas that are predominant for language processing. It is an evidence that the more delayed the learning (not already acquisition) of L2, more involvement would have the left ear and would be greater risk in the message decoding. On the other hand, as the L2 learners get older (Lenneberg, 1967), the implication of the right hemisphere with respect to discriminations in L2 seems bigger. The right ear dominance is replaced by the inter-hemispheric processing, which is accelerated by the L2 acquisition, in advantageous ways (Chuanren Ke, 1992). Studies with monolingual samples have shown, and considering always a normative sample, that the two ears and their discrimination ability increase for both, but with more evidence for the left (Nagai, 1997; Pohl, 1984). We know, however, that properties of the speech such as prosody have direct relation with cerebral right hemisphere areas, and prosody is one of the main aspects affecting message decoding (Jancke, 1994). Our hypothesis is that 'dysfunction' caused by the lateralization would increase with age (specifically the age of acquisition, Stevens, 2006). The adolescents (the youngest-13-15 years old) detect stimuli presented and processed by the both ears (left and right ears). It would be expected, with basis on previous research, that younger individuals report more words, which are presented to the right ear, proving the inter-hemispheric action developed with the age advance and the neurological maturation. Our results could indicate other possibilities: this inter-hemispheric activation could be attained early in L2 acquirers, which gives them a distinct cognitive profile when compared to monolinguals.

On the other hand, it is believed that children have greater acceptability/receptivity to pseudowords than older learners. Bilingual or L2 learners are supposed to become more flexible regarding the acceptance of sequences that are allowed phonologically but meaningless (pseudowords), because they easily apprehend the conventional relations in language (Baker, 1997). However, in this study children did not reveal differences from other participants (older) in pseudowords identification (hypothesis 4). The sequences with stronger prosodic characteristics are the ones better detected, but with bigger incidence for the left ear, which can be explained by the greatest intervention of the cerebral right hemisphere (specific areas) to interpret the properties of phonemic sequences.

6. CONCLUSION

The data presented and discussed in this paper calls for an assessment of the study conceptual perspective and aim. Phonological decoding must be analysed in two levels: awareness and consciousness. In Portuguese we do not have this term distinction which limits the perspective. We suggest that phonological awareness, in the sensitive way, is different in children in relation to adolescents and adults. Children do not present a marked awareness but really the basic phonological knowledge

(awareness, distinct from consciousness) that gives her automaticity skills. A question remains: Could it be that phonological sensitivity is the first positive performance predictor or could it be that 'automaticity' is a better predictor of performance? Automaticity must be considered a cognitive processing property that results in fewer efforts on the attention resources and it is present when there is information assimilation/stabilization. The automaticity ability is compatible, however, with inhibitory/control mechanisms, even *automatic* operations are not often conscious. That conscious level of phonological knowledge influences cognitive control and explains the superiority of the adult learner in decoding, suggesting a serious revision in the critical period hypothesis for language acquisition.

We agree that this research area (second language) is of interest to L1 and L2 audiences, since more and more second language learners (immigrant pupils) are attending our schools. As such, it is crucial to develop instruments to help us understand the competence and potential of new linguistic communities, by means of diagnosis and intervention. The battery developed can serve this purpose. The electronic format of the battery may ease testing conditions.

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