

SOCIETY FOR THE SCIENTIFIC STUDY OF READING

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The Renaissance Suites at Flatiron
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Marilyn Jager Adams (Harvard University Graduate School of Education), and Scarborough Fidell. *On students, teachers, instruction, and reading reform: Findings from California's K-3 results database*. California's K-3 Results program is a statewide reading reform initiative, conceived, managed, and operated entirely by classroom teachers. Its core design principle is one of using skill-specific classroom assessments as foundation for promoting professional development and improving student outcomes. Asked to evaluate the program by the Stuart Foundation, we have compiled a database that links performance on beginning-, middle-, and end-of-year classroom assessments, SAT9 scores, instructional programs and materials, and a range of background information on individual students, teachers, classrooms, and schools. In all, the database includes records for more than 20,000 teachers and 200,000 students across 5 school years (1996-97 to 2000-01), enabling both longitudinal and cross-section examination of the efficacy of the Program and of a number of the role of a number of factors that modulate K-3 reading success and difficulty.

Stephanie Al Otaiba (Florida State University), Marcia Grek, and Joseph Torgesen. *Core basal reading instruction as "primary intervention": A review of basal beginning reading programs for reading first schools*. This session describes a review process to select beginning reading basal curriculum (K-1) that are consistent with scientifically based reading research and with the Reading First documents. Specifically, we will describe the process of evaluating and selecting reading basal programs for Reading First Schools from basal reading programs currently on the Florida state adoption list. We will discuss, compare, and contrast curricula which are and are not in alignment with Reading First guidance documents. Implications for professional development will be discussed.

Jason L. Anthony (University of Houston), Christopher J. Lonigan, and Christopher Schatschneider. *Investigating the dimensionality of phonological sensitivity: An item response theory approach*. Controversy exists concerning the nature of phonological sensitivity (PS). One view holds different PS skills reflect independent abilities; another suggests unidimensionality. Statistical methods used to resolve the controversy have been compromised by commonplace measurement problems. We employed a method less vulnerable to measurement problems. Specifically, we examined the overlap of 18 PS skills in 1056 2- to 6-year-old children from diverse backgrounds. Modified parallel analysis demonstrated all items indexed a single latent dimension. Information functions from an Item Response Theory model illustrated important differences in how informative the skills were along the ability continuum. Findings support a unidimensional and developmental conceptualization of preschoolers' phonological sensitivity that progresses from word sensitivity to phoneme sensitivity and from synthesis to analysis.

Amanda C. Appleton (Vanderbilt University), and Donald L. Compton. *The effects of three different levels of decodability in text across time on fluency and accuracy in 3rd, 4th, and 5th grade students experiencing reading difficulties*. Children with reading difficulties spend less time reading and have significant difficulties decoding words. Furthermore, when they are exposed to text they read more difficult instructional materials for them than good readers. Explicit instruction facilitates reading fluency; however, the contributions of the components of text factors for augmenting fluency for students with reading difficulties are less clear. The purpose of this study is to

investigate the effects of three different levels of decodability in informational text across time on fluency and accuracy in 3rd, 4th, and 5th grade students who are experiencing reading difficulties and who are receiving explicit reading instruction.

Alison Arrow (University of Auckland), Claire M. Fletcher-Flinn, and Tom Nicholson. *"That's my name": Early precursors to reading development*. Recognising one's own name may be an underestimated precursor to literacy development. The letters in one's own name are those that children appear to be able to identify first. The literacy knowledge of more than 60 preschoolers (4.6 - 4.11) with no formal reading education was investigated. The findings showed that all preschoolers had rime awareness available to them regardless of own name recognition. However, children who could recognise their own name had more letter name and sound knowledge, as well as increased phoneme awareness.

Bettina Baker (University of Pennsylvania), and William Labov. *Unexpected differences in reading error profiles among regional, ethnic and language groups*. Data were collected on reading errors from 500 struggling readers in grades 2-4 in low income schools in Pennsylvania and California, including African-American, Euro-American, and Latinos. The results confirm for all groups that the major problems in decoding are the result of incomplete knowledge of combinatorial relations, but a number of unexpected findings showed the influence of learning to read in Spanish first. A pilot intervention study had similar results for all groups in improving decoding skills for many structures. However, some striking consequences of language background emerged for the Latino children who learned to read in Spanish first.

Karen Baker (Regional Support Associates), Patricia Bowers, and Joel B. Talcott. *Visual processes and the double deficit hypothesis for reading disability*. This study explored the possible links between visual processing speed, naming speed and reading disabilities as defined by the Double Deficit Hypothesis (Wolf & Bowers, 1999). Eighty-one Grade Two children representing no deficit, single and double deficit groups were administered a battery of reading and visual processing tests. Results showed that, within this sample, early visual processing, as assessed by the Coherent Motion task (Talcott, 2002), was highly related to reading skill within a poor reader group but not across the sample. Moreover, performance on the Coherent Motion task appeared to measure a unique aspect of reading disability.

Michal Balass (University of Pittsburgh), Jessica Nelson, and Charles A. Perfetti. *Learning words: An event-related potentials study*. An Event Related Potential (ERP) experiment compared word processing and learning in different word training environments (semantic, phonological, and orthographic). Subjects were taught rare words (e.g. gloaming) in one of three conditions: Orthography to Phonology; Phonology to Meaning; Orthography to Meaning. Following learning, they made meaning judgments about words while their ERPs were recorded. ERP signals distinguished between rare words and more familiar words, between learned and unknown rare words, and among orthographic, phonological and semantic information that was provided in training. The results demonstrate that ERPs not only provide distinctive information about the three constituents of word representations, they also provide signatures for word learning.

Cathy L. Barr (Hospital for Sick Children), Karen Wigg, Yu Feng, Jill Couto, Barbara Anderson, Tasha Cate, Rosemary Tannock, Marueen Lovett, and Tom Humphries. *Recent progress in genetic studies of reading disabilities: Fine mapping for gene identification in the 6p and 15q regions*. Genetic linkage studies of specific reading disabilities (RD) have found significant evidence for linkage to 6 chromosomal regions. To identify genes contributing to the susceptibility to RD, we have collected a sample of 120 families ascertained through a proband with RD. Our studies of the 6p21.3 and 15q regions indicate that this sample of families are linked to these regions. The most significant finding for the 6p21.3 region was for markers located near the gene for myelin oligodendrocyte glycoprotein (MOG), indicating that the genetic variant(s) contributing to RD is likely to be very close to this gene.

Melissa Bell (University of Toronto), and Esther Geva. *Language specific early predictors of reading difficulty in ESL children*. English measures of phonological awareness, word-reading, and reading comprehension were administered from kindergarten to grade 3 in 12 Canadian schools on English as a Second language (ESL) children whose first language (L1) was either Punjabi, or Portuguese. These two language groups were studied because the L1's include alphabetic and non-alphabetic orthographies, different phonological and syntactic structures, and their prevalence in the Canadian education system. It was hypothesized that different phonological awareness tasks (onset/rime identification, syllable segmentation, phoneme segmentation) will differentially predict difficulty on both word-reading tasks and on reading comprehension tasks between the two ESL groups. Understanding the nature of the specific phonological awareness components that predict subsequent reading ability for specific language groups is of theoretical interest as well as of educational/clinical importance.

Inez Berends (PI Research, VU Amsterdam), and Pieter Reitsma. *Lateral versus central presentation in repeated reading with limited exposure times*. Some neuropsychological theories claim advantages for training procedures for dyslexics in which words are briefly presented in the left or right visual field. In two first training experiments with backward readers the effects of location and of limited exposure duration are evaluated. Experiment 1 involved 25 slow, but accurate readers and presentation in either the left or right visual field. Experiment 2 contrasted central versus lateral presentation, and limited versus unlimited presentation duration in 36 delayed beginning readers. No effects of position nor of presentation time were found, but repeated reading appeared to be effective overall.

Rebecca S. Betjemann (University of Denver), Janice M. Keenan, and Richard K. Olson. *Listening comprehension in children with reading disability*. We investigated the contributions of word decoding, IQ, and listening comprehension to deficits in reading comprehension for children with reading disability. Results showed that subjects with reading disability are often worse on both reading and listening comprehension compared to normal readers, though the relative contributions of word decoding and listening comprehension to reading comprehension varied with age. Stepwise regression analyses found that younger subjects' reading comprehension was best predicted by decoding ability, while older subjects' reading comprehension was best predicted by IQ and listening comprehension. Listening comprehension was not a significant predictor of reading comprehension after decoding and IQ.

Anne Bishop (University of Florida), and Martha League. *Prediction of early reading achievement: Choosing the right children, at the right time, with the right instrument*. Researchers conducted a three-year study to determine the optimal combination of predictive measures that correlate to early reading achievement. Letter identification, phonological awareness, phonological memory, and rapid serial naming measures were administered in fall and winter of kindergarten to determine if results varied across time. Five predictive models were examined, based on current predictive literature. These models were correlated with four measures of reading: word reading skills, non-word reading skills, fluency, and comprehension. Results are reported for reading achievement at the end of first and second grade.

Jeffrey L. Black (Texas Scottish Rite Hospital for Children), and Jeremiah Ring. *What happens after remediation? A follow-up study of the Dyslexia Treatment Program*. An important theoretical and practical question in the field of dyslexia concerns the stability of treatment effects and the transfer of skills and strategies to literacy development following the conclusion of phonologically-based reading interventions. This study examines treatment effects after completing the Dyslexia Treatment Program, a standardized Orton-Gillingham based literacy program. The follow-up data suggest that reading skills learned during the treatment are stable one and two years after intervention. However, transfer of those skills to continued literacy growth was only found in reading comprehension for one year after intervention.

Regina Boulware-Gooden (Texas A&M University), Angelia Holcomb, Emily Ocker, and R. M. Joshi. *Expanding the evidence for the componential model of reading*. In the 1991 report by the National Research Council a fluent reader will have adequate skills in decoding, comprehension, and fluency. This finding was empirically supported by the componential model of reading which is an extension of Gough's simple view of reading. The componential model of reading hypothesizes that reading equals decoding multiplied by comprehension plus fluency. This model was applied to Chall's developmental stage model that children learn to read in first through third and then read to learn fourth and above.

Kathleen J. Brown (University of Utah Reading Clinic), Darrell Morris, Matthew Fields, Stacey Lowe, Julie Robertson, Debbie Skidmore, Debbie Van Gorder, Connie Weinstein, and Ursula Brock. *The Virginia Model of Intervention: Is it effective for English language learners? Can it be delivered by supervised teachers' aides?* The current study replicates and extends findings from Brown et al. (2002) and Morris et al. (1990) by indicating that the Virginia model of intervention is effective for helping English Language Learners who are reading below grade level expectations. Students who received Next Steps, an application of the Virginia model for students above grade one, outperformed their control group peers on all formal and informal measures. Similar results suggest that para-professionals —under close supervision by an intervention specialist —can also effectively deliver this intervention to English Language Learners who are struggling readers.

Brian Byrne (University of New England), Stefan Samuelsson, Sally Wadsworth, and Richard Olson. *Longitudinal twin study of reading and language: Preschool and kindergarten data*. We report an update on recently published behavior-genetic analyses of preschool twins' performance on a variety of literacy, cognitive and linguistic variables known to underpin reading growth. Genes appeared to influence phonological awareness and aspects of learning, including acquiring phonemic awareness. In contrast, shared environment affected vocabulary, grammar, morphology, and print knowledge. We also report preliminary data on the kindergarten follow-up of some of these twins, and on the growth from preschool to kindergarten. The update, which includes twin data from Norway, confirms earlier conclusions. The follow-up data indicate that genetic effects remain in evidence, but that shared environment continues to exert significant influence on important aspects of literacy development.

Donna Caccamise (University of Colorado), Nicole Davis, Marita Franzke, Nina Johnson, Eileen Kintsch. *Using LSA in the classroom: Implementing Summary Street in grades 6 to 12*. Summary Street is an educational application of Latent Semantic Analysis (LSA), a statistical method that enables computers to evaluate the meaning of texts in ways that resemble humans. With Summary Street students can prepare multiple drafts of a summary with feedback about the content adequacy of their summaries, regardless of the particular words used. Multiple cycles of practice in writing and revision are possible without increasing the teachers' workload. In this study, transfer effects of summary street to independently collected comprehension measures (CSAP) were assessed looking at changes in CSAP scores by experimental condition(summary street vs word processor), ability level, individual performance on summaries, and by specific CSAP items. Results show improvement in CSAP scores for deep comprehension items for students using summary street, particularly among the poorer ability levels. Claire Cameron (University of Michigan), Carol McDonald Connor, and Jocelyn Petrella. *Effect of teacher organization on classroom functioning and children's reading outcomes*. This study examined the effect of organizational time, a non-instructional variable, on the classroom environment, looking particularly at amount of transition time and child-independent work. Forty-four first-grade classrooms were observed at three points over the school year (fall, winter, spring). Narratives were kept of each activity that lasted longer than one minute. "Orient-organize" referred to the amount of time teachers spent orienting students to classroom procedures or organizing for specific assignments. Meaningful variation in orient-organize time was observed, which predicted time spent transitioning and in child-independent work. The effect of these variables on reading outcomes will be discussed.

Joanne F. Carlisle (University of Michigan), Kay Hanson, and Sarah Scott. *The interrelation of phonological development and vocabulary knowledge for beginning readers*. While models of children's phonological development generally portray vocabulary development as a major influence on the specificity of phonological representations and phonological awareness (e.g., Metsala & Walley's Lexical Restructuring Model), research reports have not consistently reported a significant association between vocabulary knowledge and phonological awareness. This study examines (1) relations of different aspects of phonological sensitivity and measures of word knowledge for beginning readers and (2) the contribution of word knowledge, phonological development, and the interaction of these two traits to their reading achievement. Results suggest that lexical representations built on mutual reinforcement of sound-meaning relations play a significant role in the early stages of learning to read.

Ronald P. Carver (University of Missouri at Kansas City). *The role of orthographic processing speed in a causal model of reading achievement*. 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.

Hugh W. Catts (University of Kansas), Tiffany P. Hogan, Amy E. Barth, and Suzanne M. Adlof. *The simple view of reading: Changes over time*. We identified a large sample of children in kindergarten (N=600) and measured their reading achievement and language/cognitive abilities in 2nd, 4th, and 8th grades. In this poster, we consider the factors related to growth in word recognition and reading comprehension abilities from kindergarten through 8th grade.

Xi Chen (University of Illinois at Urbana-Champaign), and Richard C. Anderson. *Transfer of phonological awareness in Cantonese children learning to read Mandarin*. Investigated was the phonological awareness of first, second, and fourth grade children from Guangzhou, China, who were native speakers of Cantonese and received immersion Mandarin instruction at school. The study yielded three important findings. First, phonological awareness in Cantonese and Mandarin are highly correlated, which provides confirming evidence for the transfer of phonological awareness previously found between Western languages. Second, two clear factors emerged in a factor analysis, onset-rime awareness and tone awareness, while language was not an independent factor. This indicates that onset-rime awareness and tone awareness are the same constructs in the two languages. Third, children's development of phonological awareness is affected by both the phonological structure of Cantonese and exposure to reading instruction in Mandarin.

Joanna Christodoulou (Tufts University), Maryanne Wolf, Maureen Lovett, and Robin Morris. *Comprehension abilities and expressive and receptive language profiles of three impaired-reader subtypes*. The purpose of this study is to advance our understanding of possible differences in the expressive and receptive language skills and comprehension performance of three impaired-reader subtypes. Participants were 257 children in Grades 2-3 identified as having severe reading disabilities. Students were classified in subtypes based on the performance on naming speed and phonological tasks. The relationships between measures of expressive and receptive language and four measures of comprehension will be studied for each subtype. Implications for diagnosis and intervention are discussed.

Donald L. Compton (Vanderbilt University), Amy Elleman, Natalie Olinghouse, Jan Vining, and Amanda Appleton. *Modeling individual differences in skill generalization of children with reading disabilities enrolled in a structured decoding program*. Generalization and transfer of gains in phonological processing and nonword decoding skills to real word reading has turned out to be problematic for children with reading disabilities (RD). One exception to this rule is the PHAST

program developed by Lovett and colleagues (Lovett, Lacerenza, & Borden, 2000). PHAST has been shown to promote generalization of nonword decoding skills to real word identification in children with RD. The degree of generalization, however, has yet to be quantified. This study attempted to estimate individual differences in decoding skill generalization in approximately 40 children with RD enrolled in PHAST. To do this a theoretical word decoding curve was derived for the PHAST program and individual growth curves of each child were compared to this theoretical growth curve. The difference between an individual's growth curve and the theoretical growth curve is conceptualized as an individual measure of skill generalization that is then used to predict individual growth on standardized measures of reading skill during intervention.

Nicole Conrad (McMaster University), and Betty Ann Levy. *Training letter and orthographic pattern recognition in children with slow RAN performance*. Children with slow RAN performance participated in a training study that examined the benefits of two components of reading. Training consisted of speeded letter recognition followed by orthographic pattern recognition or the reverse. The question was whether training improved the speed of letter identification, and whether the effects of letter and orthographic training were additive. Results highlighted the importance of repeated practice with orthographic units. Letter naming speed improved only when preceded by orthographic pattern recognition training. Letter recognition training provided no additional benefit to orthographic training. Results are related to theories of the relationship between RAN performance and reading.

Pierre Cormier (Université de Moncton), Alain Desrochers, and Monique Sénéchal. *The relative importance of syllabic awareness in word decoding skills: evidence from native speakers of French*. The importance of syllabic structure in oral language is a feature that distinguishes French from English. In our current research program targeting the development of a battery of tests of reading skills in French, we examined the relation of syllabic awareness to word and pseudoword decoding in French across the elementary grades. Syllabic awareness was contrasted with letter sound knowledge and phonemic awareness. A sample of 308 young French Canadian readers from Kindergarten to Grade 6 were tested at the end of the school year on measures of phonological and syllabic deletion, letter naming, grapheme sounding, and oral reading of regular and irregular words. Descriptive findings indicated that a) syllabic deletion was easier than phonological deletion at all grade levels and performance increased steadily to reach about 90% at the end of Grade 6, b) the names of over 95% of the 26 letters and the sounds of over 80% of the 40 basic graphemes of French were known by the end of Grade 1 but sounding some of the graphemes was still difficult at the end of Grade 6; and c) reading words and pseudowords aloud improved consistently across grade levels. Regression analyses using grade level as a control and contrasting the relation of syllabic awareness to that of letter sound knowledge and phonemic awareness showed that syllabic awareness has a unique contribution to word, $b = .265$, $DR2 = .028$, $F(1, 265) = 39.43$, $p < .05$, and pseudoword decoding, $b = .249$, $DR2 = .025$, $F(1, 263) = 20.23$, $p < .05$. These effects of syllabic awareness changed through time as indicated by significant interactions with grade level for word, $F(1, 264) = 17.74$, $p < .05$, and pseudoword decoding, $F(1, 262) = 7.90$, $p < .05$. For word decoding, the strength of the relation of syllabic awareness became significant in grade 2 and waned in grade 5. That pattern was different for pseudoword decoding as the relation of syllabic awareness was significant only in grades 2 and 3. In contrast, phonemic awareness was significant across almost all grade levels for word decoding and all grade levels for pseudoword decoding. Although syllabic awareness appears to be an important feature of learning to read in French, it does not preclude the importance of phonemic awareness, one of the major contributors of learning to read in English.

Kathleen Corriveau (Harvard Graduate School of Education), Tami Katzir, Beth O'Brien, Robin Morris, Maureen Lovett, and Maryanne Wolf. *Timed and untimed reading performance in subtypes of dyslexia*. A primary question of this study involved the function of limited response time in word and nonword identification tasks. In the present study 160 severely impaired readers in second and third grade were classified according to the Double-Deficit Hypothesis and assessed on four nonword and word-level identification tasks, and a variety of fluency measures. The results

demonstrated that the subtypes showed differential accuracy scores as a function of limited time, with naming-speed deficit dyslexics showing the most sensitivity. Implications of these findings for research and practice are discussed.

Ann Coulter (University of Colorado, Colorado Springs), and Bonnie Grossen. *What works to raise the performance levels of middle schools serving high-need students*. Schools serving high poverty communities (where half or more of the students are performing in the bottom quartile) struggle to raise their schoolwide performance. A model for successfully accelerating the acquisition of standards, thereby raising scores, will be presented. Schools implementing this model reduce the number of students in the bottom quartile by one-third to one-half each year. The percentile for the mean raw score is raised 10 to 15 percentile points the first year. The factors of success in this model emphasize a focus on the interaction between teachers and students as the key. Consistent with this focus, a school needs carefully designed direct instruction curricula, program-specific professional development, in-vitro coaching, and continuous monitoring of progress and mastery.

Laurie E. Cutting (Kennedy Krieger Institute), Jeanne Wilkins, Joanna G. B. Schafer, Abigail A. Flower, James J. Pekar, Susan M. Courtney, Martha Bridge Denckla, and Stewart Mostofsky. *fMRI of sentence comprehension in adults: Preliminary findings*. fMRI has been used to examine the neural mechanisms underlying sentence comprehension; however, few studies have accounted for activation attributable to two fundamental components of sentence comprehension, single word reading (SWR) and working memory (WM). To address this issue, four normal adult readers completed fMRI a sentence comprehension task that was alternated with either a SWR or a WM task. Results indicated that activation was observed in bilateral occipital lobe and middle and inferior temporal gyri (L>R) for both sentence comprehension tasks. For the sentence comprehension vs. SWR contrast, additional activation was observed in medial frontal gyrus; for the sentence comprehension vs. WM contrast, additional activation was observed in frontal operculum (L>R) and right cerebellum.

Mary E. Dahlgren (Payne Education Center), Regina Boulware-Gooden, and R. Malatesha Joshi. *Multisensory instruction: Can it prove effective after elementary level?* A multisensory, explicit, systematic, structured approach was used in middle school language arts classrooms for a one year period. A matched control school used the standard language arts curriculum. All students were reading below the 50th percentile upon entering the program. Anovas were conducted for vocabulary, spelling and comprehension and p values as well as effect sizes reported. Results showed that the differences between the multisensory treatment group and the control group were statistically significant. This study gives further evidence for the use of a multisensory approach to teaching reading and spelling beyond the elementary grades.

Claire Davis (Oxford University), and Peter Bryant. *A longitudinal study on the impact of spelling rules on children's spelling and reading of vowels*. Our longitudinal study examined the changes in young children's use of the final e rule in reading and spellings, and the causes underlying these developmental changes. The 103 children were in Year-groups 2 (n=38), 3 (n=36) and 5 (n=29) when first tested, and were tested again a year later. Results from cross-lagged panel correlations revealed that in year-group 2, rote learning was the pacemaker for rule learning in children's spellings, and that the reading of real words predicted later use of the rule in spellings. Results give support for Frith's theory of reading and spelling development.

Peter F. de Jong (University of Amsterdam). *Early predictors of letter knowledge*. Despite the importance of letter knowledge for later reading, there seems little research on the cognitive abilities that affect its development. In this study, we examined the influence of phonological memory (nonword repetition) and rapid naming (objects) on the development of letter knowledge. Participants were 77 Dutch children, which were followed from the start of their first kindergarten year (age of 4.6) to the end of their second year. We found a substantial effect of phonological memory and a small

effect of rapid naming on the development of letter knowledge. General language skills (vocabulary) did not have an independent contribution.

Carolyn A. Denton (University of Texas Health Science Center Houston), Jason L. Anthony, Patricia G. Mathes, and Jack M. Fletcher. *Properties of Clay's Observation Survey of Early Literacy Achievement: Implications for early reading intervention research*. The Observation Survey of Early Literacy Achievement (OS; Clay, 1993) is widely used by Reading Recovery (RR) teachers and others to identify students at-risk for reading difficulties, plan instruction, and evaluate program effectiveness. This paper highlights characteristics of the assessment that may limit the tool's validity and reliability. We proceed with a comprehensive demonstration of the validity and reliability of the OS subtests in the context of a randomized and controlled early reading intervention study that included a small-group intervention with many elements in common with RR.

Nell K. Duke (Michigan State University), Joseph Martineau, Kenneth Frank, and V. Susan Bennett-Armistead. *The impact of diversifying genres in first and second grade literacy instruction*. This paper reports the results of a two-year experimental study of the impact of diversifying genres children read, write, and listen to in early schooling. Ten classes were followed through first and second grade as their teachers worked toward a balance of narrative, informational, and other texts; twenty additional classes provided Hawthorne and traditional controls. Children's overall and genre-specific reading and writing achievement and motivation was measured up to six times. Results indicate whether the current dominance of narrative text in the early grades is well-justified, or whether children would benefit from experience with a more diverse array of genres.

Linnea C. Ehri (Graduate Center of the City University of New York), Julie Rosenthal, and Marcy Zipke. *Contribution of alphabetic enrichment to the repeated reading of text for struggling readers*. Two treatment groups of 3rd-4th grade struggling readers were given practice rereading texts to accuracy and fluency criteria. One treatment group received alphabetic enrichment instruction as well. This included remediating children's graphophonemic knowledge and teaching them to fully analyze graphosyllabic connections to read harder words in the texts. Children (N=30) were tutored for 28 sessions. A no-treatment control group (N=15) was included. Preliminary analyses of findings revealed that the alphabetic treatment may have benefited text reading fluency. More complete analyses as well as preliminary findings from a second study will be presented. Fataneh Farnia (University of Toronto), Gloria Ramirez, and Esther Geva. *The relation between oral language proficiency and reading comprehension in ESL children*. This study investigated the relationship between Oral Language Proficiency (OLP) and reading comprehension of a sample of 86 children; 58 ESL and 28 native speakers of English. OLP was measured with receptive vocabulary (PPVT), expressive vocabulary (EOWPT), and grammatical awareness. Reading comprehension in Grade 1 was assessed with a series of narratives. Reading comprehension in grade 4 was assessed with Gate MacGinitie. Data were analyzed using correlation and multiple regression. OLP contributed to reading comprehension of both L1 and ESL children in Grade 1, however, the correlation was highly significant for the ESL group. OLP assessed in Grade 1 predicted reading comprehension of both language groups in Grade 4. Results also indicated differences in the contribution of OLP indices in reading comprehension of the two language groups in Grade 4.

Lee Farrington-Flint (Open University), Clare Wood, Dorothy Faulkner, and Katherine Canobi. *Identifying patterns of analogical development in children's early reading*. Although there is substantial evidence that young children can use orthographic analogies during early reading development, there is general disagreement regarding the skills often associated with their successful use. It is necessary to identify those factors critical to governing the successful use of orthographic analogies in early reading. This paper will report results from an ongoing study that set out to investigate whether various forms of analogical problem solving are an important prerequisite for orthographic analogy use in early reading. A sample of 60, five to six year old beginning readers will be assessed on various measures of phonological awareness, vocabulary, analogical reasoning ability and orthographic analogy use. Firstly, the study will examine whether children's performance on the

various analogy tasks can account for some of the variance attributed to orthographic analogy use in reading. Secondly, a cluster analysis will be used to identify whether distinct patterns of analogical problem solving ability based on the speed and accuracy of children's individual responses emerge. These findings may have important implications for cognitive developmental theory of reading development.

Lauren Figueredo (University of Alberta), and Connie Varnhagen. *Spelling and punctuation checkers don't hurt and can help*. We investigated whether the presence of spelling and punctuation checkers affected the order in which students revised text for content and surface features. Participants were asked to revise two essays on a computer, one with the aid of spelling and punctuation checkers, and the other with the aid of a dictionary. While the checkers helped the participants to revise text for spelling and punctuation, they did not affect students' overall revision processes. Our results are consistent with the view that checkers are effective in helping to detect and correct errors in text, yet do not inhibit or distract students from their revision goals.

Alexis Filippini (University of California, Santa Barbara), Judith English, and Michael C. Gerber. *A linguistic analysis of phoneme awareness task items across languages: Language specificity and item complexity for Spanish and English exemplars*. Results of a linguistic analysis of onset, rime and segmentation task items for task comparability are examined for assessments used in a three year study of cross language transfer of phonological and word reading skills (Project La Patera). Differences examined for each of the tests included place and manner of articulation of the initial phoneme(s), number of phonemes per item, syllabic differences and phonological context of the initial phoneme(s) for both the English and Spanish test items. The analyses compares these findings across the two tests administered to first graders in the beginning of Years Two and Three. Student performance on items is examined relative to auditory (speech) and orthographic characteristics such as syllables, rime and onset, and individual phonemes.. Data on task item differences and student performance are discussed relative to word length, coda interference, place confusion and other linguistic markers.

Jørgen Frost (). *Phonemic awareness, spontaneous writing, and reading and spelling development from a preventive perspective*. The study showed remarkable differences between two groups with high (HPA) versus low (LPA) phonemic awareness on entry into grade 1. Level of invented spelling at Time 1 was highly predictive of both reading and spelling ability at the end of grades 1 and 2, but only for the HPA group. With Time of Mastery regarding phonemic spelling as the independent variable and reading and spelling at the end of grade 2 as the dependent variable, regressions analysis indicated strong direct effects of early phonemic spelling upon later reading and spelling development, but only for the LPA children. The two groups showed different patterns of development in learning to read and spell during grades 1 and 2.

Michael M. Gerber (University of California, Santa Barbara), Judith English, Cara Richards, and Tisa Jimenez. *Cross-language effects of intensive phonological intervention for Spanish-speaking kindergarteners at risk for reading failure in English: A longitudinal investigation of early reading outcomes*. Results of early reading performance culminating from a three year longitudinal interventive study of relationships among English and Spanish measures of phonological processing for approximately 370 second grade EL students are presented, following up a preliminary analysis presented to SSSR in June, 2002. Year Two results (June 2002) suggested that development of phonological abilities is independent of characteristics of students' first (L1) language: Spanish phonological performance was observed to predict ability to perform similarly on parallel English tasks independent of English expressive proficiency. The present paper will relate findings to Year Three post-intervention measures, including English word decoding and early reading outcomes for varying levels of reading risk among ELs.

Esther Geva (University of Toronto), and Zohreh Yagoubzadeh. *What are the roles of cognitive processes and language proficiency in the development of reading fluency in ESL*

children? The research examined the extent to which (a) ESL and English-as-a-first-language (EL1) children resemble on various aspects of reading fluency, and (b) whether individual differences in reading fluency in ESL and EL1 children can be understood in terms of similar underlying component process. The overall sample consisted of 183 Grade-2, ESL children, and 70 native speakers of English as a first language children (hereafter, EL1). There were significant differences between the EL1 and ESL children on indices of oral language proficiency (vocabulary and syntactic awareness). In spite of an oral language proficiency advantage in the EL1 group, children in the EL1 group did not do better than the ESL children on any of the cognitive and reading measures. Hierarchical multiple regression analyses revealed that the most robust predictors of reading fluency (accuracy+speed Z scores) of simple narratives in both language groups were rapid automatized naming (RAN) and phonological awareness (PA). 40% of the variance in the ESL group and 33% of the variance in the EL1 group was explained by these two variables. Vocabulary, entered first, contributed 10% to the explained variance in reading fluency in the ESL group, but was not significant in the EL1 group. Additional analysis focussed on clusters of poor and good readers, defined in terms of performance on RAN and PA: High RAN+ High PA, low RAN+ High PA, and Low RAN+ Low PA and (i.e., "double deficit"). In both language groups children with good PA and fast RAN outperformed children in the other two subgroups on all the accuracy indices (e.g., word recognition, pseudoword reading), as well as on word and text fluency indices. Furthermore, children with good PA but slow RAN outperformed children in the "double deficit" group. Implications for reading fluency, L2 reading theory, future research directions and educational practices will be discussed.

Karen Ghelani (University of Toronto), and Rosemary Tannock. *Beyond the phonological core and naming deficits: Other relevant processes at work*. We investigated whether students with ADHD have reading difficulties in the absence of comorbid developmental reading disabilities (RD). We examined cognitive processing and reading abilities in adolescents with ADHD and RD. The RD group was impaired on all reading tasks and rapid alphanumeric tasks. The ADHD group was impaired on a rapid sight word reading task but not on alphanumeric tasks. Both groups were impaired on a visual span task. Inattention and spatial span measures were significantly associated with rapid sight word reading. Findings indicate the need to explore other contributing factors, such as visual processing and attention, in reading.

Margie Gillis (Haskins Laboratories), Anne E. Fowler, Susan A. Brady, Laura C. Palumbo, Joan B. Baron, Tara Smith, and Leonard Katz. *Building the bridge from research to practice: Teachers and students benefit from ongoing onsite support of reading instruction by research-trained mentors*. The Haskins Early Reading Success team seeks to improve reading instruction by K-3 teachers by offering ongoing onsite support from carefully selected external Fellows and site-based Teacher Specialists. In turn, these mentors receive extensive training in research and ongoing guidance by Haskins research scientists. Examination of students' scores after two years of school participation indicate significant improvement in spelling, word recognition and reading of connected text, when compared to scores of students after only one year of participation. Gains are most dramatic for students who began the project in kindergarten, indicating that early intervention is particularly effective.

Rebecca Godfrey (University of Auckland), and C. Fletcher-Flinn. *Fairness for all: A computerised measure of phonemic sensitivity*. A computer-driven discrimination task, testing for the identification of voiced/voiceless (phonemic) and pre-voiced/voiced (non-phonemic) contrasts was developed as a measure of phonemic awareness for young children. Comprehensive reading-related assessments were conducted for 180 children aged 4 to 8 years attending New Zealand kindergartens or schools varying in the amount of pre-reading/reading instruction and also in instructional method along the whole-language/phonics continuum. Results were analysed as a function of each sub-skill from the assessment battery and most correlated significantly with the discrimination task. Comparisons were made across instructional methodologies. Speech-contrast discrimination across age varied significantly and will be compared with theories on the development of speech perception.

Vincent Goetry (Queen's University), Philippe Mousty, and Régine Kolinsky. *The relationship of stress processing abilities to lexical and reading development in bilingual children schooled in their second language*. In the last decades, second language acquisition through "immersion" has gained widespread acceptance, first in Canada and since then in Belgium. The results of extensive, systematic evaluations of immersion programs in a number of Canadian settings have provided strong evidence that immersion programs are remarkably effective. However, these evaluations of immersion programs have mainly concerned English-speaking children attending a French immersion program. Therefore we will try to find out if this results can be applied to immersion programs organised in Belgium. Moreover, few of these previous studies have focused on the fundamental cognitive processes characterising literacy acquisition in a second language. Our study focuses on these processes.

Robert F. Goldberg (University of Pittsburgh), Charles A. Perfetti, and Walter Schneider. *Representation of word meaning: Behavioral and neuroimaging evidence*. This poster addresses how the brain represents the meaning of words to allow for both metaphoric flexibility and scientific precision. Using behavioral and fMRI methods, our research investigates how abstract and variable semantic knowledge, like the category 'living thing', is organized and processed. The behavioral results show that feature representations learned early in childhood remain embedded within the semantic system. The neuroimaging results suggest that those items that cause behavioral difficulty are activated differentially from items that belong to the same semantic category. These results support the notion that word meaning relies on a distributed but selective feature-based cortical network.

Alexandra Gottardo (Wilfrid Laurier University), Penny Chiappe, Linda S. Siegel, and Adèle Lafrance. *A comparison of phoneme categorization performance in ESL and native English-speaking adults*. The performance of 28 adult English as Second Language learners was compared to 28 native English-speaking adults (EL1). The participants were recruited from a clinic sample. The groups were matched on reading measures. They showed no group differences on measures of reading, achievement, aptitude or phonological awareness. The EL1 group had a significantly steeper identification function on the phoneme categorization task than the ESL group, indicating that the ESL group did not have as well defined category boundaries for common English phonemes. These findings point to differences in the categorization of phonemes between ESL and EL1 adults despite identical reading performance.

Elena L. Grigorenko (Yale University), Christina Romano, Matthew Jukes, and Damaris Ngorosho. *Genetic studies of reading difficulties in Kiswahili-speaking children*. The study utilizes two different nonoverlapping subsamples of a large cohort of Tanzanian primary-school students screened with reading achievement tests. The first subsample included sibpairs, ascertained through a sibling with a reading problem. The second subsample was a case-control sample. The sibling pairs were evaluated with a battery aimed at reading-related processes. Only educational measurements were used in the case-control sample. The sample of sibling pairs was subjected to a linkage analyses with sets of markers on chromosomes 2, 6, 15, and 18. The linkage analyses resulted in positive signals that were reevaluated in the case-control subsample.

Yan Gu (Wilfrid Laurier University), Alexandra Gottardo, Bernice Yan, and Linda S. Siegel. *Examining the relationships among spelling, reading, phonological and orthographic processing measures in Chinese ESL children*. Spelling, reading, phonological and orthographic performance was measured in 48 Chinese ESL children. Relationships between second language (L2) spelling and potential factors related to spelling were examined. Correlational analyses showed that L2 but not L1 reading performance was significantly related to L2 spelling performance. Phonological and orthographic processing in each language were correlated significantly with L2 spelling. Regression analyses revealed that 1) phonological measures in both L1 and L2 accounted for variance in L2 spelling and 2) orthographic measures in L2 but not L1 contributed to L2 spelling. These results

increase our understanding of the interaction between universal and specific processes of reading and writing acquisition.

Bente E. Hagtvet (University of Oslo), Erna Horn, and Solveig A. H. Lyster. *Connections between spoken and written language: Early precursors of written problems*. Problems in learning to read and spell are typically associated with a low sensitivity to the phonological structure of language. The present study includes a broader language perspective. We investigated the relationships between phonological, syntactic and semantic skills at ages two through six and later reading and spelling skills. A sample of 70 Norwegian speaking children of dyslexic parents participated in the study. They were followed longitudinally from age two through age nine. The results underscore the predictive power of semantic and syntactic variables, in addition to phonological factors. Findings are interpreted with reference to a developmental model involving the whole language system, and with due respect to the unique contributions made by different oral language skills at each developmental stage.

Julie Hansen (Queensland University of Technology), and Judith A. Bowey. *Is there a naming speed deficit in developmental reading disability? A reading-level comparison test of the double-deficit hypothesis*. Two 3-group reading-level studies tested the prediction of the double-deficit hypothesis that poor readers have deficits in symbol naming speed in comparison to reading-level matched controls. In both studies, poor fourth-grade readers performed below the level of CA and RL controls on nonword reading and phonological awareness, but at the same level as RL controls on naming speed. Measures of word-reading latency, assessed in Study 2, revealed that poor readers had shorter reading latencies than RL controls. The double-deficit hypothesis was not supported. No deficit in symbol naming speed was found among poor readers in comparison to younger normally-developing readers.

Nicole Harlaar (Institute of Psychiatry), and Robert Plomin. *Associations between non-verbal, language and reading abilities: A behavioral genetic perspective*. The aetiology of associations between non-verbal ability, language, phonological decoding, and sight-word reading was explored in a population sample of 2,655 pairs of 7-year-old twins. Non-verbal ability correlated weakly with the language, phonological decoding, and reading measures, both phenotypically and at an aetiological level. Associations between language and the phonological and reading measures were modest and primarily mediated genetically. A separate genetic influence was identified that acted on phonological decoding and sight-word reading, which were substantially correlated phenotypically. These skills also showed highly similar aetiological profiles. Implications for molecular genetic studies are discussed. Laura Boynton Hauerwas (Providence College), and Joanne Walker. *Spelling of inflected verbs in early elementary students*. Evidence suggests that, as spelling develops, children are influenced by their phonological, morphological and orthographic abilities. Our study examined early elementary students' ability to integrate phonological, morphological and orthographic information when spelling inflected verbs. To address this, participants were given a series of spelling and metalinguistic awareness tasks. Results suggested that the students' ability to include the inflected endings as well as represent them phonologically, morphologically and orthographically in their spelling improved across the first three grades. Their spelling development of inflected verbs was related to an increase in linguistic and orthographic awareness skills.

Steven Alan Hecht (Florida Atlantic University). *Emergent literacy skills and training time uniquely predict variability in responses to phonemic awareness training in disadvantaged Kindergartners*. Factors predicting variability in responses to phonemic awareness training were investigated with two samples of economically disadvantaged kindergartners. Effect sizes for post-test phonemic awareness were comparable between samples. Pretest assessments included phonemic awareness, letter knowledge, reading, invented spelling, verbal ability, and print concepts. Invented spelling skills emerged as the best consistent predictor of emerging phonemic awareness. Relations between phonemic awareness and spelling are bi-directional. Interestingly, fidelity of treatment intervention contributed uniquely to variability in post-test levels of phonemic awareness and spelling,

providing important evidence that children can benefit from greater amounts of phonemic awareness instruction independently of their initial abilities.

Connie Suk-Han Ho (University of Hong Kong), David WAI-Ock Chan, Agnes Au, Suk-Man Tsang, Suk-Han Lee. *Reading-related cognitive deficits in developmental dyslexia, ADHD, DCD, and borderline intelligence among Chinese children*. The present study examined reading-related cognitive deficits on 108 Chinese children. These children were grouped according to their learning disabilities, namely developmental dyslexia (DYS), attention-deficit/hyperactivity disorder (ADHD), developmental coordination disorder (DCD), or borderline intelligence (BI). They were tested on literacy, rapid naming, phonological, orthographic, and visual processing. It was found that (a) the ADHD and DCD groups performed similarly, but better than the DYS and BI groups in most of the tasks; (b) the DYS group performed better than the BI group in most cognitive measures, except rapid naming and literacy; and (c) the DYS group was the poorest in literacy and rapid naming. The authors conclude that rapid naming deficit is the marker deficit for Chinese developmental dyslexia.

Angelia Holcomb (Texas A&M University), Regina-Boulware Gooden, Emily Ocker, and R. M. Joshi. *Decoding, comprehension, and fluency: Developmental changes*. In the 1991 report by the National Research Council a fluent reader will have adequate skills in decoding, comprehension, and fluency. This finding was empirically supported by the componential model of reading which is an extension of Gough's simple view of reading. The componential model of reading hypothesizes that reading equals decoding multiplied by comprehension plus fluency. This model was applied to Chall's developmental thought that children learn to read in first through third and then read to learn fourth and above.

Sherri L. Horner (Bowling Green State University). *Young children's knowledge about reading, environmental print, and words*. This study investigated the relationship between young children's knowledge of environmental print and word reading. There are two alternative perspectives on the role of environmental print in learning to read. Therefore, the researcher used methodology and reading outcomes that have been used by proponents of both perspectives to compare these alternative theories. One hundred and thirty-three preschool through second graders were assessed on alphabet naming, primer word reading, and five researcher-developed environmental print tasks. Results showed that the vast majority of children attempted to make meaning in the more contextualized measures but only those children who could read primer words could also read the decontextualized environmental print words.

Michelle K. Hosp (University of Utah), and Lynn S. Fuchs. *The relation between oral reading fluency and decoding, word reading, and comprehension across grades 1 through 4*. The purpose of this study was to examine the relation between oral reading fluency as defined by rate and accuracy with criterion measures of decoding, word reading, and comprehension across grades 1 through 4. While oral reading fluency encompasses decoding, word reading, and comprehension, this study provides evidence that the relation is not equally strong across these areas, nor is it similar across grades. With the increasing emphasis on oral reading fluency it is important to determine what reading skills are more closely related to oral reading fluency and how this relation changes across grades.

Roxanne F. Hudson (Washington State University), and Holly B. Lane. *Reading-writing connections: Compositional fluency of developing writers under various priming conditions*. This study addressed two questions related to the effects of priming conditions on the writing of second graders ($n = 195$): What are the effects of priming conditions on the whole group? and Would these effects be found among smaller subgroups based on measures related to compositional fluency? Students wrote six narratives in response to story starters presented in different ways (copying, dictation, discussion, discussion-copying, discussion-dictation, and topic). Data were collected on measures related to compositional fluency. An ANOVA with repeated measures showed that priming

condition and writing occasion were significant effects. Theoretical implications and implications for classroom practice are discussed.

Jacqui Hulslander (University of Colorado, Boulder), and Richard Olson. *The identification and utilization of nonword repetition items which maximally discriminate good and poor readers.*

Nancy Ewald Jackson (University of Iowa). *Do university students' reading skills matter?* Reading skills of 193 university sophomores and juniors were examined with tests of component skills and text comprehension, including ACT Reading Composite scores. Three orthogonal principal components described the reading scores: Word Recoding Accuracy, Reading Speed, and Text Comprehension Accuracy. Only Text Comprehension Accuracy was at all related to grade-point average (GPA; $r = .15$). Cluster analysis, using a broader set of measures that included self-reports of reading and spelling ability and tests of phoneme awareness and spelling, identified four distinct groups of students: Good Readers, Typical Readers, Struggling Readers, and Hasty Readers. These groups were similar in mean GPA.

Debra Jared (University of Western Ontario), Pierre Cormier, and Betty Ann Levy. *Early reading development in French immersion.* Many Canadian parents would like their children to be able to speak and read in both official languages of the country. Consequently, early French Immersion is a popular educational placement for anglophone children in Canada. In French Immersion programs, children begin formal schooling, including learning to read, in a second language that is often a minority language in their environment and a language that their parents typically do not speak well. We report the first year of a longitudinal investigation of the reading development of 222 anglophone children enrolled in French Immersion programs. Children from four different Canadian cities in Ontario and New Brunswick were tested in Kindergarten and again in Grade 1. The amount of French instruction in Kindergarten varied across the sites from 100% of the day to 0%, and in Grade 1 from 100% to 50% of the day. An important issue addressed in our study concerns the relationship between Kindergarten oral language skills and reading ability in Grade One. We investigated whether children who have better vocabulary and syntactic knowledge in their first language in Kindergarten were more likely to successfully learn to read in their second language and whether children who acquire more oral French in Kindergarten were more likely to be successful readers of French in Grade 1. We also examined whether home variables such as parents' ability to speak French and the child's exposure to French in the home was related to French reading ability. Furthermore, we investigated whether the same or different levels of phonological awareness (syllable, onset-rime, phoneme) in Kindergarten predicted success at reading in French and in English in Grade 1.

Tim Johnston (Queen's University), and John R. Kirby. *Does naming speed complicate the simple view of reading?* The Simple View of reading (Gough & Tunmer, 1986) proposes that the product of decoding and listening comprehension equals reading. Joshi and Aaron (2000) found that a letter naming speed test added significantly to the simple view in predicting reading comprehension. We investigated this hypothesis in a larger group of grade 3 children ($n = 152$), and added a control for phonological awareness. We found that grade 3 picture naming speed added significantly to the prediction of grade 3, 4 and 5 reading comprehension, after controlling for the simple view variate and phonological awareness. We discuss an up-dated Simple View.

Leslie Katch (University of Michigan), Frederick J. Morrison, and David Shilt. *The effect of early home literacy environment on academic skills: Multiple pathways to reading success.* Research has provided evidence of the important influences a rich home literacy environment has on children's academic skills (eg., vocabulary, word-decoding skills, and work-related skills; Morrison & Cooney, 2001). The present study examines multiple pathways through which the early home literacy environment affects 2nd and 3rd graders' end of year reading decoding skills. Path analysis illustrated early home literacy as directly affecting work-related skills, which in turn influenced end of year

decoding scores in 2nd and 3rd graders. Home literacy also directly impacted fall vocabulary, which predicted fall decoding at levels approaching significance. The influence of early home literacy environment on decoding skills demonstrates the importance of a rich home literacy environment during the early years of development.

Tami Katzir (Harvard Graduate School of Education), Beth O'Brien, Robin Morris, Maureen Lovett, and Maryanne Wolf. *Predicting fluent reading in dyslexic readers: The whole is more than its parts*. A primary question of this study involved the ability of naming speed, orthographic and phonological processing measures, as well as, word level reading to predict fluent reading. A working developmental-componential fluency model was proposed in which different reading levels, processes, and systems function as contributors to reading fluency. In the present study 160 severely impaired children in second and third grade were assessed on a variety of fluency measures and reading subskills. The results demonstrated that a combination of naming speed, phonological, orthographic, and word reading measures only partially predicted fluent reading. Implications of these findings for research and practice are discussed.

Janice M. Keenan (University of Denver), and Rebecca S. Betjemann. *Lexical computations in skilled reading and dyslexia*. We assessed the computational architecture of the mental lexicon in skilled and dyslexic readers (8 years to college-age) using combinatorial priming in lexical decision. Combinatorial priming assesses activation from a prime that combines both phonological/graphemic and semantic relatedness, such as FLOAT for the target BOAT, relative to primes related on only one dimension, e.g., GOAT or SHIP. All readers showed more priming from combinatorial primes than single-dimension primes. Combinatorial priming was clearly additive for skilled readers, but less so for dyslexic readers. Implications for the functioning of semantic and phonological/graphemic units in the computational processes of the lexicon are discussed.

Nenagh Kemp (University of Manchester). *Pronunciation-based spelling differences between British and Australian children and adults*. British and Australian adults and 6- to 7-year-old children spelled 24 words whose final vowel sound is spelled i or e, and pronounced either /i/ or /schwa/, depending on accent. Participants in both age groups tended to (mis)spell vowel sounds as they pronounced them; for example British children often wrote rockit and muffin, whereas Australian children wrote rocket and muffen. These results support the idea that sound-based spelling is not restricted to children's writing, and then superseded by more sophisticated strategies (Pennington et al., 1987), but is also used by adults when they encounter difficult words (Treiman & Barry, 2000).

Gary R. Kidd (Indiana University), Charles S. Watson, 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, grades 1-4*. The Benton-IU Project is a multidisciplinary, epidemiological-longitudinal investigation of predictors of academic achievement in elementary school. An extensive test battery of individually-administered standardized cognitive, linguistic, sensory, and perceptual tests was given to all children entering first grade in the four elementary schools of Benton County, Indiana, over a three-year period (N= 472). The children were retested in the fourth grade. An earlier report summarized preliminary findings from the first two grades. This report focuses on the relation between measures from the first and fourth grade testing, using path and cross-lagged analyses to assess the causes of reading failure.

John R. Kirby (Queen's University), Melissa Bell, and Hélène Deacon. *Grammatical awareness and the spelling of grammatical morphemes*. Nunes, Bryant and Bindman (1997) developed a Sentence Analogy measure of grammatical awareness related specifically to verb past tenses, and showed that it was predictive of success in spelling the ed ending of real verbs. We examined the ability of the Sentence Analogy test, administered in grades 2, 3, and 4, to predict the spelling of grammatical morphemes (e.g., -s, -ed, -ing) in pseudoverbs in grade 4. The Sentence Analogy effect was significant in every grade, and survived separate controls for intelligence,

phonological awareness, phonological memory, naming speed and spelling ability. The effect was not confined to ed endings.

Trudy Kwong (University of Alberta), and Connie K. Varnhagen. *Hear's the problem: Long-term effects of auditory processing on spelling ability*. Introductory psychology students at University of Alberta completed linguistic and nonlinguistic auditory tasks, standardized spelling tests, and retroactive spelling strategy reports. Spelling ability was correlated with linguistic, but not nonlinguistic, processing. We used a median-split to divide students into phonological versus nonphonological spellers. We found that the correlation between linguistic processing and spelling ability existed only for the phonological spellers; alternate strategies allowed spellers to circumvent less accurate processing. Furthermore, no correlation was found between linguistic processing and use of phonology, suggesting that instruction may be beneficial in helping spellers choose strategies adaptively. A child comparison study is currently underway. Adele Lafrance (Wilfrid Laurier University), and Alexandra Gottardo. *English reading development in French-speaking children*. Forty-two children with French as their first language (L1) were tested in Senior Kindergarten. Measures of reading and phonological processing were administered in English and French. The strongest predictors of English word reading were French word reading and French phonological awareness. The strongest predictors of French word reading were English word reading and French phonological awareness. This finding demonstrates that a relationship exists between L1 phonological awareness and reading in both L1 and L2; word decoding ability transferred across languages. Similar analyses will be conducted on Grade 1 data that is currently being collected from the same children.

Karin Landerl (University of Salzburg), and Pieter Reitsma. *Orthographic memory and memory for number facts*. Many dyslexic children show problems in arithmetic skills too. However, the connection between these two learning disabilities is not very well understood. One explanation might be that the build up of orthographic memory and memory for numerical facts is based on similar mechanisms. To examine the association between these two types of knowledge acquisition, a word learning and a number fact learning task (repeated presentation of words and simple additions) were carried out with children at the beginning of 2nd grade with relatively poor math and reading skills. The learning curves on accuracy and response times for trained for word spellings and number facts will be compared and will demonstrate whether processes of storage in both domains are related.

Nicole Landi (University of Pittsburgh), and Charles A. Perfetti. *A time course for lexical activation in skilled and less skilled readers*. Behavioral studies of word identification, utilizing priming and masking paradigms and eye tracking have shown that both orthographic and phonological information is available to readers early on in word processing — usually before semantic information (Perfetti & Bell, 1991; Lukatella & Turvey, 1994; Lee, Rayner & Pollatsek, 1999). The current study uses behavioral and eye tracking methods to investigate the time course for the availability of orthographic, phonological and semantic information across reading skill levels of adult college students. The study focuses on comparing orthographic and phonological form priming as well as semantic priming for skilled and less skilled readers.

Holly B. Lane (University of Florida), Martha B. League, Stephanie Al Otaiba, Joseph Torgesen, and Paige C. Pullen. *Leave no teacher behind: Using structured tutoring experiences to prepare teachers to apply scientifically based reading research*. Tutoring for struggling beginning readers is becoming a common approach to intervention. In some popular tutoring programs, the role of tutor preparation is emphasized. This study compared Reading Recovery with another tutoring model that uses similar materials and methods but requires substantially less tutor preparation. The purpose of the study was to determine differences in the effects of the two models on student achievement for struggling beginning readers. The student outcomes on several measures of reading achievement were not significantly different in the two models.

Alba B. Langenthal (Graduate Center of the City University of New York), Linnea C. Ehri, and Carla Langenthal. *How do novice and experienced first-grade teachers evaluate reading ability in their students?* This study examined ten experienced and ten novice first-grade teachers' knowledge of the development of reading skills in beginners. The independent variables were (1) experience teaching beginning reading and (2) amount of training in reading instruction and the structure of language. Dependent variables included working knowledge, assessment practices, content knowledge, teaching efficacy, and theoretical orientation to reading. Results showed group differences in teachers' references to non-academic factors affecting their students' reading progress. Significant relationships were observed among teachers' training, their content knowledge, and their assessment practices. Results suggest that teacher training positively influences teachers' knowledge and assessment practices.

Mark Lauterbach (Graduate Center of the City University of New York), and Michael Evans. *Spelling development in early elementary students and the contribution of classroom factors.* This study investigates growth of student spelling development in kindergarten through second grade, and explores the contribution of teacher and instructional factors to this process. Students from seven inner-city parochial schools will be given developmentally structured spelling tests at 4 times over the school year. The teachers will be assessed on 4 main factors: teaching experience and training, knowledge of the reading and spelling processes, instructional practices, and time spent on instruction. A 3-level hierarchical linear model repeated measures design will be used to model the individual subject's growth and explore the contributions of individual and classroom level variables.

T. V. Joe Layng (Headsprout, Inc.), Janet S. Twyman, and M. A. Stikeleather. *Headsprout Reading: The research base.* For a beginning reading program to be successful, the National Reading Panel (2000), among others, has identified critical program constituents scientific investigation has determined as essential. Headsprout, a privately-funded company, has taken the approach that teaching skills and strategies critical to successful reading requires the same commitment to a scientific approach, as does the scientific study of reading itself. Headsprout Reading is the result of the marriage of reading science with learning science. This presentation provides a detailed description of the single-subject control analysis methodology employed in the over two-year effort to scientifically design and test Headsprout Reading, a fully learner verified, Internet-based, beginning reading program for young learners.

Martha B. League (University of Florida), Holly B. Lane, Paige C. Pullen, and Tabatha Scharlach. *Tutoring struggling beginning readers: A comparison of tutoring models and tutor preparation.* Tutoring for struggling beginning readers is becoming a common approach to intervention. In some popular tutoring programs, the role of tutor preparation is emphasized. This study compared Reading Recovery with another tutoring model that uses similar materials and methods but requires substantially less tutor preparation. The purpose of the study was to determine differences in the effects of the two models on student achievement for struggling beginning readers. The student outcomes on several measures of reading achievement were not significantly different in the two models.

Katia Lecocq (Laboratoire de Psychologie Expérimentale), Philippe Mousty, Régine Kolinsky, Vincent Goetry, José Morais, and Jesus Alegria. *Longitudinal study of metaphonological development and of reading and spelling processes in children attending an immersion program.* In the last decades, second language acquisition through "immersion" has gained widespread acceptance, first in Canada and since then in Belgium. The results of extensive, systematic evaluations of immersion programs in a number of Canadian settings have provided strong evidence that immersion programs are remarkably effective. However, these evaluations of immersion programs have mainly concerned English-speaking children attending a French immersion program. Therefore we will try to find out if this results can be applied to immersion programs organised in Belgium. Moreover, few of these previous studies have focused on the fundamental cognitive

processes characterising literacy acquisition in a second language. Our study focuses on these processes.

Annukka Lehtonen (University of Oxford), and Peter Bryant. *The relationship between phoneme and morphological awareness and children's spelling in Finnish: A longitudinal study*. Earlier studies in regular orthographies have concentrated on investigating how either phonemic awareness or morphological awareness affects spelling. Our study aimed to answer two questions: How do these metalinguistic skills affect spelling development across time, and is there a reciprocal relationship between spelling and metalinguistic awareness in Finnish? Children did phoneme Oddity and Tapping tasks, a pseudo-word inflection task and a spelling task in December and April of Year 1 and December of Year 2. Both phoneme and morphological awareness were significant and independent predictors of spelling a year later, and spelling also predicted the development of later metalinguistic skills.

Che Kan Leong (University of Saskatchewan), Pui Wan Cheng, and Li Hai Tan. *Orthographic and phonological sensitivity both important in learning to read and spell English as L2*. It was hypothesized that sensitivity to both orthographic and phonologic structure of English is important for Chinese children learning to read and spell English as a second language (L2). From a battery of 13 group and individual orthographic and phonologic tasks given to 156 grades 4, 5 and 6 Chinese children in Hong Kong six experimental tasks from hierarchical multiple regression analyses explained 76% and 70% respective of English reading and spelling. Linear structural equation modeling (LISREL 8.51) shows the model with the two separate though related latent constructs of orthographic and phonologic sensitivity to provide the best fit for "literacy."

Nonie K. Lesaux (University of British Columbia), and Linda Siegel. *The development of reading in children from diverse backgrounds: A longitudinal latent growth curve analysis*. The prevalence of reading failure is higher in low-income populations, and in individuals with English as a second language (ESL). The participants of the 5-year longitudinal study are all of the children who entered kindergarten a school district. In kindergarten, all children identified as at-risk for reading failure received intervention to augment their pre-reading and language skills. The development of reading of the participants from kindergarten to grade 4 was examined using individual growth curves. The results show that it is possible to mediate the negative effects of socioeconomic status and ESL status through early intervention for at-risk children.

Valerie Marciarille LeVasseur (University of Connecticut), Paul Macaruso, Laura Conway Palumbo, and Donald Shankweiler. *Cuing linguistic structure promotes fluent reading: A confirmation*. Is fluency in reading facilitated by marking major syntactic boundaries in text? Third graders read aloud passages of varying difficulty under two text format conditions: In one condition, ends of lines coincided with ends of clauses; in the other, line breaks always interrupted a major constituent. The results show that text formats that avoid interrupting phrasal units result in fewer false starts at the beginning of lines following a return sweep. The findings confirm and extend our earlier results, indicating a benefit of phrasal cuing in promoting fluent reading, especially for weaker readers.

Iris Levin (Tel Aviv University), and Dorit Aram. *Children and mothers use children's names as source of letters: Sociocultural perspective*. Kindergartners use letters from their names in spelling (Treiman & Kessler). We analyzed this phenomenon from a socio-cultural perspective. The use of own name letters was shown to be prevalent among low SES, and absent among middle-high SES kindergartners; Low SES mothers were sensitive to their children's greater familiarity with their written name and used it in joint-writing. The difference between social groups was interpreted as a function of children's level of writing, as the phenomenon is typical for children who are unaware of the alphabetic principle. Mothers' sensitivity allows them to act within the child's ZPD in mediating writing.

Betty Ann Levy (McMaster University), Zhiyu Gong, Mary Ann Evans, and Debra Jared. *Emergence of orthography*. Young children's understanding of the conventions of print and spelling develops rapidly from preschool to early school years. 450 children, aged 4 to 7 years, performed 2-alternative forced choice tasks that required them to discriminate acceptable from unacceptable printed forms. The unacceptable print varied across 13 dimensions, from graphic violations (scribbles, pictures, alignments etc.) to abstract understanding of English spelling. The 13 dimensions separate into 3 more general groupings of knowledge about print and spelling that showed different growth curves. Home literacy information was used to determine how early literacy experience relates to the child's knowledge about print and spelling.

Orly Lipka (University of British Columbia), and Linda S. Siegel. *How do native language skills impact the reading and spelling in English as a second language*. This longitudinal study examined reading and spelling development of 100 ESL children from seven language families in kindergarten and grade 3. Reading, spelling, phonological processing, syntax, lexical access and memory skills were assessed in kindergarten. Additional tasks were incorporated into the battery to assess cognitive and reading processes in grade 3. Results indicated negative and positive transfer from the first language to the second. Students from different language groups performed differently on the reading and spelling tasks, based on first language skills. The presentation discusses unique characteristics of different languages and their impact on learning English as a second language.

Deborah G. Litt (University of Maryland). *The incidence and influence of phonological awareness and naming speed deficits among children learning to read in Reading Recovery*. Fifty-nine children who entered Reading Recovery in Fall, 2001 were tested on phonological awareness and rapid object naming pre and posttreatment. Students were classified along the dimensions proposed under the double-deficit hypothesis. A high incidence of phonological awareness and naming speed deficits were found pretreatment—close to half were double-deficit; only 1 child was no deficit. Skill in both areas improved during Reading Recovery instruction—20.4% were no-deficit posttreatment. Stronger reading outcomes were associated with overcoming deficits.

Ying Liu (University of Pittsburgh), Charles Perfetti, and Min Wang. *Priming and interference in reading Chinese by English readers*. American colleges students enrolled in a Chinese language course participated in a year-long learning study. Two experiments were reported in current presentation: a primed naming experiment and a pronunciation and meaning judgment experiment. Results from the primed naming experiment showed priming effect for graphically similar and homophone character pairs. More interesting, homophone interference occurred when subjects made judgments of meaning similarity, suggesting that with enough learning, L2 readers, like native speakers, activate phonology when reading for meaning. It appears that 4-6 months of classroom learning is necessary to observe the automatic activation of phonology. Paul Macaruso (Community College of Rhode Island), and Donald Shankweiler. *Relationship between spelling success and reading exposure*. There is much debate in the literature regarding the extent to which spelling success is affected by reading exposure. Adults spelled a set of "difficult to spell" words (e.g., champagne) on three occasions, were exposed to the correct spellings on five occasions, and then spelled the words again on two occasions. Reading exposure lead to temporary improvement in spelling but performance dropped to baseline after one week. Improvement was not a function of overall spelling ability. However, consistency of spelling errors was related to spelling ability. These results point to the limited degree to which reading exposure impacts spelling success.

Sharon MacCoubrey (Queen's University), and Lesly Wade-Woolley. *Phonemic awareness training of at-risk French immersion kindergarten students*. The present study examines the effects of two types of French language training programs on phonological awareness development and word reading in at-risk English native-speakers enrolled in the French Immersion (FI) kindergarten program. At-risk students are assigned to training in either: (a) phonemic awareness (PA), in which the students receive explicit instruction in phoneme analysis and synthesis; or (b) vocabulary enrichment (VE), in which students receive lessons focusing on vocabulary building and

oral language development. Three testing sessions (pre- / post-tests) are used to evaluate the effectiveness of the training. The findings contribute to the development of second language reading acquisition theories.

Frank Manis (University of Southern California), Kim A. Lindsey, and Caroline E. Bailey. *Four-year longitudinal study of reading development in English language learners*. The study examined developing relationships among language and reading skills in 220 Spanish-speaking children learning to read English in an early-exit bilingual program. The children were tested in Spanish in kindergarten and in English and Spanish in grades 1 to 3 on a battery of theoretically important predictive and outcome measures. Results showed that letter knowledge and phonological awareness were the most consistent predictors of later reading skills within and across languages. RAN tasks accounted for substantial independent variance in fluency, but not accuracy measures in 3rd grade. Expressive vocabulary had language-specific predictive relationships to later reading comprehension.

Vanessa E. G. Martens (University of Amsterdam), and Peter F. de Jong. *The use of orthographic knowledge in pseudoword reading by dyslexic and normal readers*. In this study, we investigated dyslexic children's use of orthographic knowledge in pseudoword reading. Dyslexic children, Chronological Age controls, and Reading Age controls read a set of one-syllable pseudowords composed of high or low frequent bigrams, in either lower or MiXeD CaSe. Case mixing was assumed to prevent the use of sublexical orthographic knowledge. All three groups read high frequent bigram words faster than low frequent ones. Case mixing slowed down both control groups, but did not affect the dyslexics' latencies. These results suggest that dyslexics do have orthographic knowledge at some level, but do not integrate this knowledge in the same (efficient) way as do both control groups.

Sandra Martin-Chang (McMaster University), and Betty Ann Levy. *Contextual facilitation and fluency of transfer: Evidence from good, poor, and average readers*. Two experiments examined the transfer of reading fluency as measured by the increase of reading accuracy, speed, and comprehension of novel test passages following two experimental training programs. Context Training contained target words that were embedded in children's stories, and List Training presented words in isolation. Good and Poor readings in Grade 4 and average readers in Grade 2 were examined. Results indicated that readers of all ability showed speed benefits on transfer texts from both types of training compared to control. However, the increases in speed were larger for all readers following context training compared to list training.

Imola Marton (University of Toronto), and Esther Geva. *Dynamic approaches to understanding reading efficiency in English monolingual and bilingual primary level children*. Individual growth curves and regression models are used to analyze the development of reading efficiency in monolingual (EL1) and English as Second Language (ESL) children. Growth curve models may provide a more dynamic measure of reading efficiency than the traditional regression approach, because they are more sensitive in capturing individual differences in the rate of change over time. It is hypothesized that efficient readers are characterized by steeper growth curve trajectories on measures of rapid automatized naming (RAN) and phonological awareness (PA) than non-efficient readers in both language groups.

Linda H. Mason (University of Illinois). *Two strategies for reading comprehension: Effects on performance for 5th-grade students who struggle with obtaining meaning from expository text*. The effectiveness of two expository reading comprehension strategies on oral reading comprehension performance of 32 fifth-grade students with and without disabilities who struggled with reading was examined in this experimental group design study. Students received explicit instruction in either Think Before Reading, Think While Reading, Think After Reading (TWA) with self-regulated strategy development or reciprocal questioning (RQ). Analysis of Covariance was used to analyze results from 5 oral comprehension measures obtained at pretest, posttest, and maintenance.

Results indicated that students in TWA had improved performance when compared to students in RQ. Medium and large effect sizes were obtained.

Michael F. McKay (Australian Catholic University), G. Brian Thompson, and Claire M. Fletcher-Flinn. *A disassociation effect of explicit phonics instruction on the reading strategies of low progress beginning readers.* This is a cross-national study of matched samples of low-progress beginning readers, one receiving explicit phonics instruction, the other not. In text reading, the children were equal in word accuracy and comprehension. However, the nonphonics sample was superior in speed of text reading, despite their inferior phonological recoding, as shown in speed and accuracy of reading pseudowords. The latter was in part due to their failure to use a 'sounding-out' strategy. In text reading the incidence of 'no overt response' and of 'sounding out' did not differ significantly. The higher reading speed probably derived from greater use of implicit lexical processes.

Adrine McKenzie (University of Toronto). *Primary prevention: Its role in the academic achievement of immigrant children.* The impact of primary prevention initiatives on children's well-being has not gone unnoticed (Durlak & Wells, 1997). Less well-developed is the body of literature on the overall adaptation process of immigrant children (Beiser et. al., 1999), and the role of primary prevention initiatives on specific populations (Durlak & Wells, 1997), including ethnically diverse and immigrant children from low-income families. Better Beginnings, Better Futures is a large, primary prevention, government-funded project that is operating in seven income twenty-five year project are: to prevent emotional, behavioural, social, physical and cognitive problems in young children in socio-economically disadvantaged neighbourhoods, and to promote healthy child development in these children (Ontario Ministry of Social Services, 1989). Toward these ends supports such as nutrition programs for children, home visiting, parenting programs, and classroom enrichment have been implemented in the neighbourhoods. Data on approximately 1670 families in two cohorts (ages 0-4 and 4-8) aimed at examining well-being in the aforementioned areas have been collected. The main purpose of the presentation is to report on one aspect of this large-scale prevention program, namely, the impact involvement in a primary prevention initiative has on the academic achievement of immigrant children. Information from a variety of sources including child measures, teacher reports and parent interviews was obtained. Intervention, gender and individual differences are examined over time. The proposed presentation focuses on a target child in 216 families (n= 99 in one intervention site and n= 117 in a matched control site). These children were followed from ages 4 to 8. Children born to parents who self- identified as being born outside Canada, and who have been living in Canada prior to the birth of the child in 1989, were included in the research. The parents emigrated from various developing regions including India, Jamaica and Somalia. The control group consists of newcomer children living in communities not receiving intervention. Data comparable to the intervention group has been collected from control families. In addition to demographic information collected, information regarding cognitive ability, attitude towards reading and academic achievement are examined. Included as a measure of cognitive development is the block design sub-test of the Wechsler Intelligence Test for Children-Revised (WISC-R). The Attitude towards Reading Scale was administered at grades one through three. The children also completed a number of academic measures including the Peabody Picture Vocabulary Test Revised (PPVT-R), the Wide Range Achievement Test-Revised (WRAT-R), the Key Math Diagnostic Arithmetic Test (KMDAT), and grade three provincial testing scores, Education Quality and Accountability Office (EQAO) in reading, writing and arithmetic. At this point, all the data have been scored and some of the analyses completed. The preliminary results point some important gender and intervention differences in academic achievement. Using hierarchical linear modeling (HLM), analyses will be conducted to examine whether differences in oral vocabulary exist between the control and intervention groups, between boys and girls, and across individual children over a five-year span. Given the absence of research on the role of primary prevention on immigrant children the present study aim to further our understanding of the salient factors that impact on immigrant children the learning trajectories of individual children over time, it aims to provide insight into the way

newcomer children acquire receptive vocabulary over a five-year period. This understanding can be instrumental in informing teaching practice, and correspondingly, student learning.

John McNamara (University of Saskatchewan), Sheri Simonot, Mary Scissons, and Jody Dahlen. *Using measures of phoneme awareness and letter-sound knowledge to identify at-risk readers in kindergarten*. This study measured phonemic awareness and letter-sound knowledge of 647 Kindergarten students across three school divisions. The primary purpose was to establish early identification markers for children at-risk for reading failure. Three measures of phoneme awareness and three measures of letter-sound knowledge were given to all participants. All six measures statistically significantly identified those children at-risk for reading failure. Further, a factor analysis with varimax rotation led to two separate factors. The first factor was interpreted as letter-sound knowledge and may identify all children at-risk for reading failure including those affected by SES, ESL, and environmental disadvantage. The second factor was interpreted as phoneme awareness and may identify those children at-risk for reading because of a specific phonological processing problem characteristic of dyslexia.

Eleni Morfidi (SCO-Kohnstamm Institute), and Aryan Van der Leij. *The development of phonological and literacy skills of Dutch poor and average readers who learn English as a second language*. The present study aims to investigate the development of phonological and literacy skills of average and poor Dutch readers who learn English as a second language. Two groups of average (n=25) and poor readers (n=25) at secondary school (year 1 and 2) are followed up after nine months (year 2 and 3 respectively). The two groups are matched for age, gender and listening comprehension. The first part of the study has already been conducted. The findings suggested reading difficulties of phonological nature, evident in the second language. Speed limitations were observed in both languages. In addition, individual differences indicated that a small subgroup of poor readers with good orthographic skills had better than expected reading ability in English. The second experiment will explore the development of reading and subsequent skills in both languages.

Louise Morrison (York University), and Esther Geva. *Comprehension monitoring in first and second language reading: The role of reading proficiency and individual differences in lower-level processes*. 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), Joseph Beck, Juliet Bey, Fiona Callaghan, Andrew Cuneo, June Sison, and Brian Tobin. *An embedded experiment to evaluate the effectiveness of vocabulary previews in an automated reading tutor*. When does taking time to preview a new word before reading a story improve vocabulary and comprehension more than encountering the word in context? To address this question, the 2001-2002 version of Project LISTEN's Reading Tutor embedded an automated experiment to compare three types of vocabulary preview — defining the word, giving a synonym, or just asking about the word — and a control condition. Outcomes included within-story comprehension as measured by performance on multiple-choice cloze questions, and post-story vocabulary as measured by matching words to their definitions. We analyze results based on thousands of randomized trials.

Jessica Nelson (University of Pittsburgh), Michal Balass, and Charles Perfetti. *Effects of phonological, orthographic, and semantic training of single words on reading comprehension: An eye-tracking study*. An eye-tracking study was conducted in order to examine the effects of targeted vocabulary training (either orthographic, phonological, or semantic) on eye movements

during reading. Subjects were trained on different sets of rare words in each of three training environments: orthographic/phonological, orthographic/semantic, and phonological/semantic. We then recorded eye movements during reading for comprehension as subjects read sentences containing those words. Measures were compared with those taken on rare words on which they were not trained, and on known words. This experiment is designed to break down the contribution of orthographic, phonological, and semantic representations to reading and comprehension.

Trude Nergard Nilsen (University of Oslo), and Bente E. Hagtvet. *Reading problems at age 12 in an at-risk sample of children of dyslexic parents*. The study investigates the frequencies and qualities of reading problems at age 12 in a sample of Norwegian speaking children with a genetic risk for dyslexia (N=50). It is an extension of an ongoing longitudinal project focusing connections between spoken and written language development from age two through age nine in children of dyslexic parents (N=70) (Hagtvet, Horn, Lassen, Lauvås, Lyster & Misund, 1998). Different aspects of the reading and spelling skills of the children were studied on reassessment at age 12. About 50% of these children had struggled in learning to read and spell, but at age 12 a fair number of the slow readers appeared to have normalized their reading skills according to parents' reports. The reassessment showed great variations in reading skills, and did not in all cases confirm the parents' reports. In the presentation we shall discuss the characteristics of the reading problems of the youngsters, as related to previous oral and written language performances.

Simone Nunes (Graduate Center of the City University of New York), and Linnea C. Ehri. *Understanding short vowel knowledge in beginning readers*. The objective of this study was to explore beginners' knowledge of short vowels and its relationship to their reading and spelling abilities. Twenty-four five and six-year-old children completed several tasks assessing knowledge of letter-sound and sound-letter associations, word and pseudoword reading, and spelling. Findings suggested that order of acquisition of short vowels reflects the distinctiveness of articulatory features among the vowels. Children's mistakes in short vowel sound production showed use of a letter name strategy. Short vowel knowledge was significantly correlated with reading and spelling performance.

Ana Laura Pauchulo (Wilfrid Laurier University), and Alexandra Gottardo. *Understanding reading development in second language learners in Canada and the USA*. Forty native Spanish speaking Grade 1 children will be tested. This study proposes to examine the relationship of first language (L1) and second language (L2) linguistic variables and demographic variables in English as a Second Language (ESL) learners to their English literacy skills. In particular this study will examine predictors of English word reading performance using measures of phonological processing and letter knowledge in English and Spanish. The performance of the participants in the present study will be compared to results from a similar study in the United States.

Stephen A. Petrill (Pennsylvania State University), and Kirby Deater-Deckard. *Environmental influences on early reading: Evidence from an adoption study*. Behavioral genetic studies have suggested that both genetics and environment are important to reading ability in early childhood. What is less well understood are the gene-environment processes that operate in reading and related cognitive skills. The relationship between reading, general cognitive ability, and the environment was examined using 150 school-age adoptive children and their families drawn from the Northeast Northwest Collaborative Adoption Projects. Results suggested that the significant relationships between the post-adoptive environment and reading are those that involve parental responsiveness and parents allowing their children to act on an interest in reading as opposed to more distal measures. Linda M. Phillips (University of Alberta), Heather L. Simple, and Dorothy Steffler. *Understanding reading development among Canadian aboriginal children in first grade*. Our interest is to better understand the factors that contribute to the development of reading among Aboriginal children (whose first language may not be either of our official languages). Most of the research on how children learn to read has been on monolingual children, some on ESL children, and very little on Aboriginal children. Starting with the collection of some baseline data, we investigated whether Aboriginal children in grade one are at risk of school failure? And if so, to what extent?

Sixty-five first grade children (33 boys and 32 girls) were asked to complete the Group Reading Assessment and Diagnostic Evaluation (GRA+DE), (Form A), Level K, (Williams, 2001). Level K is designed for kindergarten, early first grade, and transitional first-grade classrooms. There are eight subtests that measure early reading skills - sound matching, rhyming, same and different words, print awareness, letter recognition, phoneme-grapheme correspondence, and listening comprehension. On average, the Aboriginal grade one children studied are at risk of school failure. They perform more than 1SD below the norm for other children in their age group. Stated another way, approximately 95% of the children in the reference group scored higher on the GRA+DE than did the Aboriginal children we studied. The first two subtests (sound matching and rhyming) comprise the phonological awareness dimension and neither requires any print recognition. Sound matching measures the child's ability to hear like sounds at either the beginning or the end of a word and rhyming measures the child's ability to hear matching common phonograms. Listening comprehension and phoneme-grapheme dimensions were found to be relative strengths for the Aboriginal children while significant weaknesses were noted in phonological and early literacy skills. To the best of our knowledge, our study is the first dedicated to understanding reading development among Canadian Aboriginal children and our results certainly force us to look to the underlying beliefs, attitudes and expectations that Aboriginals hold about literacy, to the methods we use to assess literacy, and to the ways in which literacy development may be enhanced. These considerations are essential to an inclusive and consistent educational system for all Canadians.

Victoria Purcell-Gates (Michigan State University), Nell K. Duke. *Explicit teaching of genre as a means to improve comprehension and composition of non-narrative text*. This paper reports the results of a two-year study of two approaches to teaching reading and writing of informational and procedural text in second- and third-grade science. Both approaches included authentic reading and writing of informational and procedural text within science instruction; one approach also included explicit teaching of the functions and features of these genres. Classes (N = 16) were randomly assigned to condition and students' comprehension and composition of the target genres was measured up to six times. Results speak to the efficacy of explicit teaching of genre as a means to improve young children's comprehension and composition.

Pieter Reitsma (PI Research, VU Amsterdam). *Orthographic learning in children with epilepsy or dyslexia*. Degree of orthographic learning after the reading of real stories was assessed in normal Dutch beginning readers, and in two groups of children matched on reading ability: children with epilepsy, and children with dyslexia. New names were introduced in the stories and these names could be spelled homophonically in two alternate ways (e.g. Darein - Darijn). The number of times one of these spellings occurred was systematically varied. Orthographic choice, naming times, and spelling data for the target words were determined after reading the stories. Significant differences among groups were found showing that dyslexics are specifically delayed in orthographic learning.

Cara Richards (University of California, Santa Barbara), and Jill Leafstedt. *A microgenetic analysis of phonological development in English*. This paper will demonstrate the relationship between the spelling abilities of young English Learners (EL) and their phonological processing and decoding abilities. Two spelling measures, a recognition task and a production task, were given to 193 EL in Southern California. Results indicate that phonological awareness contributes to EL abilities to spell and the spelling productions of these students provide information about their phonological awareness abilities and their development in these skills as they crossover to English Literacy.

Jeremiah Ring (Texas Scottish Rite Hospital for Children), and Jeffrey L. Black. *An investigation of individual treatment response in an alphabetic phonics intervention for reading difficulties*. Recent reading intervention research has examined the interaction of student aptitudes with instruction in an effort to identify factors that can account for observed variability in treatment response. This study adds to that literature by examining reading development in a group of children attending a two-year long, Orton-Gillingham based reading program administered by their respective schools. Previously reported results from the midtest assessments of this sample found that

students with lower baseline skill levels showed the largest gains after one year of instruction. The analyses reported in this paper of new data collected after a second treatment year evaluates the overall effectiveness of the intervention and examines whether the pattern of correlation observed at midtest replicates at posttest.

Kristen D. Ritchey (Rutgers University). *Developmental spelling: A comparison of two scoring systems*. Although children in kindergarten are unlikely to spell complete words correctly, analysis of what children can spell can provide information about the development of phonological awareness and reading-related skills. This study compares the developmental spelling procedure proposed by Tangel and Blachman (1992, 1995) to correct-letter sequence scoring (Tindal & Marston, 1990) commonly used in curriculum-based measurement. This study analyzes the spelling of 94 kindergarten children and compares the relationship of the scores calculated from each method to phonological awareness and reading-related knowledge outcomes. An empirical investigation is necessary before one scoring system can be recommended over the other.

Javier S. Sainz (Universidad Complutense de Madrid), Carmen Villalba, Guillermo de Jorge Botana, and Petroula Mousikou. *Conjoining letters into words: Attention- and lexicon-based effects on the commission of lexical errors*. Ordinary adult readers participated in two word visual recognition experiments aimed at controlling attention-based and lexicon-based effects. In these experiments subjects were first presented with a two-stimuli display and then required to choose a postcued visual target among a set of distractors while ERPs measures were taken, all items controlled by lexical neighborhood size (i.e. high density vs low density according to neighborhood size), frequency and semantic relatedness. In the first experiment, a target word (e.g., VACA, i.e. COW) was to be chosen following an associate (TORO, i.e. BULL) from a response set formed by an homophonic unrelated word (BACA, i.e. RACK), a similar unrelated word (LACA, i.e. RESIN) and a partially similar pseudoword (GACA). The target word was displayed and masked under different conditions. In the second experiment, a target word (e.g., COSTE, i.e. COST) was to be chosen following an associate (e.g. GASTO, i.e. EXPENSE) from a response set formed by an unrelated word (CESTO, i.e. BASKET) made of the same letters from the target word in different order, a similar unrelated word (RESTO, i.e. REMAINDER) and a partially similar pseudoword (TOCES). The data from the two experiments seem not to be totally compatible with the notion that phonological constraints on lexical access precede and set the stage for orthographic constraints.

Donna M. Scanlon (University of Albany), Frank R. Vellutino, Sheila Small, Joan Sweeney, and Diane Fanuele. *The short and long term effects of different types of early literacy intervention on reading comprehension*. This paper will report on the comprehension performance of groups of children who received one of two types of early literacy intervention: one in which the primary focus was on developing phonological coding skills and one in which the primary focus was on engaging the children in reading connected text and developing a strategic approach to reading connected text - using both meaning and phonologically based strategies to identify unfamiliar words. The children's performance on a standardized measure of reading comprehension was measured at the end of the intervention period (Grade 1) and at the end of second and third grade.

Hollis S. Scarborough (Haskins Laboratories), Anne H. Charity, and Darion Griffin. *Linguistic challenges for young readers*. The form and content of the language used at school – in classroom instruction and in written materials — can differ markedly from the more colloquial language a child is exposed to outside of school. New evidence will be presented to illustrate these differences and to examine relationships between children's knowledge of school language and their reading achievement in Pre-K, K, and Grade 1.

Michal Shany (Haifa University), and Ilana Ben-Dror. *Surface and phonological reading: Further evidence from Hebrew orthography*. Last year we presented a pilot study that investigated the manifestation of sub-types of reading disabilities in Hebrew orthography. We found the Hebrew orthography as a unique opportunity to study the subtypes issue by analyzing the reading performance

of the same subjects dealing with the same orthography that varies along the orthographic depth characteristic, meaning: shallow/deep characteristic of the relation between orthography and phonology. In our paper we presented last year data based on reading performance of sixth grade disabled readers, and found evidence of two sub-types of reading disabilities. These results were different than results usually reported for shallow orthographies, such as German. Our results resembled the general pattern of sub-types observed in English orthography, but provided specific symptoms that characterized the Hebrew orthography. This year we would like to extend the previous data. Our first intention is to try and replicate the data that were presented last year only on the basis of clinical sample. In addition we intend to study how early in reading development these two sub-groups can be reliably identified? Such data can provide further understanding of the specific characteristic of each orthography (In English sub-types are reported for as early as second grade), as well as provide further understanding of core deficit vs. developmental lag explanation of reading disabilities. For this purpose we are analyzing reading performance of 3 reading disabled groups: second grade, fourth grade and sixth grade, data are taken from a representative national sample (1,600 subjects). This will be the first study in Hebrew that is based on national sample. Data and discussion will be presented in the conference.

David Shilt (University of Michigan), and Adenike Griffin. *How is kindergartners' reading development influenced by attending schools where invented spelling is used more and less frequently?* Using hierarchical linear modeling, we investigated whether kindergartners who attended schools where invented spelling was used frequently in kindergarten classrooms acquired more reading skills than those who attended schools where it was used less frequently. We also examined whether children who entered kindergarten with differing levels of reading proficiency benefited differently from attending schools where invented spelling was used more and less frequently. We found that, overall, kindergartners benefited from attending schools where invented spelling was used frequently in kindergarten classrooms. In addition, children who entered kindergarten with lower levels of reading achievement benefited more from using it than those who entered kindergarten with higher levels of achievement.

Joseph Shimron (University of Haifa), and Vered Vaknin. *The dynamics of reading instruction reform.* During the last decade or so a number of states have reformed or are in the process of reforming their methods of reading instruction. In most cases the direction of the reform is from a Whole Language to a Phonic Emphasized method. In this presentation we focus on the conditions that make such a reform possible or even successful. We describe one reform in which we were personally involved, and in analyzing our experience, we suggest the conditions that, in our opinion, must exist for the reform to take place. We also note that some changes may be introduced in a relatively short time and with a little effort, while others are much more difficult to achieve and their implementation may take a long time.

Robindra Sidhu (Queen's University), John Kirby, and Rauno Parilla. *Visual-orthographic pattern recognition in kindergarten children: Are there differential speed and accuracy gains after a second exposure in double deficit subtypes?* The present investigation examined visual-orthographic pattern recognition in a sample of 214 kindergarten children categorized into double deficit subtypes. Participants were exposed to a visual-orthographic pattern (e.g. Tp) and were asked to identify it from a response-array of four items (e.g., Tp, Tz, Qp, Zp). Of interest was whether participants made differential gains in accuracy and speed on a second exposure as a function of their subtype classification. Only subtypes with a naming speed deficit made gains in accuracy on a second exposure. Double deficit and double asset groups made gains in speed, albeit for different reasons.

Linda Siegel (University of British Columbia), and Nonie Lesaux. *The development of reading in children who speak English as a second language.* The prevalence of reading failure is higher in low-income populations, and in individuals with English as a second language (ESL). The participants of the 5-year longitudinal study are all of the children who entered kindergarten a school district. In kindergarten, all children identified as at-risk for reading failure received intervention to

augment their pre-reading and language skills. The development of reading of the participants from kindergarten to grade 4 was examined using individual growth curves. The results show that it is possible to mediate the negative effects of socioeconomic status and ESL status through early intervention for at-risk children.

Louise Spear-Swerling (Southern Connecticut State University), and Pamela Owen Brucker. *What affects novice teachers' knowledge base about English word structure?* This study examined novice teachers' development of knowledge important for teaching word identification and spelling. Novices' knowledge about the structure of English words increased significantly after instruction in a teacher-education course and correlated significantly with certain measures of their reading-related abilities, such as phonological skills. Struggling readers tutored by a subgroup of the novice teachers improved significantly in specific reading and spelling skills. The results suggest that teachers' understanding of word structure may be influenced by their own reading-related abilities, especially in the absence of instruction, and that even short-term tutoring by novice teachers can benefit struggling readers.

Rhona Stainthorp (London University), and Diana Highes. *Does exceptionally early reading ability affect writing quality?* This paper presents some evidence from a longitudinal study of precocious readers. The data relate to an analysis of written narratives produced by 14 children when they were 5-, 6-, and 11-years-old. The children were 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 narratives provide useful evidence about developmental changes in writing but data suggest that there were only limited positive effects on vocabulary and written expression indicating that the relationship between writing ability and reading is complex.

Kathy Stephenson (University of Alberta), and Rauno Parrila. *Effects of cognitive and noncognitive factors on the acquisition of reading skills.* The contributions of cognitive (nonverbal IQ, vocabulary, and verbal STM) and noncognitive factors (home literacy practices, parental beliefs and expectations and children's achievement strategies) on children's precocious reading is examined. The questions addressed are: a) what cognitive and noncognitive factors are uniquely associated with better preliteracy skills (phonological sensitivity and naming speed), and (b) what cognitive, noncognitive, and preliteracy skills are uniquely associated with precocious reading. 78 children were assessed in kindergarten and again in grade 1. Their parents filled out a questionnaire about home literacy practices, and about their beliefs in their child's cognitive ability and expectations for their child's education. Teachers rated the student's achievement strategies.

John Evar Strid (Northwestern University), and James R. Booth. *The effect of consonant, vowel and syllabic priming in Spanish and English.* This study examined how the consistency of orthographic and phonological mappings influenced bilingual readers' early processing during written word identification. We tested 24 English-Spanish readers using a brief identification paradigm with consonant, vowel and syllabic priming. We found that bilingual readers used priming information more in Spanish than in English, especially for vowels and syllables. This suggests (1) that vowel information in English may not play as large a role because of the disproportionate inconsistency in grapheme-phoneme mappings for vowels and (2) that the syllable may play a more important role in Spanish as a main pre-lexical unit in word recognition. Ron Stringer (McGill University), Gail McCoubrey, Malenie Gotlieb, Mariam Haider, Erin Beetham, Sharhezad Irranejad, Lisa French, and Joan Wolforth. *Assessment practices in the diagnosis of reading disability in young adults.* Two hundred learning disability assessment reports were analysed. We looked at the rates of diagnosis of reading disability, whether the assessment methods were appropriate to the detection of a reading disability, and compared reports with diagnoses of reading disabilities to reports with other diagnoses. Preliminary results indicate dramatic differences from a similar sample analysed by McGuire et al. (1997). Where McGuire et al. found a modal battery consisting of a single IQ test, our modal battery consisted of 5 – 6 tests, including measures of IQ, general and specific academic achievement, visuo-spatial processing and receptive vocabulary.

Carrie Szucs (Queen's University), and Lesly Wade-Woolley. *English phonological development in early French immersion readers*. The present study examines the development of English phonological skills in students learning to read in French. In particular, this study examines which English phonological skill (onset-rime or phoneme) is a better predictor of reading development for French immersion students. Children enrolled in the French immersion program were administered onset-rime, phoneme and reading measures in kindergarten. These same measures were re-administered in grade one. The findings are important because it will lead to better understanding of the universal and language-specific aspects of phonological development.

Yu-chi Tai (University of Illinois at Urbana-Champaign), and George W. McConkie. *Hazard curves reveal individual differences in reading*. Traditionally, readers' eye movement characteristics are represented by mean indices, including mean fixation duration and saccade length. However, these indices lose much of the temporal information that is in eye movement data. In contrast, hazard curves show changes in saccadic activity over time. In this paper, we illustrate two ways in which fixation duration hazard curves can reveal individual differences in the temporal characteristics of processing in normal and dyslexic readers.

Verena Thaler (University of Salzburg), Karin Landerl, and Heinz Wimmer. *Spelling pronunciations as a means of remediating spelling deficits*. Aim of our study was to develop and evaluate a computerised program to improve orthographic spelling skills of dyslexic children. Although German is highly consistent from graphemes to phonemes, consistency in the other direction (phonemes to graphemes) is much lower so that spelling patterns have to be stored in an orthographic lexicon. We trained poor spellers to use spelling pronunciations, that is unnatural, hypercorrect pronunciations including all letters of the word spelling, as an additional multi-sensory code to memorize orthographically correct spellings. In a first empirical assessment of this concept we did not find a specific effect of spelling pronunciations over and above a standard word-specific spelling training.

G. Brian Thompson (Victoria University of Wellington), Vincent Connelly, Claire M. Fletcher-Flinn, and Sheryl J. Hodson. *Effects of childhood phonics instruction persist as a phonemic awareness advantage in adulthood but a lexicalized recoding disadvantage*. This is a study of long-term effects of childhood phonics instruction. Two adult samples were compared. One had attended schools with explicit phonics and the other, schools without. The phonics sample was more proficient in isolated letter-sound responses and in phonemic segmentation. The nonphonics sample gave more correct responses to pseudowords, due to their greater accuracy on pseudowords with lexical rimes that always have irregular spellings. The phonics sample regularized these pseudowords. The implication is that theories of the skilled reading process cannot avoid taking account of the instructional history of the reader.

Rolando D. Tiu (Case Western Reserve University), Douglas K. Detterman, and Lee A. Thompson. *Exploring the impact of genes and environment on scholastic achievement measures as a function of parental education*. An earlier report from the Western Reserve Twin Project (WRTP) has suggested that the heritability of general cognitive ability is higher when the father's educational level is higher. The impact of the shared environment is higher when the father's educational level is lower. The current report will extend these analyses to measures of scholastic achievement. Using the DF approach developed by DeFries and Fulker, heritability and shared family environment were calculated for specific cognitive abilities and for scholastic achievement and tested for significant changes across levels of parental education and occupational status.

Joanna K. Uhry (Fordham University). *Teachers' phonemic knowledge and skills and first graders' reading outcomes*. A number of studies have looked at teachers' knowledge of the phonemic structure of oral language (Moats, 1994; McCutchen, Harry, Cunningham, Cox, Sidman, & Covill, 2002; Scarborough, Ehri, Olson, & Fowler, 1998; Uhry, 2001). Because phonemic awareness (PA) is so important to the acquisition of beginning reading (Adams, 1990), it is an assumption in the

literature that teachers' knowledge of PA will benefit the children they teach. The present study, in process, of 27 certified teachers working in one-to-one tutoring twice a week with Grade 1 students is examining teachers' knowledge of phonological processes as well as at their actual ability to carry out effective PA lessons. Videotaped lessons are being coded in regard to teachers' ability to match PA instruction to their student's PA level and to modify instruction based on student response. Correlations will look at relationships with student outcomes.

Victor van Daal (University of Wales Bangor). *Item-specificity and the role of neighbours in orthography learning*. Several views have been put forward on how orthographic knowledge is acquired. In particular, the notion of item-specific learning (Share, 1995) seems hard to be reconciled with transfer effects (the role of 'friends' and 'enemies' in the orthographic lexicon (e.g., Stuart, Masterson, Dixon & Quinlan, 1999). We also did not find effects of neighbourhood frequency in the learning of nonwords (SSSR 2002). We hypothesise that for initial learning the neighbourhood frequency is not of relevance, but neighbours will play an increasing facilitating role with repeated presentations of the nonwords. An experiment will be presented which supports this hypothesis.

Sophie van der Sluis (University of Amsterdam), Peter F. de Jong, and Aryan van der Leij. *Working memory capacity in children with reading and arithmetic disabilities*. There tends to be considerable co-morbidity between reading and arithmetic disabilities. In this study, we examined working memory deficits in children with reading disability, arithmetic disability, and both disabilities. Following the working memory model of Baddeley and Hitch, tasks were selected to reflect the central executive, the phonological loop and the visuo-spatial sketch pad. The results indicated that reading disabled children had deficits in the phonological loop and the central executive. Arithmetic disabled children showed deficits on the central executive. The pattern of deficits in children with both learning disabilities was a combination of the deficits found in singly disabled.

Connie K. Varnhagen (University of Alberta), Angela Chamberland, Morgan Willson, Lauren Figueredo, and Trudy Kwong. *Brain activation during spelling*. We examined brain regions involved in phonological, orthographic, and visual processes related to spelling using functional magnetic resonance imaging. Twelve right-handed, monolingual English-speaking males between the ages of 18-22 participated. Our experimental tasks were phonological choice (sheep-shead), orthographic choice (beff-ffeb), and visual choice (sleep-sleap) and our control task was letter choice (xlpft-#\$?!). Each experimental task was presented in eight, 20 sec blocks alternating with the control task. Our preliminary results show similar regions but different levels of activation; we found greater left inferior frontal activation (BA 38, 48) for the phonological task and greater left right inferior and middle frontal (BA 45,44) and left fusiform activation for the orthographic task.

Ludo Verhoeven (University of Nijmegen), and Jan van Leeuwe. *Growth of word decoding skills throughout primary school: The case of Dutch*. The paper presents a longitudinal study on the development of word decoding over grade 1-6 in primary school in the Netherlands. A word decoding test was administered with 1812 native Dutch children and 331 minority children. The test consisted of three subtests addressing different orthographic word patterns: CVC-words, monosyllabic words with consonant clusters and polysyllabic words. The results showed a quadratic growth model fitting the data better than a linear model. The three word decoding subskills were highly interrelated, leaving some unique variance for the three types of orthographic patterns. The relation between speed and accuracy turned out to be similar for children varying in decoding skills. Girls did better on the tests than boys with no differences between first and second language learners. Word blending and letter knowledge turned out to be substantial predictors of word decoding development.

Rose Vukovic (University of British Columbia), Nonie Lesaux, and Linda Siegel. *An investigation of the double-deficit hypothesis in a longitudinal study of reading development*. The double deficit hypothesis of dyslexia posits three subtypes of impaired reader: those with a singular deficit in phonological processing, those with a singular deficit in naming speed, and those with a double deficit. In a longitudinal (k to grade 4) investigation of reading development, there was

no support for the double-deficit hypothesis as we were unable to identify any dyslexic children with a singular naming speed deficit. Results reveal that naming speed contributes only modestly to reading ability by the end of grade 4, and when working memory is included in the analyses, naming speed does not contribute significantly.

Lesly Wade-Woolley (Queen's University), and S. H  l  ne Deacon. *Canadian spelling, eh? Bilingual children's morphological awareness and their use of morphological information*. This presentation will report on the third year of a longitudinal study of the spelling development of English-speaking children in French immersion. We examined morphemic spellings (e.g., -ed in English and -er in French) and morphological awareness in both languages. Earlier results suggested strong connections between morphological awareness and spelling in each language. These new data will test the strength of these relations by examining pseudo-words. Further, spellings will be examined for the use of phonological, orthographic and morphological information. These results will be discussed in relation to current models of spelling development and transfer processes in biliteracy.

Lesly Wade-Woolley (Symposium Covenor) (Queen's University), and researchers from the Canadian Language and Literacy Research Network (CLLRNet). *Symposium: Linguistic Diversity in Reading Development: The Canadian Context*. Canada has enjoyed a reputation as a country that welcomes linguistic diversity. As a result, Canadian children learning to read have many different faces. Some speak one of our two official languages, French and English, and are learning to read in their mother tongue. Others, whose mother tongue, English, is the dominant language in North America, are learning to read in enrichment contexts, and receive formal schooling in a second language. Still others are visible minorities and come from lower socioeconomic families, which place them at risk for reading failure; these children may speak English as a second language and/or be Aboriginal children. Canadian researchers studying reading development have located their research within these populations. Their findings address issues that are germane to Canadian children learning to read, but more importantly, they contribute to our broader theories of reading acquisition by examining cognitive, linguistic and cultural variables through cross linguistic and second language investigations. The papers in this session are submitted by researchers from the Canadian Language and Literacy Research Network (CLLRNet) to address issues in reading acquisition that are pertinent in the Canadian context, but have wider application to the field of reading research. The Network is a federally-funded National Centre of Excellence dedicated to research in language and literacy issues. CLLRNet includes researchers across the country organized across multi-disciplinary themes (biological factors; sensory processes & environments; language; literacy; social, economic & program influences) to work on collaborative projects focusing on normal and atypical language and literacy development. The papers in the current symposium focus on issues in reading development which are relevant to all researchers in our field. Geva and Yagoubzadeh pursue the cognitive and linguistic predictors of fluent reading in ESL children. Cormier et al. show that phonological characteristics of spoken French demand that syllable awareness as well as phoneme awareness play roles in reading French. Phillips et al. report a study of reading acquisition in aboriginal children that considers how phonological awareness measures interact with cultural factors. Finally, in a study of English-speaking children in French Immersion, Jared et al. investigate the role of first (L1) and second (L2) language oral proficiency measured in kindergarten in the development of grade one reading. This collection of papers build around a theme of linguistic diversity; while the particulars of the studies are specific to the Canadian population, the findings contribute to our larger knowledge of reading development in a diverse world.

Min Wang (University of Maryland), Ying Liu, Charles A. Perfetti, and Natalie Flynn. *Chinese-English biliteracy acquisition: Cross language and writing system transfer*. Recent research on biliteracy development of children learning to read English, an alphabetic writing system from another alphabetic system such as Spanish has yielded consistent results on the strong facilitation between first (L1) and second language (L2) reading skills. The present study was aimed to investigate such development of children learning to read English from an orthographically and typologically different writing system - Chinese. About 30 Mandarin speaking Chinese children were tested for their L1 and

L2 language and reading skills at grade 2. The key component skills that were examined included oral proficiency, phonological processing, word identification, and reading comprehension. Children's non-verbal cognitive skills were also tested. Relationships between L1 and L2 skills were analyzed. The specific skills that were transferred were identified based on the similarities and differences between L1 and L2. These findings provide insight into the interaction between universal and language-specific processes of biliteracy development.

Gareth J. Williams (Open University), Clare Wood, and Dorothy Faulkner. *Multi-modal temporal order judgments in typically developing children, children with dyslexia and children with dyspraxia*. Previous research has indicated that children with dyslexia and children with developmental coordination disorder (DCD) may share a common deficit that may be related to temporal processing. Ten children with dyslexia, ten children with DCD and ten controls, aged between nine and 14 were tested on a number of baseline tests and a multi-modal temporal order judgement task where they were required to reproduce the order of either auditory or visual stimuli, some of which were phonological or orthographic in nature. The data are expected to indicate different profiles of temporal order judgement deficits in both dyslexia and DCD compared to controls.

Joanna P. Williams (Teachers College, Columbia University), K. Brooke Stafford, Kendra Hall, Kristen D. Lauer, Laura DeSisto, and John S. deCani. *Improving the comprehension of informational text via text structure instruction for at-risk second graders*. This study replicated and extended a study that investigated the effectiveness of an instructional program designed to teach the comprehension of compare/contrast expository texts, 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 expository text. Students were able to demonstrate transfer of this knowledge to uninstructed compare/contrast texts, including authentic text. In last year's study, students were not able to transfer this knowledge to a text structure, pro/con, that was not addressed in the instruction. This year a limited amount of pro/con instruction was incorporated into the program and showed a small positive effect. Findings indicate that text structure instruction can improve second graders' comprehension of expository text and that such instruction does not detract from their ability to learn new content.

Kathleen M. Wilson (University of Nebraska, Lincoln), and Guy Trainin. *Blossoming literacy: Early readers' self-system and achievement*. This study examined the relationships between literacy achievement and self-system components in 198 first graders. Using the Early Literacy Motivation Scale, we measured self-efficacy / perceived competence and attributions related to reading, writing, and spelling. Findings showed that first graders did not differentiate among the three literacy tasks. Using a temporal sequence latent path model, we found that students with low literacy achievement showed a greater relationship between the self-system and their literacy performance than students who displayed an average or high performance on literacy tasks. Additionally, there was no feedback loop in which the self-system components added unique variance to consequent achievement. Gwen E. Wolters (University Leiden), Wim Van den Broeck, and Wied Ruijssenaars. *Subsyllabic processing in Dutch beginning readers: In search of a role for bigram frequency*. The role of subsyllabic processing in reading development has been explored in various ways. One way of investigating this is to take language characteristics into consideration. In this Experiment we examined whether bigram frequency influenced reading speed and accuracy in Dutch beginning readers. Results indicate that bigram frequency does influence reading speed and accuracy. Also, data showed that this frequency effect tended to play another role at different reading levels.

Clare Wood (Open University). *A longitudinal study of spoken word recognition, temporal information processing awareness and literacy*. This paper will evaluate whether spoken word recognition or temporal information processing measures are able to predict children's phonemic

awareness and literacy development. It will also consider whether children who showed difficulties in rapid processing on a temporal order judgement task were significantly worse at phonemic awareness, reading, and spelling than their peers. Children were assessed in pre-school and during their first four years in school on their phonological awareness, temporal order judgment, spoken word recognition, and literacy attainment. Data collection will finish in May 2003, and the results of the study as a whole will be presented.

Yolanda W. S. Yuen (Queen's University), and Lesly Wade-Woolley. *Phonological processing in Chinese reading*. Phonological processing has been shown to be important in alphabetic languages. However, until recently, researchers believe that visual skills are more important in Chinese reading acquisition. An increasing number of studies have demonstrated that phonological information is important in learning to read in English. The present study investigates the role of phonological processing in Chinese, and assesses the contribution of each component in phonological processing in Chinese reading. From the result of the present study, educators can better tailor the Chinese reading acquisition instructions to emphasize the most important component in phonological processing, if phonological processing does play a significant role in Chinese reading acquisition.