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PRESENTATION ABSTRACTS

Ordered by Principal Investigator's Last Name

Nobuhiko Akamatsu (Doshisha University). *Effects of word-recognition training on automatization in English as a foreign language.*

This study investigated the effects of word-recognition training on automatization of word recognition in English as a foreign language (EFL). The second aspect of the study concerned the effects of word consistency between spelling and pronunciation on EFL word-recognition performance. Results showed that EFL learners benefited from word-recognition training; they were able to recognize the target words significantly more quickly and more accurately. Furthermore, correlational analyses suggested that improvement in word-recognition speed with inconsistent words was associated with automatization. Improvement in word-recognition speed with consistent words, on the other hand, tended to be associated with simple speed-up.

Stephanie Al Otaiba (Florida State University). *"Non-responder": A synonym for reading disabled? Can third grade reading disabilities be predicted by responsiveness to early literacy treatment at kindergarten?*

The purpose of the first study was to describe the characteristics of students who did not respond to an effective early literacy intervention conducted across kindergarten and first grade. A follow-up study was conducted to examine the relationship between student responsiveness and third grade reading difficulties. Study participants were 104 children, including 7 with IEPs, tested at kindergarten and again at first grade. A combination of phonological retrieval, verbal ability, attention and conduct, access to treatment, and phonological encoding with syntactic awareness correctly predicted student responsiveness group membership for 85% of the never responsive, 82% of the always responsive, but only 35% of the sometimes responsive students. In turn, student responsiveness to kindergarten and first grade treatment correctly predicted 92% of

students with reading difficulties at third grade. Implications for research and practice will be discussed.

Jason L. Anthony (University of Houston), and Christopher J. Lonigan. *Word sensitivity, syllable sensitivity, onset/rime sensitivity, phoneme sensitivity, analysis, synthesis, and sound categorization are all phonological awareness!*

Controversy exists concerning the nature of phonological sensitivity (PS), an important causal variable in reading acquisition. One view holds different PS skills reflect independent cognitive abilities; another suggests these skills reflect a single ability. This study examined the overlap of 18 PS skills involving four levels of linguistic complexity across four levels of task complexity in 947 2- to 5-year-old children from diverse backgrounds. Confirmatory factor analyses demonstrated all PS skills indexed a single ability within each one-year age group. Findings support a developmental conceptualization of preschoolers' phonological sensitivity that progresses from word sensitivity to phoneme sensitivity and from synthesis to analysis.

Amanda Appleton (Vanderbilt University), and Donald L. Compton. *Exploring the relationship between two text leveling systems and reading fluency in students experiencing reading difficulties.*

Given that most poor readers have significant difficulties decoding words, it is unclear what criteria should be used to evaluate the accessibility of text for these children. Both readability and decodability formulas have been advocated as a means of selecting appropriate text for struggling readers. The purpose of this study is to explore the relationship between two different leveling systems, text decodability and text readability, and reading accuracy and fluency in second grade children experiencing difficulties learning to read. To examine these relationships, this study will use two different measures of readability (Dale-Chall and Flesch-Kincaid) and two different measures of decodability (the percentage of decodable words and the lesson at which the text becomes 85% decodable) based on the Phonological and Strategy Training (PHAST) program (Lovett et al., 2000). This study will extend current knowledge about the relative importance of decodability and readability levels as predictors of accuracy and fluency in text for students experiencing difficulties learning to read. Results are intended to assist practitioners in selecting texts that are accessible for children at their instructional level.

Egbert M. H. Assink (Utrecht University), Stans de Haas, Petra Rendering, Sanne Rietberg, and Maaïke de Vries. *Development of orthographic processing in elementary and secondary school age readers.*

Thirty-four normally reading eighth grade elementary school students and thirty-seven fifth grade grammar school students participated in a computer controlled orthographic processing task. Stimuli were letter sequences containing one open space, represented by an underscore character, e.g. bli_k. Subjects had to decide if inserting any letter would create a real word. The presented stimuli were factorially manipulated on frequency, age of acquisition and within-word position of the open space. Strong frequency and age of acquisition effects were found. Elementary school students showed consistent position effects, indicating an incompletely automatic access to orthographic representations in the mental lexicon.

Bettina Baker (University of Pennsylvania), and John F. Sabatini. *A comparison of a phonologically-based, linguistically informed individualized reading program and a balanced literacy approach to teaching reading for struggling minority readers.*

This paper compares the Individualized Reading Program (IRP), a program for minority, struggling readers to a balanced literacy program. The IRP combines direct instruction in alphabetic principles with narratives that address the emotional concerns and interests of inner city children. Fifty-eight 2nd to 4th grade African-American children who were 1-2 years behind in reading were randomly assigned to one of the two treatment conditions. Results indicate that both the IRP and balanced literacy groups showed significant gains on the Word Attack, Word Identification and Passage Comprehension on the Woodcock Reading Mastery Tests-Revised (WRMT-R). However, the IRP intervention led to significantly greater gains on Word Attack and Word Identification post-test scores.

Michal Balass (University of Pittsburgh), Lesley A. Hart, and Charles A. Perfetti. *Reading skill differences in semantic, phonological, and orthographic processes: Behavioral and ERP evidence.*

Research has shown that differences in comprehension skill are associated with the effectiveness of basic word identification skill (Perfetti, 1985), which in turn depends on lexical knowledge (Perfetti and Hart, 2000). Our study uses behavioral and ERP measures to examine differences in lexical skill using meaning and pronunciation decision tasks. We found skill-related differences in ERPs, including potential shifts around 300 (P3) and 400 (N4) ms after the onset of a word. The results are interpreted within the Lexical Quality Theory (Perfetti & Hart, 2000), reflecting differences in readers' knowledge at the word form (spelling and phonology) level that affect meaning retrieval.

Nanci Bell (Lindamood-Bell Learning Process). *Concept imagery: A critical factor in reading comprehension.*

This presentation describes three sensory-cognitive functions critical to language processing: concept imagery, phonemic awareness and symbol imagery. Weakness in concept imagery causes inability to comprehend and retain “gestalts” and to develop higher order thinking skills. Accurate decoding requires phonemic awareness which is implicated as the most pervasive cause of decoding and spelling problems, including those labeled “dyslexia.” Decoding and spelling fluency requires symbol imagery for quick word recognition and accurate spelling. All can be remediated.

Stuart E. Bernstein (Middle Tennessee State University), and Rebecca Treiman. *Do children use consonantal context when learning the pronunciation of vowel graphemes?* A clue word task was used to explore how children in first through third grade (N = 98) use context when learning to pronounce nonwords containing unfamiliar vowels (e.g., zuop pronounced /zup/). Children used newly learned pronunciations more often in items that shared two graphemes with a clue word (e.g., ruop and zuot) than in items that shared only one (e.g., ruok). The new pronunciation was no more frequent for targets sharing their vowel and final consonant (rime) with the clue word than for targets sharing their initial consonant and vowel. Implications for views of reading development are discussed.

Rebecca S. Betjemann (University of Denver), Janice M. Keenan, Jonathan Potter, and Tedra A. Fazendeiro. *Comprehending the GORT without reading it.*

Poor decoding on the Grey Oral Reading Test (GORT-3) is often accompanied by relatively high comprehension scores. Is this because poor decoders are good comprehenders, or because some comprehension questions can be answered even when the passage is poorly understood? To answer this question, we had 77 college students answer the 4-alternative questions of the GORT without reading the passages, and found that 57% of the questions were answered correctly, well above chance. Non-readers' accuracy correlated significantly ($r=.54$) with young readers' accuracy. Young readers' accuracy was predicted by passage-dependence of the questions but not by decoding ability.

Freyja Birgisdottir (University of Oxford), and Peter Bryant. *Pre-readers' awareness of onset, rime and coda and its relationship to reading and spelling development.*

This study examined whether different forms of phonological awareness might be linked in different ways to literacy. Pre-schoolers were followed up through their first two years of schooling and given a range of phonological tasks that required differing degrees of segmental ability. Results showed that in year 3, all the explicit measures were significant predictors of reading and spelling, but the implicit measures were not. In year 2, only implicit and explicit measures of onset were connected to literacy. These results highlight the significance of the implicit/explicit distinction in comparing the predictive value of different phonological units in reading achievement.

Richard Boada (University of Denver), and Bruce F. Pennington. *Implicit phonological representations in children with dyslexia.*

The segmentation hypothesis in dyslexia states that deficits in phoneme awareness are due to poorly segmented phonological representations. Three experimental tasks were used to measure this construct: a lexical gating task, a priming task, and a syllable similarity task. In all three tasks children with dyslexia performed consistently worse than CA controls, and generally worse than RA controls, when more segmental representations were required. Implicit phonological representations were significantly correlated with measures of speech perception, phoneme awareness, and phonological short-term memory, but not rapid automatized naming. These results provide strong support for less mature implicit phonological representations in dyslexic children.

Donald J. Bolger (University of Pittsburgh), Julie Van Dyke, Nicole Landi, Charles A. Perfetti, and Barbara Foorman. *What errors can tell us about representation and process: Investigating a quantitative theory of reading acquisition.*

Current theories of reading acquisition define the development of reading skill as the acquisition of quality orthographic word representations. Essential to the acquisition process is the development of spelling-sound relationships reflected in sublexical orthographic units (letters and letter-patterns). The Restricted-Interactive Hypothesis (Perfetti, 1992) provides a framework to understand and predict reading performance as a function of printed word learning at varying levels of skill. A study was conducted on 144 first graders in the Houston Public Schools testing the acquisition and transfer of structural orthographic knowledge. Participants were administered 2 stories on Day 1 and isolated word lists on Day 2. Oral reading performance was scored for accuracy and

errors were both hand and tape-recorded. Analyses are proposed to test the hypotheses of the RI model. Accuracy of story and isolated word reading is expected to differ as a function of skill level. More importantly, transfer of structural rime unit knowledge is expected to increase according to skill level differentially compared to the transfer of GPC knowledge. Error pattern analyses are expected to provide detailed evidence of distinctions in spelling-sound knowledge as skill level increases. The results of this study are expected to provide support to the RI model as well as suggest what role orthographic rime units play in reading development.

James R. Booth (Northwestern University), Yasu Harasaki, and Douglas D. Burman. *Development of lexical and sentence level context effects for dominant and subordinate word meanings of homonyms.*

Nine, ten and twelve-year-old children read aloud dominant, subordinate or ambiguous bias sentences that ended in a homonym. After the sentence, children read aloud targets that were related to the dominant or subordinate meaning of the homonym or control targets. There were three main developmental and reading skill findings. First, 9-year-olds and low skill readers showed lexical level facilitation in accuracy. Second, 9- and 10-year-olds or low and moderate skill readers showed lexical level facilitation in reaction time. Third, 12-year-olds or high skill readers showed sentence level facilitation in reaction time with high skill readers additionally showing sentence level inhibition in reaction time.

Mieke Bos (Vrije Universiteit Amsterdam), and Pieter Reitsma. *Effects of copying, writing-from-memory and reading on poor spellers.*

This study evaluates some computer-assisted exercises in spelling for children with problems in learning to spell. It was hypothesized that repeated practice in a carefully designed computer program could help poor spellers to improve their spelling. Every child practiced 12 words in each of 3 conditions: a) copying-from-screen, b) writing-from-memory and c) reading aloud from the screen. Both before and after the training, the children completed a dictation and a reading test. An immediate posttest in spelling showed that the children profited most from the copy-from-screen condition. However, a month after training the words of the write-from-memory condition were retained best. Reading had no significant impact on spelling improvement. It is concluded that computer assisted exercises requiring children to actually type the words have great potential to help children with problems in spelling.

Patricia Bowers (University of Waterloo), and Karen Baker. *Characteristic errors of double deficit subtypes on the Quick Spell Test.*

Do children with deficits in rapid naming tasks make particular types of errors processing briefly-presented visual stimuli? The Quick Spell Test (QST) presents differing types of four-letter strings to children for 250 ms. Previous studies found that children with deficits in both phonemic awareness and rapid naming make many errors reporting the letters in these strings, especially those with little orthographic structure. QST errors of 80 Grade 2 children fitting definitions for groups with single, double and no deficits were analyzed. Children with rapid naming deficits had characteristic errors which will be discussed in terms of broader visual processing constructs.

Margo Bowman (Wayne State University), and Rebecca Treiman. *The special status of word-initial letter names in connecting print and speech.*

Research suggests that prereaders can use their knowledge of letter names to connect printed and spoken words, especially when the letter names occur at the beginnings of words. The present study went beyond previous studies by comparing initial and final letter names in the same experiment. Prereaders learned to pronounce four types of made-up words: name initial (RM -arm), name final (FR-far), control initial (LD-arm), and control final (ML-far). Children performed significantly better in the name-initial condition than the other conditions. Young children's ability to use letter names to link print and speech appears to be limited to word-initial cues.

Ana Carolina Perrusi Brandão (University of Sussex, Falmer), and Jane Oakhill. *“How do we know the answer?” Children’s use of text data and general knowledge in story comprehension.*

This study investigates how young readers use information from the text and/or their general knowledge when answering comprehension questions. After each response, the children were asked how they found out the answers to the questions. Their responses and justifications were analyzed qualitatively and quantitatively. The text proved to be the main source of information for these readers. The procedure of asking children to justify their answers was shown to be a good way of identifying some of the problems they have with text comprehension and it also encouraged them to look back to the text.

Kathleen J. Brown (University of Utah), Darrell Morris, Matthew Fields, Stacey Lowe, Debbie Skidmore, Debbie Van Gorder, and Connie Weinstein. *Who can provide effective reading intervention after grade one? The role of teachers’ aides in serving maximum numbers of struggling readers.*

Several empirical studies suggest that early reading intervention following a model developed by Morris (1999) is more effective for at-risk first graders than standard Title 1 intervention (see Brown et al., 2000; Morris et al., 2001; Santa & Hoiem, 1999). One study (Morris, Shaw, & Perney, 1990) suggests that a similar model may be effective for second and third grade students when delivered by closely supervised volunteers. However, the effectiveness of this model, known as Next Steps, has not been evaluated for struggling readers above grade one who receive the intervention from non-certified teacher aides. The worth of such an investigation lies in the potential to inform the field regarding the parameters of effective intervention delivery for maximum numbers of struggling readers in high-impact schools.

Douglas D. Burman (Northwestern University), and James R. Booth. *Learning to read unfamiliar words improves word perception.*

The effect of reading rehearsals on the ability to accurately perceive the spelling of a word was examined. After rehearsing a list of pseudowords, adult subjects indicated whether a briefly-presented sequence of letters in a perceptual task accurately spelled the initial fragment of a rehearsed pseudoword. Due largely to improved perception of letters at later positions, rehearsals improved accuracy for longer letter sequences. Changes in perceptual processing with rehearsal were further suggested by changes in the relationship of reaction times for correct and variant sequences. Similar rehearsal effects were observed for subjects learning to read an unfamiliar musical passage.

Kate Cain (University of Essex), Jane Oakhill, and Peter Bryant. *Individual differences in children's comprehension skills: Concurrent prediction by working memory and verbal ability.*

We report data from a longitudinal study that addresses the relations between working memory capacity, reading comprehension ability, and component skills of text comprehension. When children were aged 8, 9 and 11 years, performance on working memory assessments and tasks that require the monitoring and integration of information predicted unique variance in reading comprehension after word reading, vocabulary and verbal ability controls. Further analyses revealed that the relations between the comprehension processing skills (comprehension monitoring and inference making) and reading comprehension were not wholly mediated by working memory capacity. Thus, although working memory and comprehension subskills share variance, they also explain unique variance in reading comprehension.

Marketa Caravolas (University of Liverpool), and Jan Volin. *Predictors of reading and spelling achievement in Czech and in English.*

Predictors of reading and spelling achievement were compared in a group of Czech (N = 80) and British-English (N = 60) primary school children in order to examine whether the relative importance of phonological awareness, verbal memory span, and processing speed varies as a function of orthographic depth. Parallel forms of reading and spelling tests were designed in each language. Also, matched tests of nonverbal IQ, WISC-III subtests: Vocabulary, Coding, and Digit Span, as well as phonological awareness were administered. Regression analyses indicated that when age, schooling and IQ were controlled, phonological awareness accounted for unique variance in reading and spelling in both languages as did verbal short term memory. Moreover, while graphomotor speed was a unique predictor of spelling, it did not account for unique variance in reading in either language.

Cláudia Cardoso-Martins (Universidade Federal de Minas Gerais). *The relative contribution of sensitivity to rhyme and phoneme to beginning reading acquisition in Brazilian Portuguese.*

We describe the results of a longitudinal study investigating the contribution of sensitivity to rhyme and phoneme to beginning literacy acquisition in Portuguese. Sixty-six Brazilian children participated in the study. Children's sensitivity to rhyme and phoneme at 5 years of age significantly predicted their progress in learning to read and spell later on. However, the results also suggested that the effect of sensitivity to rhyme on beginning literacy acquisition in Portuguese is largely mediated by sensitivity to phoneme. Unlike previous research, the same procedure was used to assess sensitivity to rhyme and phoneme. It is thus unlikely that the present results can be explained away in terms of differences in the cognitive demands of the rhyme and phoneme tasks.

Joanne F. Carlisle (University of Michigan), Nicole Patton, Kay Gugisberg, and Katherine Strasser. *Phonological sensitivity as a cornerstone of language learning and literacy acquisition.*

This study explores MacWhinney's view that phonological sensitivity plays is the foundation for morphological learning. Specifically, the precision of children's representations of the word phonology may impact their learning of vocabulary and

grammatical forms and their developing language comprehension and expression. Kindergartners and first graders were given tests of (a) segmentation of syllables in nonsense words and novel compounds, (b) nonword and "silly sentence" repetition, and (c) formation of noun compounds. Along with developmental changes in the relation of phonological measures to language and reading, the results show that sensitivity to sounds in words contributes to students' grasp of word formation principles, word meaning, and comprehension.

Julia Carroll (University of York), and Maggie Snowling. *The speech and language skills of children at risk of reading difficulties.*

Studies have found that children with a family history of dyslexia often show difficulties in speech and language tasks in the pre-school years. The present study examines these deficits. Fifteen children with a family history of dyslexia were compared to children with speech difficulties in the absence of family risk and fifteen normally developing controls in a 'matched triplet' design. The children were given language, speech, and phonological awareness tasks. The children with a family history of dyslexia showed speech skills in between those of the other two groups. However, their language and phonological awareness was similar to that of the speech impaired children. These results are interpreted using the phonological representations hypothesis.

Ronald P. Carver (University of Missouri-Kansas City). *Investigating the root causes of high and low reading achievement and the phonological deficit hypothesis.*

A verbal aptitude test, called Verbal Level Aptitude Test (VLAT), and a pronunciation aptitude test called Spelling Words Aptitude Test (SWAT) have been developed to test components of a causal model of reading achievement. These two tests, plus 8 other tests, were administered to 130 sixth and seventh graders in an urban charter school. This data collection has just been completed. These data will be analyzed prior to the annual meeting to see if there is correlational evidence consistent with hypotheses regarding the theorized causal model, using structural equation modeling.

Soracha Cashman (University of Wales), and Victor vonDaal. *Effects of neighborhood frequency and instructional method on novel word learning.*

Effects of neighbourhood frequency in reading acquisition were examined by comparing the acquisition of novel words of high and low neighbourhood frequency. Implicit and explicit methods of reading acquisition were evaluated. Forty Year 2 monolingual English speaking children were assessed for reading and spelling ability, and were measured on acquisition of novel words of varying neighbourhood frequency in two learning conditions; incidental and instructional. It was hypothesised that the higher the frequency of the neighbourhood of the novel word, the better it will be recalled, and that instructional methods of reading acquisition will yield significantly higher levels of word recall than incidental methods. This study will discuss the effects of neighbourhood frequency on reading acquisition, evaluate neighbourhood frequency effects on orthographic code mapping, and consider the merits of print exposure versus specific instruction on reading tasks.

Hugh W. Catts (University of Kansas), and Tiffany Hogan. *The fourth grade slump: Later emerging poor readers.*

In learning to read, a “slump” is often reported around the 4th grade. At this point, some children who have had few difficulties begin to experience significant problems in reading. In this study, we identified a group of late emerging poor readers (at 4th grade) and compared them to early emerging poor readers (at 2nd grade) and consistent poor readers on measures of language comprehension and word recognition speed and accuracy. Late emerging poor readers demonstrated normal word recognition abilities, but showed deficits in language comprehension. Early emerging poor readers showed deficits in word recognition speed and accuracy and low-normal to normal abilities in language comprehension.

Carol Christensen (University of Queensland). *The impact of collaborative writing compared with whole-class direct instruction in remediating writing disabilities.*

This study examined the efficacy of two forms of pedagogy for children in Grade 4 experiencing difficulty in producing written text. Specifically, whole class teacher-directed instruction was compared with collaborative writing. In addition to children with writing disabilities there were two control groups; one age, class and sex matched, and one achievement, school and sex matched (grade 2). Over 700 children in 30 classes in seven schools were initially assessed. Within schools participating classes were assigned to either whole-class direct teaching or collaborative writing. The intervention program consisted of a sequence of 10 lessons in written language. Children were taught; that sentences begin with capital letters and end with periods, to segment text into sentences, to sequence ideas based on logical structure, to use cue questions (why, when what, where) to extend their text on a particular topic, and to revise text at syntactic, semantic and pragmatic levels. Final testing occurred at the conclusion of the sequence of lessons and consisted of an individual and collaborative writing sample. Analyses indicate that significant differences exist between normally achieving students and students experiencing writing disabilities depending on the type of instruction they receive. All students seemed to make remarkable gains during the program. However, normally-achieving students seem to have performed in the collaborative writing condition relative to children experiencing writing disabilities. The paper will explore factors underlying performances of different types of children under different instructional conditions.

Chris Coleman (University of Georgia), Noel Gregg, Robert Stennett, Cheri Hoy, J. Mark Davis, Richard K. Olson, Sally J. Wadsworth, and John C. DeFries. *The Colorado Perceptual Speed Task as a measure of orthographic processing.*

The presentation will feature research and normative data on the Colorado Perceptual Speed Test (CPST; DeFries et al. 1981; Decker 1989), a 3-part, timed task requiring the examinee to rapidly scan and circle groups of matching letter-number clusters. The CPST correlates highly with other tests that address orthographic awareness/skill (e.g., decoding and spelling achievement tasks), and yet is not itself an achievement test. Therefore, it can serve as a valuable independent measure of orthographic processing. Clinical use and performance patterns (among students with and without disabilities) will be discussed.

Donald L. Compton (Vanderbilt University). *Modeling the relationship between growth in rapid naming speed and decoding skill in first-grade children.*

This study used an extant longitudinal correlational data set (Compton, 2000) to model the relationship between growth in decoding skill and rapid naming speed in 1st grade

children. Over an academic year, 75 1st grade children were assessed 7 times (once per month) in word reading, nonword reading, rapid naming of numbers, and rapid naming of colors. Phonemic awareness skill and letter name knowledge were also measured during the initial assessment wave. Results from three different sets of analyses are presented with each addressing a different question regarding the relationship between rapid naming speed and early decoding skill development. In the first set, hierarchical linear modeling (HLM) was used to investigate the importance of phonemic awareness skill, letter knowledge, rapid naming of numbers, and rapid naming of colors as predictors of individual decoding skill growth parameters. In the second set, multivariate latent growth curve analysis was used to examine the relationship between growth in decoding skill and growth in rapid naming speed. In the final set, a 2-piece incremental linear growth model was used to explore growth in rapid naming speed before and after the initial onset of decoding skill acquisition. Results indicated a unique relationship between rapid naming of numbers and early decoding skill. A bidirectional relationship between decoding skill and rapid naming speed of numbers was supported, with rapid naming speed prior to the acquisition of decoding skill predictive of future decoding skill and with increased growth in rapid naming speed facilitated by the acquisition of decoding skill.

Carol McDonald Connor (University of Michigan), and Holly K. Craig. *Cultural-linguistically diverse preschoolers' responses to teachers' requests and effects on early reading skills.*

This study explored how the cultural-linguistic status of at risk preschoolers' language systems impacted classroom discourse surrounding teacher requests, as a mediating effect on early literacy development. Preschoolers included children who used African American English (AAE), children for whom English was a second language (ESL), and children who used Standard American English (SAE). Children in the SAE group attained significantly stronger early reading skills than did children in the AAE and ESL groups. Classroom discourse mediated achievement differences; SAE and AAE children benefited from highly interactive classroom discourse whereas ESL children benefited from more structured and predictable discourse.

Holly K. Craig (University of Michigan), Connie A. Thompson, Julie A. Washington, and Stephanie L. Potter. *Dialectal variations from print by African American students.* This investigation examined African American English (AAE) production during reading of the Gray Oral Reading Tests. Participants were 64 typically developing African American male and female 2nd through 5th graders. Most students produced dialect during oral reading and crediting the accuracy scores for AAE features yielded statistically increased total reading scores. Opportunities for phonological features of AAE were high and all but one phonological feature was produced in this context. A phonological feature system for child AAE is presented. Results are discussed in terms of the impact of dialect on the reading of typically developing African American students.

Claudine Crane (University of York), and M. Snowling. *On-line inference during children's reading of fairy tales: A developmental perspective.*

This paper presents findings from a study investigating on-line inference generation during children's reading of narratives based on real-world and fictitious information. 45 children (aged 7, 8 and 9 years) read a series of passages and completed a True/False

sentence judgment task based on causal and elaborative inferences embedded in the text. Results suggested that children from all three age groups generated causal but not elaborative inferences on-line during reading. This pattern of inference generation was the same in both real-world and fictitious passages. Findings are interpreted with reference to the influence of belief bias on inference generation.

Virginia Cronin (Mount St. Vincent University). *Rhyming, rapid naming, verbal fluency and reading acquisition.*

Although many investigators find that early rhyme discrimination and rapid naming tasks predict later reading acquisition in young children, theoretical understanding remains elusive. This paper relates early language abilities that may reflect automaticity to reading acquisition in a longitudinal study. The ratio of sight word and nonsense word acquisition was related to preschool rhyme discrimination, rapid naming, and verbal fluency. Children who needed many sight words before reading three nonsense words were found have slower early automaticity scores and to develop reading proficiency more slowly. These results were discussed in term of the theory of word modules.

Rebecca J. Cross (University of Colorado), Chayna J. Davis, Sally J. Wadsworth, John C. DeFries, and Richard K. Olson. *Testing the evidence for a differential genetic etiology of reading disability subtypes.*

Previous studies have presented evidence for a significant differential genetic influence on reading disability in relation to both IQ and processing-speed subtypes: Genetic influence was relatively low for disabled readers who were relatively low in IQ and processing speed. This difference in genetic influence is confirmed in the present study. However, additional analyses show that much of the difference in genetic influence on reading disability depends on the IQ and speed correlations with the reading measure. When reading level was regressed out of IQ and speed, their differential genetic influence on reading disability was reduced and no longer statistically significant. A similar pattern of results was found with several new subtype variables that are highly correlated with reading, including phoneme awareness, phonological decoding, and orthographic coding.

Anne E. Cunningham (University of California, Berkeley), Kathryn E. Perry, Laura Rodriguez, Keith E. Stanovich, and Paula J. Stanovich. *How teachers spend their time teaching language arts: The mismatch between policy and practice.*

Teacher education is becoming a central issue in policy discussions of children's literacy. How teachers structure and allocate their instructional time for reading education, in addition to their knowledge of reading development and processes and pedagogy, is of increasing concern among researchers and policy makers. In this study, we investigated reading-related subject matter knowledge, beliefs and instructional practices in 150 first grade teachers. We examined the structure of teacher's implicit beliefs about reading instruction, and the relations between teacher's knowledge, beliefs, and practices via teacher reported rubrics delineating the amount of instructional time they devoted to different reading-related activities.

Chayna J. Davis (University of Colorado), Javier Gayan, Valerie S. Knopik, Shelley D. Smith, Lon R. Cardon, Bruce F. Pennington, Richard R. Olson, and John C. DeFries. *Genetic covariation between deficits in reading and rapid automatized naming.*

Children with reading deficits perform more slowly than normally-achieving readers on speed of processing measures, such as rapid automatized naming (RAN). While RAN is a well-established correlate of reading performance, and the heritable nature of both reading difficulties and RAN have been supported by previous research, few studies have attempted to assess the etiology of their covariation. In the present study, bivariate DF models showed that deficits in these three reading measures covary genetically with RAN. Univariate sib-pair linkage analyses confirmed the presence of a QTL on chromosome 6p21.3 for phonological decoding, orthographic choice, and reading deficits. Bivariate linkage analyses suggest that a QTL for reading difficulties may be also a susceptibility locus for slower performance on RAN tasks.

Peter F. de Jong (Universiteit van Amsterdam), and Aryan van der Leij. *Developmental changes in the manifestation of a phonological deficit in Dutch dyslexic children.* In a longitudinal study the development of phonological awareness and rapid naming was studied in 19 dyslexic and 19 normal readers learning to read in Dutch. Dyslexic children showed impairments in rapid naming from kindergarten through sixth grade. Impairments in phonological awareness at the level of phonemes became manifest in first grade and tended to disappear at the end of primary school. However, a second cross-sectional study revealed that fourth grade dyslexic children's phoneme awareness was hampered when task demands increased. Results of both studies suggest that dyslexic children's deficits in phonological awareness and rapid naming follow distinct developmental pathways.

S. Hélène Deacon (University of Oxford), and Peter Bryant. *Young children's use of base morphemes to spell derived words.* This study examined 7-, 8- and 9-year-old children's use of roots in spelling two types of derived words: those with phonological changes between base to derived form (e.g. obsess to obsession) and those with no change (e.g., magic to magical). Children were shown a clue and asked to spell two-morpheme words (e.g., shown magic and asked to spell magical) and one-morpheme words (e.g., shown met and asked to spell metal). For both types of derivations children used the clues only in spelling the two-morpheme words. Results will be discussed in the context of previous research and theories of spelling development.

Carolyn A. Denton (University of Texas, Houston), and Patricia G. Mathes. *Word identification strategies in two early reading intervention models.* As part of a study of early reading intervention, we implemented two small-group interventions, a direct instruction model and a guided reading model with added emphasis on word work. This session reports the results of a study in which we observed and coded the decoding strategies and linguistic units children were taught to use in the two approaches, and their relationships to reading outcomes.

Aram Dorit (Tel Aviv University), and Iris Levin. *The role of maternal writing mediation in the child's literacy achievements in school: A longitudinal perspective from kindergarten to second grade.*

Eva-Maria Ebner (University of Salzburg), Verena Thaler, and Heinz Wimmer. *Enhance reading fluency in German speaking dyslexics.*

This study evaluates the effects of a computer-based reading program to enhance reading speed. Twenty poor readers were trained individually with two different treatments for five weeks. Both treatments aimed at the implementation of multiple sublexical associations, concerning onset-clusters and their segments. Words were presented with either visually and auditorily highlighting the onset-cluster and its segments or just visually highlighting the relevant parts. The results indicated substantial gains in reading time. Effects concerning retention one and four weeks after training as well as generalization on transfer and control words showed to be significant.

Carsten Elbro (University of Copenhagen), and Dorthe Klint Petersen. *Pre-school prediction of good and poor reading comprehension in grade 7.*

Pre-school language measures predict initial reading development fairly well. But some students may experience late developing problems - perhaps particularly in the area of reading comprehension. The questions to be addressed are whether such specific comprehension problems can be found and, if so, how well they can be predicted from language and other cognitive measures taken in pre-school. The presentation will report from a follow-up on the Copenhagen longitudinal study of approx 160 children of dyslexic and non-dyslexic parents. Results from pre-school to grade 3 were reported previously to the SSSR community.

Mary Ann Evans (University of Guelph), Deborah Shaw, Michelle Bell, Shelley Moretti, and Maureen Fox. *Shared book reading: A "yes" for vocabulary and phonological awareness; a "maybe" for beginning reading.*

The assumption that reading to your child will foster reading and vocabulary acquisition was stringently tested by first controlling for child age and sex, then parental education, and then child cognitive ability before evaluating the contribution of shared reading in a sample of 120 children. Whether shared reading fosters phonological awareness was also examined. As the last step in linear regressions, shared reading predicted no additional variance in kindergarten emergent literacy, but did predict vocabulary and phonological awareness. In grades one and two, neither shared reading nor vocabulary predicted reading. However kindergarten phonological awareness, entered after all other predictors including vocabulary, predicted both reading, and spelling.

Michaela Evans (University of Waterloo), and Richard Steffy. *Predicting performance in reading achievement: The unique contributions of orthographic/processing speed and phonological/working memory.*

In Grade Four Children (n=100) a Structural Equation Model (SEM) reveals two separate but positively correlated factors: 1) processing speed and orthographic measures, and 2) working memory and phonological measures. This SEM was used to predict shared and unique variance of reading achievement scores, namely Letter Word Identification (LWID) and Word Attack (WA), from the Woodcock-Johnson-Revised. Results show that these two factors account for 43% of the variance in LWID and 80% of the variance in WA. The orthographic/processing speed factor contributes significantly more unique variance to LWID than the phonological/working memory factor, while the opposite is true for the WA task.

Tedra A. Fazendeiro (University of Denver), Janice M. Keenan, and Rebecca S. Betjemann. *Latent semantic analysis versus idea checklists: Methods for assessing passage recall and comprehension.*

Children with reading disability and controls both read and listened to passages from the Qualitative Reading Inventory (QRI). They gave retellings following each passage and answered both implicit and explicit comprehension questions. Retellings were scored using both the QRI idea checklists and Latent Semantic Analysis (LSA). Results show high correlations between scores from the checklists and those from LSA for both reading and listening passages. Both measures adequately predicted performance on explicit comprehension questions, but neither measure sufficiently predicted scores on implicit questions. Both measures showed that controls produced better retellings than dyslexics for reading but not listening passages.

Lauren Figueredo (University of Alberta), and Connie Varnhagen. *Detecting a problem is half the battle: The relation between error type and spelling performance.*

We examined differences in spelling error detection and correction in adults as a function of error type. The error types were phonological (e.g., incredibul), orthographic (e.g., decisian), and morphological (e.g., extention) errors. Participants detected and then corrected spelling errors in a one-page essay that contained 18 misspellings. Participants detected significantly more phonological errors than orthographic and morphological errors and detected morphological errors the least. Knowledge of how to correct an error may be sufficient for detection of phonological errors, but is not always sufficient for detection of orthographic and morphological errors.

Michael M. Gerber (University of California, Santa Barbara), Judy English, and Jill Leafstedt. *Cross language relationships of phonological processing abilities in young, emerging bilingual students.*

Little is known about cross-language transfer of phonological skills in support of second language reading acquisition by young children. We present results from the first two years of a longitudinal study of relationships among English and Spanish measures of phonological processing by 376 Spanish-speaking kindergarten and first grade students. Analyses are interpreted to suggest that development of phonological abilities is independent of the characteristics of students' first (L1) or second (L2) language. Performance on Spanish phonological tasks is predictive of ability to perform similarly on parallel English tasks despite lack of proficiency in spoken English.

Vincent Goetry (Université Libre de Bruxelles), and Philippe Mousty. *Do bilingual children activate the grapheme-phoneme correspondences of their two languages when reading in one?*

The present study examined whether French-Dutch and Dutch-French bilingual children activate the grapheme-phoneme correspondences of their non-dominant reading language when required to name words in their dominant reading language. These children were compared respectively to Dutch and French monolinguals in a reading task including words with cross-linguistic inconsistent grapheme-phoneme correspondences. The results show that the bilinguals are able to inhibit their knowledge of the non-dominant language only when none of the stimuli contain graphemes typical to that language. It is suggested

that orthographic typicality may play an important role in preventing cross-linguistic interference during reading in bilingual children.

Noël Gregg (University of Georgia), Deborah Knight, Chris Coleman, Robert B. Stennett, Cheri Hoy, and Mark Davis. *Reading comprehension: The influence of task demands.*

This study investigated the contribution of specific cognitive and linguistic processes on three different reading comprehension tasks (multiple choice; cloze; free recall) in samples of college students with (n=93) and without dyslexia (100). A series of regressions were conducted to investigate the contribution of phonology, orthography, fluency, working memory, executive functioning and oral language to different reading comprehension task demands.

Jennifer Griffin (University of Texas, Houston), Jason L. Anthony, Barbara R. Foorman, Christopher Schatschneider, and David Francis. *Word decodability as a function of context and repetition.*

Identifying determinants of word decodability is important for classroom instruction, curriculum development, and policy making. This study examined the effects of context and repetition on word decodability. Ninety at-risk first graders read words in no context, low context, and high context conditions. Half of the words in each condition were repeated once. Separate ANOVAs for each list found significant main effects of context and repetition and a significant context by repetition interaction, such that context effects were overshadowed by repetition effects if words were encountered twice. Results indicate that decoding skills of at-risk beginning readers benefit from increased contextual cues and repeated exposure to challenging words.

Yvonne Griffiths (University of Essex), Peter Bailey, Nicholas Hill, and Margaret Snowling. *An examination of the evidence for basic auditory processing deficits in dyslexia: Frequency discrimination.*

Pure tone frequency difference limens were measured in a group of 12 dyslexic and normal reading adults. The following variables were examined: paradigm (2I2AFC v 4I2AFC), standard frequency (fixed v roved), stimulus duration (400 ms v 20 ms), interstimulus interval (400 ms v 2800 ms), interpolated interferers (present v absent). Group thresholds did not differ significantly when the 4I2AFC procedure was used, but differ in all conditions using a 2I2AFC procedure. There were no significant interactions between group and the remaining variables tested suggesting that dyslexics' difficulty with frequency discrimination is not attributable to poorer auditory memory or impaired phase locking.

Bente E. Hagtvet (University of Oslo), Erna Horn, and Sol A. H. Lyster. *Oral language precursors of reading difficulties: A longitudinal study of children of dyslexic parents.*

The present study focuses on the relation between phonological, syntactical and semantic variables as measured at ages three through six, and different aspects of reading, at ages seven, eight and nine. Seventy children of dyslexic parents were followed longitudinally during the age period from three through nine, and oral and written language skills were assessed yearly. The results suggest that later reading skills are determined by a broad specter of oral language variables. A rather strong relationship is, for example, found

between comprehension of complex syntax at age three and reading comprehension at age nine. The results are discussed with reference to Norwegian orthography, which is rather transparent, and also with reference to developmental theory.

Kendra M. Hall (Teachers College, Columbia University), Joanna P. Williams, Kristen D. Lauer, K. Brooke Stafford, Laura A. DeSisto, and John S. deCani. *A study of the effect of text structure and content on at-risk second graders' comprehension of compare/contrast informational text.*

This study investigated the effectiveness of an instructional program designed to teach the comprehension of compare/contrast informational text, a program that emphasized text structure while also introducing new content. Compared to more traditional instruction that emphasized only content and to no instruction, the program improved students' ability to comprehend compare/contrast informational text. Students were able to demonstrate some transfer of this knowledge to uninstructed compare/contrast texts, although they were not able to transfer this knowledge to text structures other than compare/contrast. Findings indicate that text structure instruction can improve 2nd grade students' comprehension of compare/contrast informational text and such instruction does not detract from their ability to learn new content.

Lesley Hart (University of Pittsburgh), Edward Wlotko, and Charles Perfetti. *Event related potential study of individual differences in learning.*

An Event Related Potential (ERP) experiment compared word processing and learning in skilled and less-skilled reading comprehenders. Subjects took a vocabulary test and were given 45 minutes to study 60 of the words they did not know. They then participated in an ERP task in which they made semantic judgments about previously known words, newly learned words, and unknown words. ERP recordings were made during the presentation of the word. The ERP signatures to the word types and comprehension were different, indicating that ERPs can be used to study individual differences and learning.

Laura Boynton Hauerwas (Providence College), and Joanne Walker. *Spelling of inflectional morphemes: A study of phonological, morphological and orthographic influences on children's spelling.*

Evidence suggests that, as spelling develops, children are influenced by their phonological, morphological, and orthographic abilities. Little is known about the relationship of these factors in impaired spellers. To address this, our study focused on the relationship between children's spelling of inflected verbs and performance on phonological, morphological, and orthographic tasks in both impaired and age-matched and spelling-matched peers. Children were given a series of spelling and metalinguistic awareness tasks. Results indicated that age-matched and spelling-matched subjects did better on inflectional morpheme spelling tasks than the children with deficits in spelling. Variation in phonological and orthographic awareness accounted for differences.

Kristina Herden (University of York), and Margaret J. Snowling. *The role of paired-associate learning in the development of reading skills.*

The acquisitions of letter-sound rules and of sight words are both forms of visual-verbal paired-associate learning. Thus, most research in relation to reading development has focused on visual-verbal paired-associate learning. This paper explores how performance

on both inter- and intra-modal paired-associate learning tasks relates to reading skills as well as to phonological and rapid naming skills. A group of 49 children (5-11 years) were administered tests of word and nonword reading, phoneme deletion and rapid naming, as well as visual-visual, verbal-verbal and visual-verbal paired associate learning tasks. It was established, which of the measures could account for unique variance in concurrent reading skill. Results are discussed within a developmental model of the acquisition of reading skills.

Benjamin Heuston (Waterford Institute), and Mark St. Andre. *A three-year study of the effectiveness of the Waterford Early Reading Program Level 1 in eight Idaho school districts.*

In 1998, the Waterford Early Reading Program - Level 1 was implemented in virtually every Kindergarten classroom in the state of Idaho. Eight districts were selected as a representative sample and agreed to be part of a three-year study. Each year the performance of Kindergarten students were tracked relative to an historical control group. The results were measured using a Kindergarten Inventory that had been created by Marilyn Adams and Phil Gough. Overall, students performed markedly better than the control group, with average effect sizes measuring between 0.21 and 1.09 for various groupings of students.

Tiffany Hogan (University of Kansas), and Rochelle Harris. *Phonological awareness training in first graders and the later effects on word reading in their native and second language.*

This study investigated the effects of a short, intensive English phonological awareness intervention on the native and second language reading skills of 64 first grade children in a French immersion program. Results indicated that the phonological awareness treatment yielded statistically significant increases in phonological awareness skills immediately following the treatment although these effects did not differentiate native or second language reading skills over time. Furthermore, findings showed that risk grouping based on initial phonological awareness scores differentiated native and second language reading skills at pre-, post-, and follow-up testing. Implications for phonological awareness training in an immersion setting are discussed as well as the at-risk determination for native and second language reading skills.

Lorenc Hoxhallari (University of Wales), and Victor vonDaal. *Learning to read in Albanian: A skill easily acquired.*

Effects of orthographic transparency were examined by comparing children learning to read in Albanian, Welsh and English. Twenty Year 1 Albanian children were given a reading test consisting of a 100 word stratified sample of decreasing written frequency. They were able to read accurately 80% of the words and knew the meaning of 77%. Reading latency was a direct effect of word-length ($R^2=.88$). Errors tended to be mispronunciations rather than real word replacements, and there were hardly any null-responses. These results were compared with Ellis and Hooper (2001), in which an identical design was used with English and Welsh children of the same age, but with one more year of formal reading instruction. The Albanian children read more words than the English and Welsh children, knew more word meanings, but had longer reading latencies. Like the Welsh children, but unlike the English children, the Albanian children made

more nonword errors. These results suggest that children acquire reading faster the more transparent the orthography, and that shallow orthography promotes an initial reliance on a phonological encoding strategy.

Jacqueline Hulslander (University of Colorado, Boulder), Erik Willcutt, Joel Talcott, Caroline Witton, Bruce Pennington, and Richard Olson. *Reading ability, ADHD, and performance on visual and auditory psychophysical tasks.*

Two auditory psychophysical tasks, 2Hz auditory modulation detection and 2Hz frequency detection, and one visual psychophysical task, coherent motion detection, were significantly correlated (.3-.4) to individual differences in word reading. A visual form detection task was not (although this task had poor reliability). However, ADHD is related to both word reading and auditory thresholds, thus possibly contributing to their correlation. When controlling for ADHD, the auditory-word reading correlations become non-significant. The relationship between motion detection and word reading appears independent of this potential confound. Relationships between psychophysical thresholds, ADHD, and the component skills of reading are also discussed.

Florian Hutzler (University of Salzburg). *Different reading strategies in orthographies of different consistency: Evidence from an eye movement study.*

Our hypothesis was that readers may adapt to the inconsistencies of English by relying on larger letter clusters or whole word patterns, while less pressure towards large grain-sizes may operate in more regular orthographies. We tested this hypothesis by collecting naming latencies and eye-movement data of German and English readers. Expectations were that English readers may exhibit shorter naming latencies and fewer fixations per word, in particular for high frequency items. English readers indeed exhibited shorter latencies and a smaller number of fixations for high, but not for low frequency words. There was no orthography difference for fixation time.

Galit Ishaik (University of Waterloo), Patricia G. Bowers, and Richard A. Steffy. *On the road to understanding good and poor reader accuracy differences for different word types.*

The literature addresses the importance of a variety of skills for reading achievement. The current study investigates the contribution of phonological awareness (PA), rapid automatized naming (RAN), orthographic awareness (OA), and rapid perception (auditory and visual) to regular, exception, and pseudoword reading in good and poor reader groups. Exploratory factor analyses with the 5 independent variables yielded slightly different factor structures in grade 4 good and poor reader groups. Furthermore, variance in reading regular, exception and pseudowords was explained by different factors in the good and poor reader groups.

Joseph R. Jenkins (University of Washington), Julia A. Peyton, Patricia F. Vadasy, and Liz Sanders. *Effects of more and less decodable text on reading development of at-risk first grade students.*

Two groups of at-risk first graders received reading tutoring using the same phonics program. Students in the More Decodable group also read storybooks that were consistent with the phonics program. Students in the Less Decodable group read stories composed of high frequency words. During the first 30 lessons, the more decodable

storybooks were 85% decodable vs. 14% decodable for the less decodable storybooks. A control group did not receive tutoring. Both tutored groups significantly surpassed the control on an array of decoding, word reading, passage reading, and comprehension measures. However, the more and less decodable groups did not differ significantly on any measure.

Annette R. Jenner (College of the Holy Cross), Katherine M. Quinn, Erin J. Sorey-Gregory, and Leonard Katz. *Make familiar words unfamiliar: A study of mixed-cAsE*. Recent neurobiological model of reading proposes that unfamiliar words are processed in a left dorsal circuit but familiar words are processed in a left ventral circuit. This model has stimulated interest in the mechanism by which unfamiliar words become familiar over time through repetition. Two experiments were run in which some words were made initially unfamiliar by mIxEd-cAsE presentation. Subjects performed a lexical decision on both lowercase and mixed-case stimuli; mixed-cases were slower. For the final repetition, mixed-cases stimuli were reversed (e.g., bEaCh - BeAcH). Reaction time did not change. This suggests that participants are not using whole word orthographic patterns to recognize words.

Rhona S. Johnston (University of Hull), Alan McNeil, and Hazel Scott. *Poor readers are impaired in using phonological coding in pictorial memory tasks*. Poor readers aged 12 did not show word length effects with pictorial presentation, and had smaller phonological similarity effects than reading age controls. However, the poor readers showed a normal pattern of performance with auditory and printed word presentation. Attempts to induce 10 year old poor readers to show word length effects via teaching them either covert or overt rehearsal were unsuccessful. A longitudinal study of poor readers showed that by the age of 15 poor readers were still not showing clear cut word length effects. The relevance of these findings for difficulties in learning to recognize words will be discussed.

Lauren A. Katz (University of Michigan), and Joanne F. Carlisle. *The making of close readers: Using word-analysis strategies to improve comprehension*. This paper presents an investigation of an instructional program designed to address the needs of students with reading and language-learning difficulties who have difficulty becoming independent readers in the late and middle school elementary years. The program consists of training in word analysis strategies (for higher-level decoding and for inferring meanings of unfamiliar words in texts) and guided practice using these analytic skills during reading. Case studies (single-subject design) of students between 4th and 7th grade show that the instructional program results in noticeable growth on treatment and transfer measures of reading morphologically complex words and inferring meanings of words from context. In addition, students tended to make significant progress on standardized measures of word reading and comprehension.

Janice M. Keenan (University of Denver), Rebecca Betjemann, and Tedra Fazendeiro. *Reading disability and inference deficits in listening comprehension*. This study presents preliminary results from the listening comprehension component of an ongoing behavioral genetics study of comprehension skills in reading disability (RD). Using Barnes, et al.'s (1996) task, we assessed inferencing when knowledge differences

between RD and non-RD children were equated. Twins ages 8 - 16 learned a knowledge base, then listened to passages referring to it, and then answered literal, coherence inference, and elaborative inference questions. Younger children with RD, but not older children, show deficits in inferencing even when they are just listening and even when they have the knowledge needed to make an inference; these comprehension skills are heritable.

Nenagh Kemp (University of Manchester). *Adults' spelling of pseudoword plurals: Not as good as you'd think.*

This study examined whether adults spelled the final /s/ or /z/ of ostensibly plural, non-plural, and neutral pseudowords via the morphology-based plural rule (regular English plurals are always spelled with "s"), or simply via knowledge of the frequency with which certain letters co-occur. Sixty adults wrote 48 pseudowords whose appropriate final spelling could be determined by a) the plural rule only (e.g., "prees"/"preeze") or b) the plural rule or their final sound combination (e.g., "pleens"). Participants used the plural rule, but only to a limited extent. They instead relied heavily on orthographic frequency patterns to complete both plural and non-plural pseudowords.

Brett Kessler (Wayne State University), Rebecca Treiman, and Suzanne Bick. *Use by skilled spellers of context-sensitive patterns: Onsets and codas constrain the spelling of English vowels.*

The English monosyllables familiar to adults were analyzed to find the situations in which the spelling of a vowel becomes significantly more determinable when the identity of an adjacent consonant is taken into account. We ran experiments to test whether adults are sensitive to these patterns when spelling nonwords and when making errors in spelling real words. The results with single-syllable stimuli show that spellers are indeed sensitive to influences of both preceding consonants (syllable onset) and following consonants (syllable coda) when spelling vowels, belying theories that context is unimportant or only influential within the rime.

John R. Kirby (Queen's University), and S. Hélène Deacon. *Comparing the roles of morphological and phonological awareness in children's reading.*

It has been suggested that phonological awareness plays an important role in predicting early reading achievement, while morphological awareness is important in determining later reading development (e.g., Singson, Mahony & Mann, 2000). The present research examines this question in a longitudinal study with 101 children (beginning in grade 2). Over the course of four years, measures of phonological and morphological awareness accounted for similar amounts of the variance in children's progress in reading comprehension, phonological decoding and word identification, after controlling for IQ. The implications of these results will be discussed in the context of previous research on the role of linguistic skills in reading development.

Line Knudsen (University of Copenhagen), and Carsten Elbro. *The X-test: Knowledge of text genre may influence reading comprehension.*

The poster presents a test of knowledge of genre and structural text features. Measures of readers' use of higher order text structures are usually confounded with lower order abilities, notably decoding. This confound is avoided in the X-test by replacing all letters

with Xs. The reader is then asked to use his or her knowledge of how information is conventionally organized in each of the X-texts presented. A study indicated that knowledge of genres and structural features explained a significant amount of variance in reading comprehension after controlling for decoding.

Karin Landerl (University of Salzburg). *Arithmetic skills in children with dyslexia.* Everyday experience with dyslexic children suggests that a substantial number of them have problems with arithmetic, as well as with reading and spelling. Difficulties with certain arithmetic skills could well be a consequence of the specific cognitive deficits underlying the children's literacy difficulties. On the other hand, there may exist a considerable amount of comorbidity of dyslexia and dyscalculia. The paper is going to report first findings from a comprehensive assessment of arithmetic skills in 8- to 9-year old poor readers. The tasks were designed to tap different basic components of arithmetic ability, e.g. number reading and writing, mental calculations, counting speed, automatic number processing, understanding of mathematical concepts and estimation.

Nicole Landi (University of Pittsburgh), Julie Van Dyke, Charles A. Perfetti, and Barbara Foorman. *Causes and consequences of predictability.* A predictable sentence context has been shown to facilitate word identification, an effect that is greater for less skilled readers than for skilled readers. In addition, words that are more difficult to identify in isolation receive a greater benefit from a predictable context than words that are easy to identify in isolation (Stanovich & West, 1982). These effects suggest that readers can use context to aid word identification. This work combines empirical evidence (from first grade readers) examining the effect of learning words in a predictable context on later word identification and from computational models that outline factors important to word predictability.

Kristen D. Lauer (Teachers College, Columbia University), Joanna P. Williams, Kendra M. Hall, K. Brooke Stafford, and Laura A. DeSisto. *Are second grade students sensitive to informational texts: The relationship among structure, content, and ability.* This study examined whether second grade students were able to read and understand unfamiliar, historical content texts written in either a typical informational textbook structure or a narrative structure. Comprehension of these texts was compared with comprehension of familiar texts in which the events paralleled those in the unfamiliar texts and were events that could possibly occur in the students' everyday lives. Finally, the study investigated the effect of low and high reading ability. The study found that ability, structure, and content familiarity influenced performance for questions related to the content and structure of the text; ability and structure influenced summarization performance; and only ability influenced performance on detail questions.

T. V. Joe Layng (Headsprout, Inc.), Janet S. Twyman, and Kent R. Johnson. *Contingency adduction in a beginning reading program.* A process of contingency adduction is defined when behaviors learned under one set of circumstances may, either combined with other behaviors or alone, be recruited to serve a new function by a different set of circumstances. The research reported here investigated the application of contingency adduction to establishing sound-to-letter correspondence, and vocalized sound blending in the context of an Internet deployed reading/decoding

program for non-readers. Children age 4 to 6 were taught to discriminate letter/sound correspondence with minimal presentations; often, only one stimulus presentation was required. With little instruction, children also reliably blended sounds to say words.

Annukka Lehtonen (University of Oxford), and Peter Bryant. *Awareness of phoneme duration predicts literacy skills.*

Traditionally, phoneme awareness tasks have tested children's ability to manipulate or differentiate between different phonemes. However, other aspects of sound can differentiate between meanings in different orthographies, e.g. tones in Chinese and duration in Finnish. We used Oddity Task (Bryant & Bradley, 1978) with two conditions to test children's phoneme awareness. The items differed either in terms of phoneme identity or duration. Children also did a pseudo-word spelling task and a reading test. We found that the Duration condition emerged as a strong and significant predictor of both spelling and reading, while Identity condition predicted neither.

Valerie Marciarille LeVasseur (University of Connecticut), Paul Macaruso, Laura Conway Palumbo, and Donald Shankweiler. *Formatting text facilitates fluency in developing readers.*

Is reading facilitated by marking major syntactic boundaries in text? Second graders read aloud passages appropriate for their grade level under two text format conditions: In one condition the end of every line coincided with the end of a phrase; in the other, line breaks always interrupted a major phrasal constituent. The results show that text formats preserving phrasal units facilitate reading response time and result in fewer false starts and stumbles at the beginning of lines following return sweep. The findings indicate a potential benefit of text manipulation in promoting fluency in young readers.

Deborah Litt (University of Maryland, College Park). *An exploration of the double deficit hypothesis in the reading recovery population.*

Sixty children selected for Reading Recovery were tested on rapid object naming, elision, and blending before instruction in Reading Recovery began. Subjects were then classified along the dimensions proposed by the double deficit hypothesis. At the end of their Reading Recovery instruction, the data will be analyzed to determine whether deficit status is related to reading outcomes as measured by: (1) successful completion of Reading Recovery, (2) difficulty of text read at 90% accuracy, (3) reading rate, (4) length of time needed to complete the program, and (5) TOWRE Sight Word Efficiency. Analysis of post-treatment scores on the classification measures may provide an indication of whether instruction in Reading Recovery brings about change in the core processes.

Ying Liu (University of Pittsburgh), Charles Perfetti, and Min Wang. *Learning to read in a new writing system: ERP evidence.*

Can ERP data indicate learning in a new writing system? American colleges students enrolled in a Chinese language course participated in a year long learning study. In one of many tasks to assess their learning, students named both Chinese characters and English words while ERP recordings were made from surface electrodes. Results showed an early indicator of language difference between English and Chinese at 120ms. Curriculum-defined character frequency effects, taken to be the indicator of learning, were observed

at 450ms, later than frequency effects observed in the reader's native language. These results show that a reader's exposure to learned words is detectable in ERP recordings.

Denis Lobo (Reading Upgrade LLC). *Scientific reading instruction meets MTV: Results from first year studies on Reading Upgrade.*

Results from completed studies at four sites have shown that the Reading Upgrade intervention program delivers dramatic gains of one to three grade levels in reading over four to ten weeks, versus one grade per year with alternative methods. The program uses pop and hip-hop teaching songs, interactive auditory processing games, and MTV-style visuals. The processing centers for music (rhythm, pitch, lyrics) overlap with centers for reading. After a lifetime of exposure to environmental music and television U.S. students develop advanced neural pathways for audiovisual input. Thus we hypothesize that the rapid gains achieved result from exploiting these pathways.

Linda J. Lombardino (University of Florida), Wayne M. King, Sarah T. Ahmed, and Simone Campbell. *Computerized program for evaluating accuracy and speed for nonword decoding, word recognition and spelling recognition tasks.*

A computerized program (The Phonological and Orthographic Screening Tool for Dyslexia, POST-D) was developed to assess accuracy and rate in nonword decoding, word reading, and spelling recognition. The program was administered to 21 participants who were diagnosed with dyslexia and 17 who had normal reading and spelling abilities. Participants were given the computerized test in addition to a battery of standardized reading/spelling tests. The two groups differed significantly on all of the computerized test measures. Further, the POST-D reading and spelling scores were highly correlated with the standardized spelling and reading measures. The computerized test proved to an efficient and valid method for measuring decoding, word reading, and spelling recognition.

Sharon MacCoubrey (Queen's University), Lesly Wade-Woolley, and Don A. Klinger. *Early identification of grade one French immersion students at-risk for future reading difficulties.*

The present study examined which measures best identify English-speaking French Immersion students at-risk of future reading difficulties in French and English. Using reading scores taken in both languages at the end of Grade 1 and beginning of Grade 2, good and poor reading groups were defined. Measures taken at the beginning of Grade 1 were used to determine group membership. Discriminant analysis showed phoneme blending and sound isolation identified group membership in English and phoneme blending and rapid naming identified poor and good readers in French. These results can be used to identify new cases for early intervention.

Frank Manis (University of Southern California), Kim Lindsey, and Caroline Bailey. *Early prediction of reading disabilities in Spanish-speaking children.*

We explored cross-linguistic transfer of phonological and other reading-related skills between Spanish and English. We administered a kindergarten battery of Spanish language tests to 330 children in a Texas border town. Follow up measures of reading in Spanish and English were obtained at the end of first and second grade. Analyses revealed some evidence for cross-linguistic transfer, but also some evidence for language

specificity. Letter knowledge, phoneme awareness and print awareness showed evidence of transfer, whereas Spanish vocabulary was uniquely predictive of Spanish reading skill. Approximately 65% of the children could be classified correctly as good or poor readers in English at the end of second grade based on kindergarten Spanish measures.

James R. McBride (Renaissance Learning, Inc.), and Steven P. Tardrew. *Mapping the development of pre-reading skills with STAR early literacy.*

Research for an innovative assessment system has provided a map of the development of pre-literacy skills. STAR Early Literacy is a computer-administered, adaptive assessment of component skills of reading. It administers test items, tailored to ability level, from seven literacy domains: General Readiness, Graphophonemic Knowledge, Phonemic Awareness, Phonics, Vocabulary, Comprehension, and Structural Analysis. This paper will describe STAR Early Literacy, and emphasize the methodology employed in calibration of its item bank, and in mapping the development of proficiency in the seven literacy domains it comprises. Finally, it will display results of the mapping by age cohort, grade, and scale score.

Catherine McBride-Chang (Chinese University of Hong Kong), Chun Pong Wat, and Yiping Zhong. *The role of morphological awareness in predicting Chinese character recognition in beginning readers.*

We examined concurrent and longitudinal (across 9 months) predictors of Chinese character recognition in 192 Hong Kong and 89 Xian Tan Chinese kindergartners (mean age=4.9 years). Because Chinese characters contain relatively rich visual information (Chen, 1996), we tested the extent to which various visual skills would predict early character acquisition. Children's syllable deletion skill was a strong predictor of early reading. Various visual skills were also associated with early character recognition, though their patterns of association were less consistent across cultures. Future research should focus on isolating which visual skills are most strongly predictive of early Chinese character acquisition.

George W. McConkie (University of Illinois at Urbana-Champaign), and Shun-nan Yang. *How cognition affects eye movements in reading: An interaction/competition explanation.*

Cognitive processes related to reading have been observed to affect eye movement patterns in several ways. Detailed explanations about the underlying mechanisms of eliciting such effects often assume direct cognitive control. Here we reported a newly developed theory of eye movement control in reading, emphasizing on the neurophysiological underpinning about how and what certain oculomotor events occur when readers encounters reading difficulty, by means of neural inhibition. Two studies are reported, revealing the effects of reading difficulty on saccade programming, in terms of its effects on saccade latency and saccade length in a time-linked manner. Emphases will be on the effects of detecting or previewing an obvious reading problem on the dynamic process of saccade programming, and on how the elicited effects can be observed across several fixations, depending on the nature of the difficulty.

Souhila Messaoud-Galusi (LEAPLE and ILPGA), René Carré, Liliane Sprenger-Charolles, Agnes Kipffer-Piquard, and Will Serniclaes. *Perceptual segregation of speech*

sounds by dyslexic children.

Speech stimuli can be perceived as a sequence of phonemes despite the absence of a segmental marker. Formant transitions between two vocalic endpoints (/a/ and /i/) are perceived as a sequence of three vowels (/aEi/) when their duration exceeds some threshold. The present study shows that segregation of a continuous transition into small-size linguistic units depends both on reading delay and age. This seems to indicate that acquisition of small-size units in speech perception, although not necessary for oral communication, are required for establishing the correspondence with graphemes during reading development.

Vera C. S. Messbauer (University of Amsterdam), and Peter F. de Jong. *The influence of visual and phonological distinctiveness on visual-verbal paired associate learning in Dutch dyslexic and normal readers.*

The effect of visual and phonological distinctiveness on visual-verbal paired associate learning was studied in two experiments. In the first experiment, the influence of visual similarity on word learning was examined in 46 dyslexics and 46 chronological-age controls. Results showed that dyslexic children performed worse than controls on word learning, but were not hampered to a greater extent than the controls by visual indistinctiveness. In the second experiment (dyslexics, n=43; chronological-age controls, n=43) phonological similarity of the words was manipulated. Results replicated the findings of experiment 1. Additionally, it was found that only normal readers associated phonologically distinct words with indistinct visual stimuli more easily than indistinct words.

Carlin J. Miller (University of Georgia), George W. Hynd, and Scott R. Miller. *Using parental phonological processing and rapid naming ability to predict child decoding ability.*

The double-deficit hypothesis suggests that phonological processing and rapid naming may be the core deficit areas in dyslexia. Dyslexia is also known to have genetic etiological factors, but an intergenerational model of the double-deficit hypothesis has not been tested. Eighteen parents who reported childhood reading problems and 23 of their children who also demonstrated poor reading achievement were identified. Hierarchical linear regression was used to test the predictive effects of parental phonological processing and rapid naming on child decoding skills. Results from this study suggest that parental phonological processing, but not rapid naming is predictive of child reading performance.

Paul Morgan (Peabody College, Vanderbilt University), Caresa Young, and Doug Fuchs. *Effects of tutoring on the reading performance of treatment resistant children.*

This study evaluated the effects of providing treatment resistant children exhibiting chronically low sight word and non-word performance with short-term but intensive one-to-one tutoring. Participants were four 1st-grade children failing to make adequate progress after receiving increasingly individualized reading interventions. Each child received one hour of one-on-one tutoring daily for 10 consecutive school days. Instruction included phonemic awareness training, letter-sound recognition, and decoding through reciprocal teaching. Visual analysis indicated that all participants made strong

gains in non-word reading, but weak gains in sight word reading. Results are discussed in terms of the resource needs and characteristics of treatment resisters.

Frederick J. Morrison (University of Michigan), Carol McDonald Connor, and Leslie Katch. *Specificity in classroom instruction effects on first graders' reading outcomes*. Research provides information about the skills children need to master to become good readers; however we understand less about the methods and styles of teaching that best meet the individual needs of first-grade children. In this study we explore the contrasting effects of teacher-directed-explicit-word-level instruction and child-directed-higher-order instruction on end-of-the-year outcomes for children with differing cognitive abilities and beginning of first-grade reading skills. HLM results suggest significant interactions between children's cognitive and beginning-of-the-year reading skills and the amount of and change in time spent over the school year on specific types of instruction. Research and instructional implications are discussed.

Louise Morrison (York University), and Esther Geva. *Comprehension monitoring in first and second language reading*.

In this paper, I report the results of a cross-lingual study on the role of comprehension monitoring and underlying linguistics/cognitive processes on first and second language reading proficiency (English and French, respectively). Results show that successful monitoring, as measured by error detection performance at the discourse level, does transfer across languages, and that monitoring performance is highly correlated with reading proficiency in both languages. While monitoring performance in English was the most important predictor of reading proficiency in both languages, lower level processes such as word recognition and working memory played an important role in predicting reading proficiency in both languages.

Jack Mostow (Carnegie Mellon University), Greg Aist, Juliet Bey, Paul Burkhead, Andrew Cuneo, Brian Junker, Susan Rossbach, Brian Tobin, Joe Valeri, and Sara Wilson. *Independent practice versus computer-guided oral reading: Equal-time comparison of sustained silent reading to an automated reading tutor that listens*.

A 7-month study of 178 students in grades 1-4 at two schools compared two daily 20-minute treatments. 88 students did Sustained Silent Reading (SSR) in their classrooms. 90 students in 10-computer labs used the 2000-2001 version of Project LISTENs Reading Tutor (RT), which uses speech recognition to listen to a child read aloud, and responds with spoken and graphical assistance (www.cs.cmu.edu/~listen). The RT group significantly outgained their statistically matched SSR classmates in phonemic awareness, rapid letter naming, word identification, word comprehension, passage comprehension, fluency, and spelling -- especially in grade 1, where effect sizes for these skills ranged from .20 to .72.

Valerie Muter (University of York), Charles Hulme, Margaret Snowling, and Jim Stevenson. *Phonology, grammar and reading: Extending the phonology-reading model*. We present the results of a two-year longitudinal study of 90 children beginning at school entry. We investigate the relationships between early phonological skills, letter knowledge and grammatical awareness as predictors of the development of reading ability (word recognition and reading comprehension). Word recognition skills are

consistently predicted by earlier measures of letter knowledge and phoneme deletion ability (but not by vocabulary knowledge, rhyme skills or grammatical awareness). In contrast, reading comprehension is predicted by grammatical awareness but not by earlier phoneme deletion ability. The results are related to current theories about the role of phonological and language skills in the development of reading ability.

Alyssa Goldberg O'Rourke (Tufts University), Beth O'Brien, Robin Morris, Maureen Lovett, and Maryanne Wolf. *Rethinking the role of intelligence measures in reading disability research and practice: Cognitive profiles of the double-deficit subtypes*. Within the reading disability field, intelligence tests are often administered to document a discrepancy between ability and achievement or to aid in the development of subtyping classification schemes. Profile analysis techniques represent an alternative to more traditional methods of analyzing performance on intelligence tests. In the present study, 235 children with severe reading disabilities in Grades 2 and 3 were classified into three subtypes according to the framework of the Double-Deficit Hypothesis (DDH) (Wolf & Bowers, 1999). Profile analysis demonstrated subtype differences in the patterns of cognitive strength and weakness based on 10 subtests from the WISC-3. Implications of these findings for research and practice are discussed.

Richard K. Olson (University of Colorado), Brian Byrne, and Stefan Samuelsson. *Preliminary results from an international longitudinal twin study of genetic and environmental influences on early reading development*. Parallel longitudinal studies of early reading development in identical (MZ) and fraternal (DZ) twins have been initiated in Australia (Byrne, PI), the U.S. (Olson, PI), and Norway (Samuelsson, PI). The twins are being tested in preschool with static and dynamic assessments of pre-reading skills, and in kindergarten, first grade, and second grade for their development of early reading, spelling, and related cognitive skills. Comparisons of the similarities of MZ and DZ twins are revealing the relative importance of genetic, shared family environment, and non-shared environment influences on individual differences. Most of the data collected so far has been from preschool twins, so the talk will focus on results from the first wave of testing/training.

Rauno Parrila (University of Alberta), Mari Lokholm, and Hanne Nergård. *Phonological processing of high-performing adult dyslexics*. Word reading and phonological processing of self-described Norwegian adult dyslexics was compared to those of matched controls. Words varying in length, frequency, and complexity were presented for 500msec and 200msec. Under the long presentation time, both groups were highly accurate but the control group was significantly faster. The differences in response speed were largest for short and simple words. When words were presented for 200msec, there was a significant difference in both accuracy and response speed. Similar differences were found in nonword decoding, pseudohomophone choice, and rapid automatized naming tasks, whereas homophone choice, phonological memory, and choice reaction time tasks indicated smaller differences. Results are discussed in terms of different models of reading development.

Dolores Perin (Teachers College, Columbia University). *Effects of language proficiency and text characteristics on the written summarization of urban adult remedial students*.

Urban postsecondary remedial reading students who were native (N=37) or non-native (N=48) English speakers were compared on their inclusion of important ideas in an expository composing-from-sources task. Four source texts in two knowledge domains were used. Native vs. non-native differences were found for only one of the sources (native < non-native). Similarities between the two groups on specific ideas selected for inclusion ranged from 14% to 100%, depending on the source text. Both language proficiency and source text affected the frequency of copying vs. paraphrasing ideas in producing the written summaries. Readability and organization of ideas in the source texts are compared.

Linda M. Phillips (University of Alberta), and Stephen P. Norris. *University students' interpretations of media reports of science and their self-assessments of those interpretations.*

Three hundred and eight first and second year university students were asked to read five media reports of science describing recent scientific research and findings. The tasks asked students to interpret and make judgements about the certainty, status, and role of statements identified in the reports; to indicate how much knowledge they had about the general topic of the report, their interest in the general topic, and to self-assess their difficulty reading each report. Students' self-assessments of their knowledge, interests, and reading difficulty were rarely significantly correlated with performance on their respective sections of the interpretative test. However, knowledge, interests, and reading difficulty within each section tended to be correlated and frequently were correlated across sections. Students seemed to have an inflated view of their own ability to read and to understand the five media reports of science. Yet, their interpretative performance was low. Implications for the development of scientific literacy will be discussed.

Paige C. Pullen (University of Virginia), Holly B. Lane, and John Wills Lloyd.. *Early literacy intervention: Identifying effective intervention components.*

Individual tutoring was provided to 86 struggling beginning readers to identify effective components of reading intervention. We compared the effects of four conditions-children formed words by (a) manipulating magnetic letters, (b) writing letters in Elkonin boxes, (c) manipulating magnetic letters and using Elkonin boxes, and (d) control-in promoting an understanding of the alphabetic principle. Results of the study will be discussed.

Pieter Reitsma (VU Amsterdam). *Preparing the neighbourhood: Transfer of specific PA training on reading.*

In two training studies the hypothesis was tested that improving phonological representations of specific words would have beneficial effects on learning to read similar words (neighbors). In each study severely reading disabled Dutch children participated and received various kinds of practice in order to attain more distinct phonological information on these items. In a pretest and posttest similar words and controls were read. Results of both studies show that training in phonemic awareness seem to have 'localized' transfer effects.

Jeremiah Ring (Texas Scottish Rite Hospital for Children), and Jeffrey L. Black. *Correlates of treatment response in an alphabetic phonics dyslexia curriculum.*

Reading intervention research shows there is variability in children's response to

treatment, and that some variance can be attributed to individual differences at the beginning of treatment. The purpose of this study is to add to that body of evidence by examining reading growth in an Orton-Gillingham derived treatment program. The curriculum emphasizes systematic instruction in the structure of written language to teach reading skills. The data presented in this paper represent interim results after one year of that intervention. The analyses focus on student cognitive profiles at pretest with the goal of identifying student characteristics that can reliably account for observed variability in treatment response.

João Rosa (Oxford Brookes University), and Terezinha Nunes. *Morphological priming effects in children's spelling.*

Our aim was to analyze the effectiveness of priming in improving children's spelling of schwa vowels in Portuguese. Primes (presented orally or in writing) contained well articulated, stressed vowels whereas the targets contained non-stressed vowels. A non-primed condition served as baseline. If primes prove effective in improving the schwa vowel spelling, this would demonstrate children's implicit use of morphological information. No priming effects were detected in 6 and 7-year-old children; 8- and 9-year-olds' spelling improved significantly with priming. Thus there was no evidence of use of morphological information in younger children's spelling; implicit use of morphology was demonstrated in older children's spelling.

Emily Russell (University of Rhode Island), and Susan Brady. *An examination of the nature of reading fluency.*

This study investigated the nature of reading fluency by measuring: 1) skills thought to comprise fluency (rate, accuracy, phrasing ability, expression); 2) other reading abilities (word recognition speed, decoding speed, comprehension); and 3) potentially related cognitive and linguistic abilities (oromotor speed/ accuracy, syntactic awareness, listening comprehension, working memory, rapid serial naming). Participants were 83 third- and fourth-grade children whose fluency was studied at their independent reading levels. Analyses are underway to determine which cognitive and reading skills best predict each component of fluent oral reading and to examine the pattern of associations between components of fluency and other reading abilities.

Mark Sadoski (Texas A&M University), Ernest T. Goetz, Andrew G. Stricker, and Thomas K. Burdinski, Jr.. *New findings for concreteness and imagery effects in the composition of written definitions*

Ninety-two undergraduates wrote definitions of a set of concrete terms and a set of abstract terms with assignment to use either an imagery strategy, a verbal strategy, or no strategy (control). Results replicate previous findings of a significant effect of concreteness and no effect of strategy assignment, but findings differed in the direction of some concreteness effects. Definitions of concrete terms tended to be higher in quality. Definitions of abstract terms were longer and used longer words. Regardless of strategy assignment, participants reported using an imagery strategy with concrete words and a verbal strategy with abstract words.

Elinor Saiegh-Haddad (University of Toronto). *Linguistic distance and initial reading acquisition in Arabic diglossic context.*

The study examined phonological sensitivity and pseudo word decoding ability in kindergarten and first-grade Arabic native children. Because native speakers of Arabic first learn to read in Modern Standard Arabic (MSA)- a language structurally distinct from the language they grow up speaking- it was hypothesized that linguistic differences between the two varieties of Arabic would interfere with the acquisition of basic reading processes in MSA. Two linguistic contrasts were examined: sound and syllabic structure. The results showed a clear, but different pattern of interference of the two contrastive structures addressed on performance. The results are discussed in terms of the role of linguistic distance in the acquisition of basic reading processes in a bidialectal/ bilingual situation.

Javier S. Sainz (Universidad Complutense de Madrid), Carmen Villalba, and Betty Moussikou. *Illusory word- and illusory object-conjunctions: Are the same brain mechanisms in use?*

A migration error can be described as an interaction among items in a multi-word or multi-object display. For example, given the tachitoscopic display SAND LANE, subjects cued to report the item on the left often report LAND or SANE instead of SAND, there being a similar tendency to make migration errors when the item on the right is cued as well, a result which is known as the surround-similarity effect. In the first experiment, migration errors were investigated by manipulating the way a target word is recognized in the context of close similar word-like distractors. In the second experiment, pictures of artificial objects were constructed to parallel the experimental conditions of the first one. The same normal adult readers were run in both experiments, while event-related potentials measures as well as the usual behavioral responses were taken. Preliminary results show that both kinds of migration errors partially share common brain mechanisms.

Rebecca L. Sandak (Haskins Laboratories), W. Einar Mencl, Stephen J. Frost, Justin Bates, Annette Jenner, Stephanie A. Mason, Jay G. Rueckl, Kenneth R. Pugh, and Leonard Katz. *The neurobiology of adaptive learning in reading: The effects of repetition and differential encoding of word stimuli.*

Neuroimaging studies have revealed a set of LH areas critical for word identification, with ventral (occipitotemporal), dorsal (temporoparietal), and anterior (IFG) components. Some findings suggest that dorsal and anterior components recognize printed words by means of slow, attentional processing whereas ventral regions constitute a fast word-form system. Using fMRI, Experiment 1 tested this hypothesis by examining cortical activation during a semantic categorization task to novel vs. repeated items. Areas showing repetition-correlated decreases and increases in activation were isolated. Experiment 2 investigated how practice with unfamiliar words resulted in these shifts, more precisely characterizing the cortical changes associated with adaptive learning.

Dominiek Sandra (University of Antwerp), James Booth, Heike Martensen, Astrid Geudens, and Charles A. Perfetti. *Which factors cause the emergence of onset-rime effects in word reading? The role of grapheme-phoneme consistency, orthographic pattern frequency, and experimental task.*

This is a follow-up to our SSSR.2001 talk. In a cross-linguistic study we investigated three factors which possibly underlie rime effects in reading. (i) Rime effects might

reflect that the vowel's pronunciation depends on the coda. Such dependency occurs in English (can/car), not in Dutch. (ii) Rime effects might (partly) be effects of orthographic pattern frequency. (iii) They might also be task-dependent. Using masked priming in brief identification (BI) and naming we found no language effect, only a task effect: language-independent effects in BI, none in naming. To relate these findings to our research question we ran experiments in which (i) the English vowel pronunciation depended more heavily on the coda and (ii) non-rimes were primed.

Kathryn Saunders (University of Kansas), and Anthony DeFulio. *Relationships among word attack and phonological-processing skills in individuals with mild mental retardation.*

We explored relationships among word attack and phonological-processing skills in 30 adults with mild mental retardation. The mean Woodcock Word ID age equivalent (AE) was 7.8, while mean Word Attack AE was 6.6. There were four tests of phonological awareness (for rime, and first, middle, and end sound), two rapid-naming tests (pictures and letters), and a test of speech perception, which involved repeating nonsense words. All of the phonological awareness measures and both rapid-naming measures were also significantly correlated with Word Attack skills. The speech perception task measure was not significantly correlated with Word Attack skills.

Hollis S. Scarborough (City University of New York, Brooklyn), Anne Charity, and Darion Griffin. *Is unfamiliarity with "school English" related to reading acquisition by African-American students?*

Urban African-American students in kindergarten through second grade were asked to imitate the sentences in a story book that was read aloud to them in "school English" (SE). Responses were scored as verbatim correct, as differences in dialect (phonological or morphosyntactic), or as recall errors that were unrelated to dialect. Also, comprehension of SE instructional terms was assessed using a receptive vocabulary measure. Scores on these tests of the children's familiarity with SE were examined in relation to grade level, reading achievement, and other language skills.

Barbara T. Schmidt (Graduate School and University Center, City University of New York), Loraine K. Obler, Linnea Ehri, and Martin Chodorow. *Evidence of dissociation between phonological processes and lexical processes.*

This study examines the extent to which oral reading and silent reading comprehension are dissociable in skilled readers. The twelve undergraduate participants in this study had good reading comprehension and performed similarly on a silent single-word reading task. However, there was no significant correlation between oral reading rate and silent reading comprehension. The results suggest that oral reading of text and single-word reading aloud are linked to each other, but not to reading comprehension, providing evidence of a dissociation between the phonological and lexical processing of words with utilization of two distinct reading routes, one for decoding and one for meaning.

Latrice M. Seals (University of Texas), Barbara R. Foorman, and Jason L. Anthony. *Evaluation of a vocabulary enrichment program for at-risk third graders.*

The present study investigated the effects of a classroom-based Vocabulary Enrichment Program (VEP) on language and literacy outcomes of schoolchildren. The twenty-week

vocabulary curriculum was designed for speakers of African American Vernacular English with limited vocabulary. Participants were 231 third grade students from urban Title 1 schools. The sample was 97% African-American, 3% Hispanic, and 51% female. After matching on school demographics, schools and sometimes classrooms within schools were randomly assigned to an intervention or comparison group. Results indicated that VEP participants experienced greater vocabulary growth than nonparticipants, $F=35.7$, $p<.001$; however, gains did not generalize to verbal reasoning, reading comprehension, or decoding.

Willy Serniclaes (Université Libre de Bruxelles), Liliane Sprenger-Charolles, Caroline Bogliotti, Souhila Messaoud-Galusi, Sandra Vanheghe, Philippe Mousty, and René Carré. *Categorical perception deficit in dyslexia: Reliability and implications*. Different studies show that dyslexic children suffer from a categorical deficit in speech perception. We present a review of the available evidence for the “Categorical Perception” (CP) deficit and stress its implications for reading development. We conclude that: (1) the CP deficit is reliable across studies taking account of methodological differences; (2) dyslexics are less sensitive to differences between phonemes and more sensitive to acoustic variants of the same phoneme; (3) this arises from a higher sensitivity to allophonic differences in speech; (4) this in turn has obvious implications for reading development and might be a major determinant of dyslexia.

Micahl Shany (Haifa University), and Ilana Ben-Dror. *Surface and phonological reading—Evidence from Hebrew orthography*.

The present study investigated the manifestation of sub-types of reading disabilities in Hebrew orthography. Thirty-seven reading disabled sixth graders participated in the study. Eighteen subjects presented slow-accurate reading pattern when reading fully vowelized text (SA) and 19 presented slow-inaccurate reading pattern (SIA). These two reading disabled groups further presented other distinct reading patterns: they presented different use of context for word recognition, in addition omission of vowel marks affected differently their reading patterns. These results support the patterns of sub-types observed in English orthography but provides different symptoms that are associated with each reading disabled group. Results were interpreted as reflecting efficiency of phonological processing as the most influential cognitive mechanism that underlies the different reading patterns. In addition it was suggested that other language specific processing such as naming speed and morphological processing might play an important role in the development of word recognition efficacy in the case of SA disabled readers and should be further investigated.

Joseph Shimron (University of Haifa), and Vered Vaknin. *Access units in a Semitic language*.

Recent studies in word morphology in Hebrew are reported in an attempt to examine the construct of "Access units" in Semitic languages. "Access units" are defined as units that mediate between input stimulus and lexical representations. Often they give access to grammatical information--forms that indicate syntactic and semantic notions, but they may also be units that are simply sensitive to superficial aspects of word structure, appearing as clusters of graphemes or phonemes. The majority of studies on access units were conducted on European languages, in which the word's stem as a whole is

considered as one access unit. In Semitic languages, the word's stem is traditionally seen as a merger of two morphemes, the root and the template. In addition, affixes are used for inflections and derivations. The studies reported evidence from Hebrew that necessitates some modification of the access unit definition.

Robindra Sidhu (Queen's University), and Lesly Wade-Woolley. *The role of language-specific orthographic awareness, phonological awareness, and rapid automatized naming (RAN) in the word recognition of second grade French immersion students.* This investigation examined the relation between naming speed and language-specific orthographic awareness in English and French word recognition. RAN-numbers predicted unique variance in English word recognition. This variance was related to English orthographic awareness and not phonological awareness. RAN-letters also predicted unique variance in English word recognition, however subsequent analyses showed that RAN-letters considerable overlapping variance with phonological awareness. In predicting French word recognition, only RAN-letters explained significant unique variance. RAN-numbers did not predict any unique variance. This difference may be attributed to lower French orthographic awareness compared to English orthographic awareness.

Margaret J. Snowling (University of York), Alison Gallagher, and Uta Frith. *Individual differences in the precursors of orthographic skill: Evidence from children at genetic risk of dyslexia.*

This paper reports a longitudinal study of 56 children at genetic risk of dyslexia, assessed at the ages of 3;09, 6 and 8 years. Sixty six percent of the high-risk group had reading disabilities at age 8 years. The data suggest that the risk of dyslexia is continuous: at-risk children who did not fulfill criteria for reading impairment were slow to learn letters and, at age 6 years of age, they performed as poorly as at-risk reading impaired children on tests of grapheme-phoneme knowledge. The findings are discussed within an interactive model of reading development.

Louise Spear-Swerling (Southern Connecticut State University). *Comparing third graders' reading comprehension with their fluency in easy text.*

This study explored the contributions of word identification accuracy, naming speed, and oral language comprehension to third graders' reading comprehension and oral reading fluency (ORF) in easy text. Children's ORF and reading comprehension correlated substantially with each other ($r = .63$, $p = .000$), and with all three predictors. However, language comprehension accounted for more variance in reading comprehension than in ORF; conversely, naming speed accounted for more variance in ORF than in reading comprehension. Children with weak ORF were not always weak comprehenders in reading (and vice versa). The results suggest text difficulty may be important to consider in evaluating fluency.

Rhona Stainthorp (London University Institute of Education), and Diana Hughes. *"Matthew effects" in writing: Evidence from precocious readers.*

"Matthew effects" in reading predict positive effects from reading across the curriculum. This paper presents some evidence from a longitudinal study of precocious readers. The data relate to standardized measures of reading, writing, and language obtained from

fourteen 11 year-olds who had been identified as being precocious readers before they had started school. Their performance is contrasted with that of an able group who had not been precocious readers. The data suggest that there are positive effects on vocabulary and written expression. However, experimental tasks of narrative writing indicate that it is difficult to quantify differences in writing performance.

Ronald Stringer (McGill University), Lisa French, Melanie Gotlieb, Mariam Haider, Shahrzad Irannejad, and Gail McCoubrey. *Analyzing the RAN with eye fixation duration and total task time.*

Eye movement characteristics of good and poor readers were observed during RAN performance. Two groups of twenty participants, categorized as good or poor readers based on their Wide Range Achievement Test (WRAT-3) reading levels, were administered the Rapid Automatized Naming Task (RAN). Eye movement characteristics were digitally recorded simultaneously and analyzed with a computer video editing program. Based on previous research, we hypothesized that eye movement characteristics exhibited during the RAN task would differentiate between good and poor readers. Data analyses are in progress.

Tara Stringer (Northwestern University), James Booth, Douglas D. Burman, Yasu Harasaki, and Frank W. VanSanten. *The influence of orthographically or phonologically inconsistent word pairs on intra-modal and cross-modal lexical judgment tasks.* Intra-modal and cross-modal lexical judgment tasks were administered to adults (Study 1) and children (Study 2). For the cross-modal tasks with adults, phonological inconsistency (charm-swarm) influenced visual rhyming more than auditory spelling, whereas orthographic inconsistency (grade-laid) influenced auditory spelling more than visual rhyming. Accuracy and reaction time on the intra-modal tasks (visual spelling, auditory rhyming) for the adults were not greatly influenced by phonological or orthographic inconsistency. Although we have not yet collected data on phonologically inconsistent pairs, Study 2 revealed larger developmental differences for orthographically inconsistent pairs for auditory spelling than for visual rhyming. Interestingly, orthographically inconsistent pairs also produced large developmental differences for the intra-modal visual spelling task.

Carrie A. Szucs (Queen's University), and Lesly Wade-Woolley. *Syllable and phoneme awareness as a predictor of word-reading in French immersion students.*

The purpose of the present study was to determine whether syllable and phoneme-level processes make different contributions to English and French word-reading after orthographic processing has been considered. English-speaking French Immersion children were given phonological and reading measures at the beginning of Grade 2. Results showed syllable deletion made an independent contribution to French reading after orthographic processing was entered into the regression analysis. However, only phoneme deletion was related to English reading. The results, therefore, suggest that bilingual children use language-specific phonological information to read words in their first and second languages.

Connie A. Thompson (University of Michigan), and Holly K. Craig. *Relationships between vocabulary breadth, depth, flexibility and reading skills of elementary age*

African Americans.

This study examined the vocabulary and reading skills of typically developing African American 4th graders who spoke African American English. Measures included a standardized reading assessment, standardized vocabulary tests, and a task that probed knowledge of words with multiple meanings. Recognition of vocabulary words and understanding words that have multiple meanings strongly predicted performance on decoding and text comprehension tasks. A unidirectional relationship existed between vocabulary recognition tasks and reading, whereas a bi-directional relationship was evident between comprehension of multiple meanings and text comprehension. Outcomes will address the causal relationships between reading achievement and vocabulary abilities for African American students.

Catherine Transler (PI Research), Ilse Jansma, and Pieter Reitsma. *Reading and spelling in profoundly deaf children.*

Phonological coding is performed by profoundly deaf people during written word processing, but no study ever demonstrated its relationship with reading comprehension, nor with spelling, among deaf children. We raise this issue in presenting four different tasks to profoundly deaf children in Dutch, exploring 1) word recognition - with pseudohomophones introduced in a lexical decision; 2) reading comprehension levels; 3) spelling levels; 4) sensitivity to orthotactics - with a word-likeness decision task. Results shed new light on the relationships between word recognition and reading comprehension among reading learners and on reading and spelling relationships among deaf readers.

Rebecca Treiman (Wayne State University), Judy Bowey, and Derrick Bourassa. *Segmentation of spoken words into syllables by English-speaking children as compared to adults.*

Given the role of syllables in reading, information is needed about how children divide words into syllables. In two experiments, we examined children's syllabifications of spoken words and how they compare with adults'. Six and seven year olds did not show effects of spelling knowledge on syllabification, performing no differently on words such as habit and rabbit. Orthography did influence the syllabifications of older children and adults. Young children, like older children and adults, showed differences between words with "short" and "long" vowels (e.g., lemon vs. demon) and between words with medial sonorants and medial obstruents (e.g., melon vs. wagon).

William E. Tunmer (Massey University), and James W. Chapman. *The relation of metalinguistic abilities, phonological recoding skill and the use of sentence context to beginning reading development: A longitudinal study.*

Joanna K. Uhry (Fordham University). *The relationship between teachers' knowledge of phonology and their grade 1 students' progress in reading.*

Phonemic awareness (PA) is associated with reading acquisition (see Adams, 1990) and PA instruction can have a positive effect on early reading progress (see the Report of the National Reading Panel, 2000). Unfortunately, many teachers are not particularly sensitive to, or knowledgeable about, the sounds in words (Moats, 1994). This may be because mature readers are more attuned to orthographic and morphological knowledge

than to phonology when they read and spell (Scarborough, Ehri, Olson, & Fowler, 1998). Most teacher education programs do not provide adequate instruction in the teaching of PA. This study explores the relationship between teacher proficiency in PA and the reading progress of the students they teach. Twenty classroom teachers in a post-certification professional development program that included PA training made substantial gains in PA knowledge over the course of the program and outperformed other teachers taking graduate reading courses without this PA training. The children they tutored in a supervised practicum were significantly lower in reading skills than their higher-achieving classmates at the onset of tutoring, but this difference was no longer significant after eight months of tutoring. Regression analyses were carried out to explore the association among variables including teacher knowledge of PA and student reading achievement.

Vered Vaknin (University of Haifa), and Joseph Shimron. *The effect of prosodic change on inflection: Evidence from a Semitic language.*

This study examines an often neglected facet of word formation a prosodic change during word inflection. We shall focus on the inflection of singular nouns in forming plural nouns. Plural formation in Hebrew is achieved by affixation. However, on many occasions, there also appears a change of vocal pattern. The change ranges from having no change at all in the vocal pattern of the word stem to having one or even two vocal changes in the word stem. We investigated whether these vocal changes affect transformation of singulars to plurals as measured by reaction time and error rates in a naming task. Our results indicate that vocal changes additively affect plural transformation in Hebrew.

Victor van Daal (University of Wales), Llinos Spencer, Soracha Cashman, and Lorenc Hoxhallari. *Orthographic processing in bilinguals.*

A test that measures the proficiency in building a memory for written words was designed. In the test the subjects were presented pictures along with a sentence. Two types of items were constructed, 'old' brands like "Drink the new BEER of HEINEKEN", and 'new' brands, "Use only GLAX SOAP". Subjects were misleadingly instructed to remember which brands were familiar, and which were new. But they also were asked to choose the correct writing ('tick GLAKS, CLAX, VLOS, or GLAX'). In previous SSSR meetings we have reported on the reliability and validity of this test. Also we presented research in Dutch beginning readers and English beginning readers. The main conclusions: (1) the newly developed test is a very specific measure of orthographic processing, (2) In normal readers orthographic representations are built up with only few presentations of the written word, and (3) the more experienced the reader is, the more susceptible he becomes to orthographic foils. (4) English beginning readers developed these orthographic skills at a later stage than their Dutch counterparts. In the current presentation we will discuss the findings obtained in monolingual English beginning readers, in monolingual Welsh beginning readers, and in bilingual (English/Welsh) beginning readers. With respect to the latter group possible interference effects will be discussed.

Frank R. Vellutino (The University of Albany), William Tunmer, Donna M. Scanlon, James Jaccard, and RuSan Chen. *The components of reading ability: Multivariate*

evidence for a convergent skills model of reading development.

A "Convergent Skills Model of Reading Development" is proposed that specifies causal relations between skills and abilities believed to underlie reading ability. The model is based on the foundational assumption that facility in word identification and underlying phonological skills carry greater weight as determinants of reading ability in beginning readers than they do in more advanced readers, whereas facility in language comprehension and underlying semantic and syntactic skills carry greater weight as determinants of reading ability in more advanced readers. Phonological and visual coding abilities are theorized to be causally related to language based reading abilities (e.g., phoneme awareness, phonological decoding, semantic knowledge, etc.), which, in turn, are theorized to be causally related to word identification, language comprehension and reading comprehension, as reading subskills. The model was evaluated with beginning and more advanced readers using the LISREL program to analyze multivariate data derived from these children and it was found to be acceptable.

Lesly Wade-Woolley (Queen's University), and S. Helene Deacon. *Bilingual children's spelling development in L1 and L2.*

Children's creative spellings have long been examined for the degree to which they represent the sound constituents of words. Phonemic representation, however, is only one component of spelling accuracy. Morphological information in words may not be accurately represented by a reliance on the sounds of the words. This study reports an investigation of the development of morphological, phonological and orthographic information in the French spelling of 70 anglophone children in French immersion in grades 1 and 2. Of particular interest is the development of language-specific spelling knowledge in both English and French, and the predictive role of morphological awareness in both languages.

Min Wang (University of Pittsburgh), Charles A. Perfetti, and Ying Liu. *The implicit and explicit learning of orthographic structure of a new writing system.*

Can ERP data indicate learning in a new writing system? American colleges students enrolled in a Chinese language course participated in a year long learning study. In one of many tasks to assess their learning, students named both Chinese characters and English words while ERP recordings were made from surface electrodes. Results showed an early indicator of language difference between English and Chinese at 120ms. Curriculum-defined character frequency effects, taken to be the indicator of learning, were observed at 450ms, later than frequency effects observed in the reader's native language. These results show that a reader's exposure to learned words is detectable in ERP recordings.

Charles S. Watson (Indiana University), Gary R. Kidd, Phil J. Connell, David A. Eddins, Mary D. Gospel, Betty U. Watson, Douglas H. Horner, David A. Goss, Andrya Lowther, Bill B. Rainey, and Glenn Krueger. *Linguistic, cognitive and sensory-perceptual factors in the academic performance of elementary school children: The Benton-IU project.*

The Benton-IU Project is a multidisciplinary, epidemiological-longitudinal investigation of predictors of academic achievement in elementary school. An 8-10 hour battery of individually-administered standardized cognitive, linguistic, sensory, and perceptual tests was given to 472 children, approximately 96% of all students entering the first grade in

the four elementary schools of Benton County, Indiana, over a three-year period; the children were retested when they reached the fourth grade. Correlations between predicted and obtained reading achievement were approximately 0.7 in first through fourth grades; on the basis of the tests administered at entry to first grade. Data on specific predictors will be discussed.

Loes Wauters (University of Nijmegen), Wim van Bon, and Agnes Tellings. *Reading comprehension of deaf students in primary and secondary education.*

This study examined the reading comprehension skills of deaf children and adolescents in the Netherlands. In comparison with hearing students, the deaf participants in this study show a low performance on reading comprehension. Although some participants score at an age-appropriate level, the mean score of the total group is at the first grade level for hearing students. The mean word reading score, however, corresponds to the mean score of hearing students in grade 4. No differences in word reading and reading comprehension were found between deaf children of hearing parents and deaf children of deaf parents.

Gareth Williams (Open University), Dorothy Faulkner, and Clare Wood. *Temporal awareness and motor synchronisation systems in participants with dyslexia, developmental coordination disorder and a control group.*

Previous research suggests that a possible underlying cause for dyslexia is atypical development of the cerebellum. It is likely that temporal awareness is closely related to the cerebellar system, and this assertion has some support from a study where children with dyslexia showed poorer temporal judgment thresholds than controls. This study aims to examine the area in further detail. Two temporal judgment tasks and two motor synchronization tapping tasks were given to 20 children with dyslexia, a similar number of children with developmental coordination disorder and controls, aged 8 -11 years. The results are discussed in terms of support for the cerebellar hypothesis in dyslexia.

Evelin Witruk (University of Leipzig), Juergen Finster, and Enchschargal Schirtschinbaatar. *Reading automatization and use of mass media in primary school children.*

In a combined longitudinal-cross sectional study with children from 1st to 4th grade the determinants of reading automation, measured by eye movement indices, and the use of mass media were analyzed in their relation to cognitive and socio-demographic traits and characteristics. The influences of class level and intelligence were described significantly by a non-linear fit. The residue showed no significant correlations with the raised performances of working memory subsets and the ability of concentration. Significantly improved however the residual reading automation along with fewer older siblings, better school achievement, higher qualified job of the parents, more frequent computer use and more frequent reading of chosen books. Negative correlations were found with frequent magazine reading, CD listening and TV watching.

John Worthington (University of Queensland), and John Elkins. *Three perspectives of the literacy skills of young children.*

This poster and the accompanying notes describe the implications of three perspectives of the literacy development of a group of 30 children aged 4 to 8 years. The longitudinal

group data highlights the accuracy and relevance of the parental perspective and examines the relationship between the judgments made by parents and those made by teachers. Literacy test data trajectories describe the differing ways in which individual children develop and how parents and teachers perceived that development. The three perspectives presented come from the repeated judgments by parents, by teachers and the results of repeated standardized literacy tests. In the context of identifying young children who are at risk of early learning delays, parental perceptions are highly relevant and should be part of the assessment process. Teachers' perceptions, while also highly relevant, may also be influenced by the time of year at which the judgments are made.

Yolanda W. S. Yuen (Queen's University), Lesly Wade-Woolley, and Robindra Sidhu.

Does reading language dominance affect word reading in bilingual children?

This study investigated the word reading skills of grade two anglophone children educated in French. These children were categorized as either English- or French-dominant. These children read English words that differed as a function of regularity, consistency and lexicality. It was expected that children's relative advantage in French or English, particularly regarding language-specific orthographic knowledge, would influence their word naming performance. English dominant readers significantly outperformed French dominant readers in naming words which make use of small unit consistency, while no such pattern was seen for large-unit consistency. Results are interpreted in the context of orthographic differences between French and English.