

# Society for the Scientific Study of Reading,

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Abstracts, in alphabetical order by first author

**P. G. Aaron** (epaaron@befac.indstate.edu; Indiana State University) and R.M. Joshi. *Outcome of a component-model-based remedial reading project.*

The Reading-component Model of instruction is developed from the perspectives of classroom instruction. It proposes that reading is composed of two major components: word recognition and comprehension. The model was used to remediate 60 at-risk readers from grades 1 through 5. On the basis of their scores obtained from standardized tests, the children were divided into two groups: poor decoders and poor comprehenders. Poor decoders were instructed in decoding skills starting with phoneme awareness; poor comprehenders were taught comprehension strategies. The children were met 30 minutes a day, 4 days a week, for a year. Post tests showed that poor decoders, when compared to control groups, gained significantly in both decoding and comprehension. Poor comprehenders also showed gains but the gains were not uniformly significant in all areas.

**Marilyn Jager Adams** (madams@bbn.com; Harvard Graduate School of Education), Hollis Scarborough, Scott Masten, Julie Smurda, Maria Prokop, and Linda Fidell. *First-year findings from an independent evaluation of California's K-3 results initiative.*

The K-3 Results program, a grassroots initiative of California's state-funded consortium of Reading & Literature teachers (CRLP), is an experiment on using informal, teacher-administered assessments to inform professional development and instructional progress and priorities. Since 1996 when the program began, the number of participating teachers has grown from 23 to more than 6,000. In this session, we will present first-year findings from our independent analyses of student information archived by the program and of its influence on the professional development and classroom practices of participating K-3 teachers.

**Stephanie Al Otaiba** (stephanie.d.al.otaiba@Vanderbilt.edu; Vanderbilt University), and Michelle K. Hosp. *Effective teaching and assessment of literacy for individuals with Down's syndrome.*

Little is known about the effective teaching and assessment of literacy for individuals with Down's syndrome despite evidence supporting practices in instruction and assessment of literacy for young typically developing children (e.g., explicit phonological awareness and decoding training, curriculum-based measurement). The purpose of this poster session is to report findings from 4 case studies examining the effects on reading performance of one-to-one tutoring program for Down's syndrome. In addition, the relationship between language ability and growth in letter-sound correspondence and sight word reading for these children will be reported.

**Stephanie Al Otaiba** (stephanie.d.al.otaiba@Vanderbilt.edu; Vanderbilt University), Douglas Fuchs, and Lynn S. Fuchs. *Success for many, but not for all: A review of the literature describing characteristics of children unresponsive to early literacy intervention.*

Recent research indicates that as many as 30% of children at-risk for reading difficulties and as many as 50% of children with special needs, may not benefit from effective and well-implemented early literacy interventions. This poster session will present a review of the literature that describes children unresponsive to early literacy intervention. Findings suggest unresponsiveness was associated with one or more characteristics: low initial phonological skill (particularly segmentation), slow naming, low verbal ability, poor phonological encoding, attention deficits or behavior problems, or additional disabilities such as mild mental retardation. Implications for research and practice will be discussed.

**Jane Ashby** (ashby@psych.umass.edu; University of Massachusetts) and Keith Rayner. *Eye movements and reading skill: Differential effects of word frequency and predictability.*

Eye movement research has demonstrated effects of word frequency and predictability on the fixation times of proficient readers. Those effects are generally assumed to be consistent among college-age subjects irrespective of overall reading ability. This experiment monitored the eye movements of three groups of college readers as they silently read sentences containing predictable and unpredictable words of high or low frequency. For the most proficient readers, frequency influenced initial reading times while predictability did not. Only the lower group showed strong predictability effects in initial reading times. Results suggest that expert readers engage qualitatively different processes to support their comprehension of text.

**Egbert M. H. Assink** (e.assink@fss.uu.nl; Utrecht University, The Netherlands) and Sonja van Well. *Contrasting effects of age of acquisition and word frequency in visual and auditory lexical decision.*

An intriguing outcome of recent lexical decision experiments manipulating Word Frequency and Age of Acquisition (AOA) is that in visual lexical decision the effects of both word frequency and age of acquisition were found, whereas in auditory lexical decision only an age of acquisition effect was found (Turner, Valentine and Ellis, 1998). A series of follow-up experiments were designed to shed more light on this paradoxical finding. How can we explain this remarkable absence of frequency in the auditory condition? An important feature of the present experiments is that contrary to the stimulus word set used in the Turner et al. (1998) study, frequency and acquisition age were factorially manipulated, controlling for concreteness. Reference: Turner, J.E., Valentine, T., & Ellis, A.W. (1998). *Contrasting*

*effects of age of acquisition and word frequency on auditory and visual lexical decision.* *Memory & Cognition*, 26, 1282-1291.

**Heather J. Bachman** (hbachma@luc.edu; Loyola University-Chicago). *Phonological skills and early reading: Sources of influence and performance discrepancies.*

The present investigation examined: age-and schooling-related effects on phonological segmentation tasks (syllabic, subsyllabic, and phonemic), the influence of phonemic complexity on segmentation skills, and whether growth in phonemic segmentation skills paralleled children's decoding of increasingly phonemically complex words. Children whose birthdates fell two months before or after the cutoff date for school entry were followed for two years. A unique effect of schooling (first grade) emerged only for the phonemic segmentation task, but exclusively for two or three phoneme words. By the end of second grade, children could accurately decode words with five or more phonemes, while able to segment only two and three phoneme words.

**Caroline E. Bailey** (cebailey@usc.edu; University of Southern California), Franklin R. Manis, Mark S. Seidenberg, William C. Pedersen, and Laurie Freedman. *Variation among developmental dyslexics: Evidence from a novel word learning task.*

A nonsense word learning task was used to investigate variation in word reading processes among developmental dyslexics. Phonological dyslexics, surface dyslexics and younger normal readers were taught to pronounce nonsense words. Half the nonsense words were assigned a regular pronunciation. The remaining half were assigned an irregular pronunciation. Print exposure and feedback were controlled. Subjects received 6 training trials and two days of testing. Progress was assessed across training trials, a spelling test, and a post-test of word pronunciation. As predicted, PD's demonstrated a distinctive developmental pattern. The SD profile was similar yet depressed when compared to younger normal readers.

**Megan M. Bakan** (dixon@psy.fsu.edu; Florida State University) and Richard K. Wagner. *Orthographic models of geminate representation.*

Even good readers can have difficulty spelling words with doubled letters. One problem with geminates is that they cannot be discerned from the phonological representation, an orthographic representation is required. Two recent models of the orthographic representation of words have been developed by Caramazza and Miceli (1990) and McCloskey, Badecker, Goodman-Schulman and Aliminosa (1994) based upon case studies of individuals with acquired dyslexia. This study tests the accuracy of these models in explaining the geminate spelling errors of individuals without dyslexia. Findings from both college student and elementary student samples support the McCloskey et. al. model. Interaction between orthographic and phonological representations are discussed.

**Virginia W. Berninger** (vwb@u.washington.edu; University of Washington). *A simple story for the simple view of reading instruction.*

The 96 lowest-achieving 2nd grade readers from 7 schools were randomly assigned to time-equated treatments over 4 months: word reading; comprehension; combined word reading and comprehension; and repeated reading. Of the treatments, combined was the most superior to the control (effect sizes, 1.24, real word, 1.1, pseudoword reading). All treatments improved in word reading and comprehension, and accuracy and rate of word reading (or text reading) uniquely predicted each of 5 measures selected for text-based and situation-based comprehension, which loaded on one factor (cf1=1.00). Conclusion: Word reading accuracy and rate constrain comprehension, but word reading and comprehension also exert reciprocal influences that enable each other.

**Alpana Bhattacharya** (abhattach@aol.com; City University of New York) and Linnea C. Ehri. *Syllable reading practice improves decoding and spelling in disabled readers.*

Triplets of adolescent disabled readers matched on word reading score were randomly assigned to one of two instructional treatments or a no-treatment control condition. Syllable-treatment participants practiced reading 100 multisyllabic words by breaking them into syllables. Whole word participants practiced reading the same words as wholes. Results showed that the syllable treatment produced superior gains in reading and spelling compared to the word treatment and no-treatment control. Results suggest that disabled readers' reading and spelling deficits can be remediated through explicit instruction and practice segmenting and blending multi-letter units in words. Results support Ehri's (1992) theory of sight word learning.

**Andrew Biemiller** (abiemiller@oise.utoronto.ca; Institute of Child Study, Canada). *The relationship between vocabulary assessed with picture vocabulary methodology, same words with sentence context method, root word inventory, and reading comprehension.*

I tested the hypothesis that young children (SK and grade 1) may do less well than older children on a vocabulary test requiring explaining word meaning for words presented in sentences. Items from the Peabody Picture Vocabulary Test were easier than similar Peabody words given in sentences. However, there was no age discontinuity. Words from the Root Word Inventory (SSSR 2000) continued to show a very large increase in vocabulary in grade two. The Root Word Inventory also proved to be more strongly correlated with reading comprehension.

**Benita A. Blachman** (blachman@syr.edu; Syracuse University), Chris Schatschneider, and Jack M. Fletcher. *Intensive, phonologically-based tutoring: Do the benefits last?*

Second and third grade children with reading disabilities were randomly assigned to an intensive tutoring program that emphasized the phonologic and orthographic connections in words or to the remediation program provided by the school. After eight months of tutoring, treatment children significantly outperformed control children on standardized measures of word identification, word attack, spelling, and paragraph reading and comprehension. In this presentation,

we will report the results of a one-year follow-up on these same measures and also look at the ability of pretreatment phonological processing measures to predict reading and spelling achievement at the end of the follow-up year.

**Jay S. Blanchard** (jsb46@asu.edu; Arizona State University), Kristen Eignor DiCerbo, Jill Oliver, and Craig A. Albers. *Can divided-time administration raise test scores? The relationship between attention and standardized reading comprehension tests.*

Quantifying student achievement has gained the interest of policy makers and the public. A significant portion of this interest focuses on reading achievement tests. The researchers examined the effects of reducing attention demands on reading comprehension test scores. Third grade students (N=939) completed two forms of the Stanford 9 reading comprehension test. The state-mandated version was administered following standardized procedures in one session. The alternate form was administered in multiple, divided-time sessions to lessen attention demands. A repeated measure ANOVA found significant effects for average and low readers. Implications for assessment of reading ability will be discussed.

**Derrick C. Bourassa** (Derrick.Bourassa@Acadiau.Ca; Acadia University, Canada), and Betty Ann Levy. *Developing reading skills in children with down syndrome: Use of orthographic analogies.*

We compared the effectiveness of Rime versus Whole Word training as a means of building a reading vocabulary in children with Down Syndrome. Reading vocabulary was rapidly and accurately acquired when the words were segmented into onset- rime units compared to when the words were repeated as whole word units. Furthermore, the segmentation technique yielded superior generalization to reading new words. These data point to the superiority of onset-rime segmentation techniques in teaching children with Down Syndrome to read.

**D.J. Bolger** (djbolger@pitt.edu; University of Pittsburgh), Julie Van Dyke, Charles A. Perfetti, and Barbara Foorman. *Decoding skill and orthographic knowledge, perfect together.*

The following study looks at reading performance as a function of printed word learning of first grade children and the development of word decoding skills. By printed word learning, we mean the acquisition of specific word forms beyond the decodability of their letter sequences. Such acquisition is increasingly observed as children come to read words with increased fluency. According to Perfetti's (1992) Restricted-Interactive model, the acquisition of a quality lexical representation depends upon both the number of exposures to the word and the availability of the correspondences between the graphemes of the word and the appropriate phonemic representations. Share's self-teaching hypothesis (1995) rests on a similar idea that each successful identification of a new word (via decoding) provides an opportunity to acquire the word-specific orthographic representations on which skilled visual word recognition is based. Relying upon both the orthographic knowledge of words and upon decoding skill, children develop a bootstrapping mechanism from which to read new and old words alike. As Perfetti's developmental model predicts, increased exposures to a word leads to both accurate visual representations of the word itself, but also to the sub-lexical components of the word. For example, accurately decoding the word "cat" numerous times results in a strong visual code for the whole stimulus 'cat' and for the onset and rime constituents (c = /k/ and a = /at/). Consistent with this prediction, Treiman's (et al, 1990) orthographic-rime hypothesis claims that as children acquire orthographic/lexical knowledge grapheme-phoneme (GPC) rules early, then develop larger and more reliable units (i.e. onsets and rimes) are coded. We suggest that word identification and acquisition follows this trajectory as exposure to novel words increases. That is, knowledge of print-sound correspondences enables early bootstrapping to visual word forms, as exposure to words increases, both lexical and sublexical representations are strengthened enabling more accurate novel word reading. We set out to test the acquisition of accurate lexical and sublexical word forms as a function of decoding skill. We measured children's decoding skills by accounting for individual knowledge of specific letter-sound patterns from instruction, having students read stories matched to their reading level, and then testing isolated word reading. The experiment is carried out in two sessions with individual students. In the first session (Day 1), the child will read two stories that are similar in level of decodability (i.e. having nearly identical spelling-sound patterns) and they are equivalent to the child's on reading level (as identified by performance predictive reading lists). In the second session (Day 2), students receive a word list containing familiar words (from the stories) and novel words (using the letter sound patterns of words from day 1. Novel words were divided into three categories: items sharing rimes units, items sharing positional dependent GPC units, and items sharing no units with words from day 1. If the Restricted-Interactive hypothesis holds true, high skilled readers should have stronger lexical and sublexical representations than less skilled readers, allowing them to read novel words sharing constituents with familiar words. We predict that children with high decoding skill should be able to accurately identify familiar words, as well as accurately identify novel words similar in both rime units and GPC units. Children with less adequate skills will perform well on familiar words, but show decrements in novel words sharing rime units and in words sharing single GPC units. If the rime hypothesis holds true, low skilled readers should perform worse for rimes over GPC words when controlling for number of shared phonemes. Data are being collected from approximately 60 first grade children in the Houston public schools as part of a larger assessment project.

**James R. Booth** (j-booth@nwu.edu; Northwestern University), Charles A. Perfetti, Lesley Hart, and Kathleen Barlo. *Developmental and reading skill differences of consistency effects in visual and auditory word recognition.*

Children and adults were administered visual and auditory lexical decision tasks to examine consistency effects in word recognition. The results showed that younger or less skilled readers showed a larger accuracy difference between phoneme-grapheme consistent and inconsistent items as compared to older or more skilled readers in visual and

spoken word recognition. This finding provides support for the hypothesis that less skilled readers have weak connections between orthography and phonology for lexical mappings, and therefore, sub-lexical mappings can interfere with word recognition. In contrast, more skilled readers have strong connections for lexical mappings, so sub-lexical mappings cannot interfere with word recognition.

**Candace S. Bos** (cbos@mail.utexas.edu; University of Texas-Austin), Nancy Mather, Shirley Dickson, David Chard, and Blanche Podhajski. *Perceptions and knowledge of preservice and inservice teachers about early reading and spelling.*

To teach early reading and spelling to students at risk for reading disabilities, teachers need to have positive perceptions regarding the role of systematic explicit instruction, as well as knowledge of English language structure. This study examined the perceptions and knowledge of elementary educators at two professional levels (preservice and inservice) across three major universities and teachers in surrounding school districts. Results indicated that inservice teachers were more positive toward explicit code based instruction than preservice educators. While inservice educators (66%) scored significantly higher on the knowledge measure than preservice educators (51%), neither group approached mastery.

**Regina Boulware-Gooden** (reg1950@hotmail.com; Texas A&M University), Mary Dahlgren, and R.M. Joshi. *Does a direct multisensory approach of teaching reading in first and second grade classrooms significantly influence spelling?*

The purpose of this study was to discover if a direct multisensory approach to teaching reading would have a statistically significant influence on the beginning reader's ability to spell. Two inner city schools participated in the study. In the experimental school, all first and second grade teachers attended a summer workshop where they learned to use a structured language program. Students receiving the treatment outperformed the control school on a standardized spelling test. Implications for the classroom teacher are that direct multisensory teaching enhances spelling performance, and that reading and spelling should be taught in an integrated manner.

**Patricia Greig Bowers** (pbowers@watarts.uwaterloo.ca; University of Waterloo, Canada). *Processing briefly presented letter strings: How errors are related to reading skill.*

Previous work has indicated that children with double deficits in naming speed and phonological awareness make more errors naming briefly presented letter strings, especially those composed of all consonant nonwords with low bigram frequencies. A new sample of 72 Grade 3 children named varied types of four-letter strings presented for 250 msec. Errors in naming letters will be analyzed according to type of letter string and position in the string. Relationships between such errors and several other measures, including reading efficiency, will be reported. Theoretical issues are highlighted.

**Zvia Breznitz** (zbrenitz@hotmail.com; University of Haifa, Israel), *The determinants of reading fluency and accuracy among young dyslexic and average readers.*

The new working definition of dyslexia incorporates accuracy and fluency in word reading as measures of the reading difficulties of dyslexic readers (British Psychological Society, 1999). For years the study of dyslexia has mainly focused on word reading accuracy, and a phonological core deficit was held as the primary source of dyslexics' inaccuracy in word reading (see Liberman & Shankweiler, 1991, for a review). As such, reading fluency was presented as an outcome of the effectiveness of phonological processing (Lyon & Moats, 1997). However, recent reading intervention research demonstrates that direct intensive intervention in phonemic awareness improves decoding and word identification in poor readers, but yields only minimal gains in reading fluency (see Lyon & Moats, 1997; Mayers & Felton, 1999, for a review). Based on this observation an in-depth investigation of the characteristics of word reading accuracy and word reading fluency was designed. The study focused on 1) the determinants of reading accuracy and reading fluency in word reading, 2) the potential differential contribution of each for effective word reading, and 3) whether dyslexics differ from average readers in these domains. 1000 fourth to sixth graders (all within a normal range of IQ) participated in this study. This sample was representative of the population of Israeli students in this age range. The sample included 400 dyslexic readers that scored in the bottom 20% on reading measures and two control groups consisting of 300 age matched students and 300 reading level matched children. All subjects were tested with a comprehensive battery that examined a wide range of reading and reading related tasks, and performance time and accuracy were measured for each test. Results indicated that reading accuracy is one aspect of reading fluency. However, reading fluency also incorporates a separate component of reading rate. Rate and accuracy are each characterized by different underlying factors and contribute differently to reading effectiveness. Moreover, rate and accuracy performance in word reading among dyslexics and controls stem from different stages of information processing. Our results have the potential to contribute to the theoretical conception of dyslexia and have critical implications for how we diagnose and predict reading performance and how we design interventions.

**Kathleen Brown** (brown@gse.utah.edu; University of Utah), Matt Fields, Stacey Lowe, Debbie Skidmore, Debbie Van Gorder, and Connie Weinstein. *The benefits of intervention for at-risk first graders: What happens in second grade?*

To what extent do differences between at-risk first graders who receive one-on-one intervention and their control group peers continue beyond the end of first grade? Research on this question is limited. With this in mind, the current study will examine the performance of second grade students who participated in an intervention study during the previous year. Performance measures at the end of first grade indicated that students who received intervention did significantly better on all measures than those who received Title 1 intervention that reinforced classroom instruction with a direct code emphasis.

**Peter Bryant** (peter.bryant@psy.ox.ac.uk; Oxford University, United Kingdom) and Maggie Cavendish. *Two hypotheses about the phonological connection with reading.*

Several longitudinal studies have shown a significant connection between children's performance in rhyme oddity tasks before they learn to read and these children's subsequent success in reading. However the connection could be due to the cognitive and not to the phonological demands of the oddity task. We checked this in a 3-year longitudinal study by giving 114 children who were 4-5 years at the start rhyme and phoneme oddity and detection tasks in four out of 6 sessions, and reading and spelling tests in the last session. Both the rhyme and the phoneme tasks predicted reading and spelling, and rhyme predicted some of the reading and spelling scores even after controls for phoneme detection. Early rhyme scores predicted later phoneme detection, but not vice versa. This is evidence that rhyme contributes to reading and also to phoneme awareness.

**Markéta Caravolas** (m.c.caravolas@liv.ac.uk; University of Liverpool, United Kingdom) and Jan Volín. *Persistent phoneme awareness and word recognition deficits in Czech-speaking dyslexic children: Is the effect of transparent orthography overstated?*

Reading, spelling, phonological awareness, phonological memory, and speed of processing skills were assessed among 42 Czech dyslexic children (9-12 years old) and were compared with those of 42 age peers and with 42 spelling/reading ability matched peers (7-10 years old). We investigated whether dyslexic children learning a consistent orthography have a persistent phoneme awareness deficit, or whether their primary difficulty is with phonological memory and reading fluency, as recently proposed by Landerl and Wimmer (2000). As expected, the dyslexic children performed significantly worse than their age peers on all tasks. The dyslexics did show a deficit in phoneme awareness (deletion task), however they showed no deficit on two memory span measures, relative to younger reading/spelling ability peers. As in previous studies in consistent orthographies, the Czech dyslexics showed a deficit in single-word-reading speed; however, they also showed a deficit in word recognition accuracy.

**Claudia Cardoso-Martins** (cacau@fafich.ufmg.br; Universidade Federal de Minas Gerais, Brazil), Larissa A. Rodrigues, and Linnea C. Ehri. *Illiterate adults' print identification.*

The study investigated the strategies that illiterate adults use to identify print. Participants were 20 low SES Brazilian adults ranging in age from 20 to 74 years. Participants' ability to identify common environmental signs with varying degrees of contextual information was investigated along with their ability to learn to read visual and phonetic simplified spellings. The results showed a clear dissociation between the two sets of tasks: Even though the participants learned the phonetic spellings more easily than the visual spellings, environmental signs were recognized only when presented in their full context. The implications of these results for our understanding of beginning reading are discussed.

**Claudia Cardoso-Martins** (cacau@fafich.ufmg.br; Universidade Federal de Minas Gerais, Brazil), and Bruce Pennington. *The relationship between early sensitivity to rhyme and later reading and spelling ability: Evidence from children at low and high familial risk for reading disability.*

Relations between sensitivity to rhyme and reading and spelling ability were investigated in a longitudinal study of children at either low (N=57) or high (N=67) familial risk for reading disability. The results question the hypothesis that early sensitivity to rhyme makes a direct contribution to reading and spelling ability. Sensitivity to rhyme at 5 years predicted reading and spelling ability at 7 and 8 years, but only for the children of the low risk group. Furthermore, when we controlled for the effect of differences in these children's phoneme awareness at 6 years, the correlation between early sensitivity to rhyme and later reading and spelling ability was no longer significant.

**Joanne F. Carlisle** (jfcarl@umich.edu; University of Michigan), Margaret M. Beeman, and Liliana B. Zecker. *Learning to write in two languages: More on the question of transfer.*

This study investigates aspects of writing that transfer from the native (L1) to the second language (L2), when writing instruction is given in L1. Subjects were elementary children in maintenance bilingual program. Fall and spring spontaneous writing samples in Spanish and English were compared to assess growth within and across languages and to investigate the claim that basic components (e.g., spelling) are more likely to transfer from L1 to L2 than higher level components (e.g., discourse level), which are likely to be related to L1 proficiency. Results show improvement in higher level components over time, but little change in the discrepancy between Spanish and English. Results contribute to our understanding of transitions in the process of acquiring literacy in L2.

**María S. Carlo** (maria\_carlo@harvard.edu; Harvard Graduate School of Education), Diane August, and Margarita Calderón. *Transfer of reading skills from Spanish to English.*

This study evaluated the transfer of reading skills from Spanish to English among 127 2nd grade Latino/a students. Students were tested at the end of 2nd & 3rd grade on measures of phonemic segmentation, letter, word and pseudoword naming in both languages. Regression analyses evaluated the predictability of 3rd grade performance from Spanish performance at the end of 2nd grade. Spanish performance reliably predicted English 3rd grade performance on the phonemic segmentation, letter and word naming tasks when variation due to oral English proficiency, non-verbal ability, initial English component task performance and language of instruction were controlled in the analyses.

**Ronald P. Carver** (carver@umkc.edu; University of Missouri-Kansas City). *A treatment study: using a computer tutor to teach spelling and its effect upon reading level and reading rate.*

This research will investigate the effect of using a computer tutor to teach students how to spell words; the effect upon reading level and reading rate. The experimental treatment will be given to 50 - seventh, eighth, and ninth graders in a new charter school, who are reading at least one grade equivalent (GE) below their grade in school and who know more words when listening than when reading. The computer tutor helps students learn to read words that they know when listening but do not know in print; they learn to spell the words and also recognize them at their own reading rate. Students will be paired in terms of their listening and spelling ability and then randomly assigned to experimental and control groups. When each student in the experimental group has learned to spell and quickly recognize quickly all words known when listening, then the treatment will be ended and this experimental student and the control paired student will be given post measures of reading level and a measure of rate level. This study will be completed in February, 2001, and the results are expected to indicate that this treatment is highly effective with respect to helping poor readers read much better.

**Lisa Pericola Case** (lp64@umail.umd.edu; University of Maryland), Deborah Speece, and Dawn Molloy. *Severity of reading problems: Individual differences and contextual influences.*

We examined the validity of an alternative identification model of reading disability by comparing two groups of at-risk children longitudinally on a variety of reading and reading related measures. From our analysis of the first two years we have evidence that a dual discrepancy model based on reading fluency identified students with more severe reading problems. In addition a qualitative analysis will be utilized to expose instructional issues and/or particular student characteristics that further exacerbated the children's difficulties. Use of this alternative model has great potential for the early identification of children at risk for reading difficulty.

**Anne Castles** (a.castles@psych.unimelb.edu.au; University of Melbourne, Australia), Chris Davis, and Tracey Holt. *Word recognition development in children: Results of a longitudinal priming study.*

We present some results of a longitudinal study in which a *masked priming* procedure was used to examine the nature and specificity of children's written word representations over time. Children from age seven through to age ten responded to familiar words preceded by rapidly presented primes. At the youngest age, the children showed facilitation in responding to the target words when the primes were identical (e.g. salt -> SALT) and also when they differed by one or more letters (e.g. malt -> SALT) or letter positions (slat -> SALT). However, at later ages, the pattern of priming became more restricted, suggesting the emergence of a more precisely specified word recognition system.

**Hugh W. Catts** (catts@ukans.edu; University of Kansas). *The role of speed processing, rapid naming, and phonological awareness in reading achievement.*

Some have proposed the existence of a 4th grade hump in reading achievement at which point a new group of poor readers emerge. We examined approximately 200 children demonstrating deficits in reading comprehension in the 2nd and/or 4th grades (poor readers). Approximately one quarter of the poor readers in 4th grade had no problem in reading comprehension in the 2nd grade (i.e., late emerging poor readers). These children were characterized by better word recognition skills and poorer listening comprehension abilities than those who showed reading comprehension deficits in 2nd grade alone. These and other results will be discussed in terms of their theoretical and clinical/educational implications.

**Charlene Chamberlain** (charlene\_chamberlain@und.nodak.edu; University of North Dakota) and Rachel Mayberry. *Pseudohomophone effects in good and poor readers who are deaf and use ASL.*

We investigated whether the use of phonology in word recognition differentiated good from poor deaf readers. We tested 14 good readers, 17 poor readers, and 14 hearing controls with a pseudohomophone lexical decision task. The hearing control group was slower and less accurate on pseudohomophones than on the nonpseudohomophones. The two deaf groups were slower, but not less accurate. These results suggest that deaf readers, while sensitive to phonology in words, are more reliant on visual or orthographic patterns in words, and that factors other than use of phonology may differentiate good from poor deaf readers.

**W. Cynthia Chan** (c7chan@uwaterloo.ca; University of Waterloo, Canada) and Patricia G. Bowers. *Acquisition of sight word vocabulary in young beginning readers: Context, exposure and individual difference effects.*

40 second-grade children were given a sight word-training task to explore the effects of practice and presentation in context or in isolation on the acquisition of sight vocabulary. Words initially unknown in isolation were presented alone and in sentence context. Three trials of this sequence occurred. The influence of context on subsequent isolation trials was assessed. Phonological awareness, naming speed, short-term memory, and reading achievement were assessed. More words were identified in context than in isolation across trials. Reading and phonological awareness scores were the best predictors of gains made in isolated word identification. Better readers benefited more from context.

**Chris Chase** (cchase@mckenna.edu; Claremont McKenna College) and Brandi Page. *Color affects orthographic priming.*

Oral pronunciation latencies can be influenced by primes, or briefly (less than 100 ms) exposed letter strings which are orthographically, phonologically, or semantically related to the target word. In this study, we found orthographic primes, e.g., "BOOK" for the target "book", sped up pronunciation by almost 50 ms compared to a neutral prime "XXXX" under blue light conditions. However, under red light there was no prime facilitation. Results suggest a role for the magnocellular pathway in the earliest stages of text processing.

**Hsuan-Chih Chen** (hcchen@origin.psy.cuhk.edu.hk; The Chinese University of Hong Kong, China) and Kin Fai Ellick Wong. *Resolution of morphemic ambiguity in reading Chinese.*

Issues of lexical ambiguity resolution have been examined primarily in the context of sentence/text processing. This work explores how morphemic ambiguity is resolved within a word. In four eye-monitoring experiments, subjects performed lexical decisions on Chinese two-character words. Experiment 1 found that the second characters of words having polysemy first characters (PIC words) were fixated longer than those having monosemy first characters (MIC words). When the character not being fixated was masked (Experiment 2), there were more regressions to the first characters in reading PIC words than in reading MIC words. Experiments 3 and 4 found that the second characters of P2C words were fixated longer than those of M2C words, regardless of whether the character not being fixated was visible (Experiment 3) or masked (Experiment 4). These results are discussed in terms of how the meanings of individual characters are activated and used in recognizing Chinese compound words.

**Chris Coleman** (ccoleman@arches.uga.edu; Regents' Center for Learning Disorders), Noel Gregg, Don Rubin, and J. Mark Davis. *Analysis of word knowledge in the expository essays of college students with and without learning disabilities.*

The study explored word knowledge, both semantic and orthographic, in the expository writing samples of four groups of college writers. Group 1 demonstrated learning disabilities (LD), Group 2 demonstrated Attention-Deficit/Hyperactivity Disorder (AD/HD), Group 3 demonstrated both LD and AD/HD, and Group 4 had no history of a documented or suspected disability. Corpus-based analysis, frequency counts, vocabulary estimation methods, and spelling error analyses were conducted in order to gauge the richness and sophistication of the college writers' word knowledge. T-tests and multiple regression analyses were used to examine group differences, the relationship between receptive and expressive vocabulary, and the relationship between semantic and orthographic word knowledge.

**Donald L. Compton** (donald.l.compton@vanderbilt.edu; Vanderbilt University), Doug Fuchs, and Lynn Fuchs. *The influence of item composition on RAN-letter performance in first-grade children.*

There is growing evidence to suggest that rapid automatized naming (RAN) performance is strongly associated with early word reading development. Specifically, RAN has been shown to have considerable predictive power for both concurrent and future reading achievement in beginning and poor readers. It has consistently been reported that serial naming of alphanumeric symbols (i.e., letters and numbers) is more closely associated with reading development than is the serial naming of nonalphanumeric symbols (i.e., object and colors). Furthermore, differences between good and poor readers tend to be greater for alphanumeric symbols than for nonalphanumeric symbols. To date there has not been a study to evaluate whether within a given symbol set (e.g., letters) the items used to construct the RAN task affect performance and/or the relationship with reading. The purpose of this study was to substitute items into the traditional RAN-letter task (a,d,o,p,s) designed by Denckla and Rudel (1976) and evaluate the effects on naming speed and correlations with reading skill. To accomplish this three new versions of the RAN task were constructed by substituting a different letter for the "o" in the traditional RAN task. Two different dimensions were explored through the substitution pattern - rhyming with other letters and visual confusability with other letters. To increase the number of rhyming letters the "o" was replaced by a "v" that rhymed with both "p" and "d" thus creating a symbol set consisting of (a,d,v,p,s). To increase the number of visually confusable letters the "o" was replaced by a "q" that was confusable with both "p" and "d" thus creating a symbol set consisting of (a,d,q,p,s). To test the extent to which these dimensions are additive a letter that is both rhyming and confusable "b" was substituted in for the "o" (a,d,b,p,s). These four different RAN tests (administered in randomized order) were given to approximately 500 first-grade children. In addition, each child was administered a one minute test of letter name knowledge, one minute test of letter sound knowledge, RAN-numbers, phoneme segmentation and blending, WRMT-R Word ID and Word Attack, and WIAT Spelling. Relationships between the various RAN tasks, phonemic awareness, and reading and spelling skills will be explored through commonality analysis.

**Nicole Conrad** (conradnj@mcmaster.ca; McMaster University, Canada) and Betty Ann Levy. *Letter processing in children with slow RAN performance.*

Wolf and Bowers (1999) proposed that performance on the RAN task is associated with the ease of building up orthographic representations, which in turn support fluent reading. This theory predicted that children with slow naming speed may be less sensitive to orthographic units larger than single letters. Results reported here indicate that children with slow naming speed on the RAN task have difficulty processing individual letters in a string, whether or not the string is orthographically regular. Results also indicate that children with slow naming speed make use of orthographic redundancy found in words, consistent with results reported by Bowers, Sunseth, & Golden (1999). Implications to Bowers and Wolf's theory are discussed.

**Pierre Cormier** (Cormiep@umoncton.ca; Université de Moncton, Canada) and Philippe Goffaux. *Different patterns of cross-linguistic transfer for phonological skills in French-speaking adults learning English as a second language.*

Cross linguistic transfer of phonological skills was examined in 57 French-speaking (L1) university students enrolled in courses of English as a second language (L2) at three levels. Participants were administered tests of auditory analysis, verbal working memory, rapid naming, word decoding in both French and English. Receptive vocabulary was tested in French only. For French word decoding, regression weights of all three phonological skills were equal in L1 and L2 whereas, for English word decoding, only the regression weights of auditory analysis were equal. Cross linguistic transfer of skills seems symmetrical for phonological awareness, but not for other phonological skills.

**Virginia Cronin** (Virginia.Cronin@MSVU.CA; Mount Saint Vincent University, Canada). *Sight word reading and the development of automaticity.*

First grade sight word and nonsense word reading as well as earlier prereading abilities were examined in a longitudinal study. From a larger group, 62 children were selected by various combinations of sight word and nonsense word reading. Group 1 children read between 1 and 8 sight words, and 0 or 1 nonsense words. Group 2 children read between 11 and 34 sight words, and 0 or 1 nonsense words. Group 3 children read 4 or more nonsense words, and between 11 and 34 sight words. It was found that knowing more sight words, but no nonsense words was not an advantage in grades 2 and 3 reading, but that knowing more nonsense words facilitated later reading. The prereading rapid naming and phonological sensitivity scores of groups 1 and 2 did not differ and in most cases were significantly worse than those of group 3. These results were explained by the development of automaticity.

**Rebecca Cross** (Rebecca.Cross@Colorado.edu; University of Colorado) and Richard K. Olson. *Processing speed and the genetic etiology of reading disability.*

There is strong evidence from behavioral genetic studies for a significant genetic etiology in reading disability at the group level, but genetic influence is likely to vary in kind and amount across individuals. We have previously shown that genetic influence is relatively low for disabled readers who are also low in IQ. In the present analyses, we show that genetic influence on reading deficits is also relatively low in disabled readers who are relatively slow in several processing speed measures.

**Anne E. Cunningham** (acunning@socrates.berkeley.edu; University of California, Berkeley), Kathryn E. Perry, Keith E. Stanovich, Paula J. Stanovich, and Michelle Chapell. *Teachers disciplinary knowledge of reading and its relation to K-3 pedagogy.*

Teacher education is becoming a central issue in policy discussions of children's literacy. What do teachers need to know to be effective practitioners in teaching reading? How deep and explicit must their knowledge base be to provide effective instruction? We are conducting a year-long longitudinal study investigating 950 urban K-3 teachers' knowledge of the structure of the English language, literature and reading development as well as an examination of their beliefs and practices in reading education. Following a year of training and in-class coaching, we will measure their growth in these domains and correlate teacher development to student achievement among a subsample of teachers.

**Laurie E. Cutting** (cutting@kennedykrieger.org; Developmental Cognitive Neurology- Kennedy Krieger Institute), Christine W. Koth, Laura T. Crowhurst, and Martha Bridge Denckla. *The effect of varying orthographic patterns (OP) and word frequency in first and second grade readers subtyped according to the "Double-Deficit (DD) Hypothesis."*

Fifty-four normal readers were categorized by relative strengths and weaknesses in rapid naming (RN) and phonological skills (Phono) and compared on reading words varying in frequency and difficulty of OP. Children with weaker RN and Phono ("DD") had the lowest reading scores, children with either weak RN or Phono ("single-deficit" groups) were middle range readers, and children with the highest RN and Phono ("No-Deficit") were the best readers. All "deficit" groups scored lower on word lists as compared to the "No-Deficit" group; however, the "single-deficit RN" group scored lower only on words with difficult OP. Findings support four reader subtypes and suggest that the effect of OP discriminates reader subtypes.

**Marcia Davidson** (Marcia.Davidson@wwu.edu; Western Washington University) and John Towner. *Validity and reliability of oral reading fluency measures.*

This paper summarizes the results of three, relatively large scale, research studies conducted in Washington State examining the validity and reliability of an oral reading fluency as a measure of reading skill. Specifically, the studies examine cross-sectional and longitudinal data on one-minute oral reading fluency as related to performance on standardized high stakes measures. Across all three studies, strong correlations were found between the one-minute sample of oral reading and a variety of standardized reading tests. Likewise, the oral reading fluency measure was found to be high reliable over time. Discussion includes implications for using the standardized oral reading fluency measure as a proxy for basic skill proficiency in reading and as a tool for screening for children at risk for reading failure.

**Chayna J. Davis** (chayna.davis@colorado.edu; University of Colorado-Boulder), Valerie S. Knopik, Richard K. Olson, Sally J. Wadsworth, and John C. DeFries. *Etiology of covariation between reading performance and rapid automatized naming: A twin study.*

The present study assesses the genetic and environmental etiologies of reading, rapid automatized naming (RAN), and their covariation by fitting multivariate structural equation models to data from 587 twin pairs in which at least one member of the pair exhibited reading difficulties (low-range) and from 360 control (normal-range) twin pairs who were tested in the Colorado Learning Disabilities Research Center. The measures included the Reading Recognition, Reading Comprehension and Spelling subtests (READ) of the Peabody Individual Achievement Test, as well as the 4 subtests (Numbers, Colors, Pictures, and Letters) of the RAN paradigm. Results from a bivariate phenotypic analysis with two hypothesized latent factors, READ and RAN, indicated that the correlation between reading and RAN performance for the low-range sample (.58) was significantly higher than that of the normal-range sample (.32). When this model was partitioned to include estimates of genetic, shared environmental and non-shared environmental influences, resulting heritability estimates did not differ significantly for the low-range and normal-range samples for either READ ( $a^2 = .85$  and  $.76$ , respectively) or RAN ( $a^2 = .58$  and  $.62$ , respectively). However, similar to the

phenotypic correlation, the genetic correlation between the READ and RAN latent factors could not be equated for the two groups ( $r_A = .71$  for the low-range sample and  $.35$  for the normal-range sample), and 86% of the phenotypic correlation between READ and RAN was accounted for by genetic influences in the low-range sample, compared with 71% for the normal-range sample. Thus, the etiology of the relationship between reading performance and RAN may differ for children with reading difficulties and normally-achieving readers. Moreover, these results support previous findings that the best predictors of reading skills may differ for samples of children with normal reading levels and those with reading difficulties.

**Marcia H. Davis** (mhardisk@wam.umd.edu; University of Maryland), John T. Guthrie, William D. Schafer, and Kathy Cox. *Associations of integrated reading-content instruction, reading engagement and text comprehension.*

A model of the relations among the variables of reading engagement, integrated reading instruction (IRI), and text comprehension was investigated. Third grade students ( $N = 7630$ ) completed a questionnaire to assess amount of reading engagement and perceived amount of IRI. The reading subsection of the Maryland State Performance Assessment measured text comprehension. For both Caucasian and African American students amount of reading engagement was positively related to both text comprehension and IRI when word recognition instruction, gender, and SES were statistically controlled. IRI was positively related to text comprehension for Caucasian, but not for African American students, with variables controlled.

**S. Hélène Deacon** (strom.deacon@psy.ox.ac.uk; University of Oxford, United Kingdom) and P.E. Byrant. *Children's use of base words to spell derived and inflected words: Beyond phonological and orthographic similarity.*

Recent research has been quite successful in establishing that children use morphological information in their spelling (e.g., Nunes, Bryant & Bindman, 1997). This study explores children's (in years 3, 4 and 5) use of base words in spelling derived (such as 'fairly') and inflected words, as well as in control words (such as 'fairies'), thereby controlling for orthographic and phonological similarities between morphologically related words. Spelling will be correlated with a measure of morphological awareness and good and poor spellers, as well as derived and inflected words will be compared. Results will be presented at the SSSR meeting.

**Guy Denhière** (Guy.Denhiere@newsup.univ-mrs.fr; Université de Provence, France), Marie-Anne Schelstraete, and Céline Hupet. *The specificity of reading comprehension processes in story recall.*

The present study addresses the question of the specificity of comprehension processes in reading with regard to listening comprehension. The aim of the experiment was to see if the importance level of information in a story would have the same effect on recall performances after an oral presentation than after the participants read the story at their own pace. Analyses of the recall protocols mainly showed that the importance level effect traditionally found in recall experiments was present in reading but not in listening. Such a result has important consequences both for reading comprehension researches and intervention since it seems to show that the processing at work in listening and reading comprehension would be not the same even at the text level.

**Carolyn A. Denton** (Carolyn.A.Denton@uth.tmc.edu; University of Texas Health Science Center-Houston) and Jan E. Hasbrouck. *The efficacy of two English reading interventions for bilingual students.*

This study evaluated two English reading interventions for Spanish-dominant bilingual students in Grades 2 - 5. The progress of tutored students ( $n = 45$ ) was compared to that of non-tutored classmates ( $n = 39$ ), using the Woodcock Reading Mastery Tests-Revised and curriculum-based measures. Students who received explicit instruction in decoding made significant progress in word reading and reading accuracy. Students in a repeated reading program made gains in oral fluency and accuracy and in passage comprehension, although progress was weaker than predicted. There is a need for study of the relationship between optimal fluency levels and listening comprehension levels for English Language Learners.

**Linnea Ehri** (Lehri@gc.cuny.edu; CUNY Graduate Center) and Maria L. C. Spalten. *Phonemic awareness instruction: Teaching kindergartners to segment articulatory gestures in words.*

Effects of phonemic segmentation instruction on kindergartners' reading and spelling acquisition were examined in two experiments. Triplets of novice beginning readers were matched and assigned randomly to three groups. The "mouth" group learned to position blocks to depict the sequence of articulatory gestures corresponding to phonemes in words. The "ear" group learned to position blocks to depict the sequence of sounds in words rather than gestures. Members of a no-treatment control group remained in their classrooms. Results revealed that both types of instruction were effective in teaching phonemic segmentation. However, articulatory segmentation instruction was more engaging than sound segmentation instruction. Both types enhanced children's ability to spell the sounds in words even though letter manipulation was not taught. However, only articulatory instruction contributed to children's word reading processes. Results are interpreted to clarify how phonemic segmentation instruction helps children at the partial alphabetic phase learn to read and spell words.

**John Elkins** (j.elkins@mailbox.uq.edu.au; Schonell Special Education Research Centre, Australia) and Christina E. van Kraayenoord. *Teaching methods and materials for students with disabilities in regular classes.*

With the trend towards inclusion of students with disabilities it is vital to know whether teaching approaches are valid for this group. We will report some of the findings related to teaching methods and materials from a recent study completed for the federal government of Australia. The study, entitled "Literacy, numeracy and students with disabilities" (van Kraayenoord, Elkins, Palmer, Rickards and Colbert, 2000), focused on elementary education. The

paper will identify a number of concerns related to the extensive use of methods that have little empirically established validity.

**Angela J. Fawcett** (a.fawcett@sheffield.ac.uk; University of Sheffield, United Kingdom) and Roderick I. Nicolson. *Evaluation of reading interventions in UK infant and junior schools.*

There is widespread concern over literacy standards in UK and US schools. Research evidence suggests that the earlier children at risk of literacy failure can be identified, the more effective (and cost-effective) intervention will be. In this talk we present data from a range of controlled studies designed to evaluate the effectiveness and cost-effectiveness of support using traditional and computer-based teaching methods in infant, junior and secondary schools. The results have been extremely encouraging and provide a baseline that allows alternative interventions to be compared. Effect sizes will be compared with those established in NIH work, and strategic implications considered.

**Barbara Foorman** (Barbara.R. Foorman@uth.tmc.edu; University of Texas-Houston Health Science Center), David Francis, Dung-tsa Chen, Christopher Schatschneider, and Louisa Moats. *Does writing instruction improve reading?*

Will classrooms that start the year with similar student-level word reading and phonemic awareness means and similar time-sampling profiles on reading instruction but different profiles on writing instruction differ at the end of the year in reading as well as in writing outcomes? To answer this question, analyses of writing samples from 1100 second and third graders from 110 classrooms in high poverty schools were analyzed, along with observational data of classroom instruction and student outcomes in reading, spelling, and phonemic awareness. Results suggest that in classrooms where writing is taught the impact on word reading and comprehension is significant.

**Anne E. Fowler** (FowlerA@Haskins.Yale.edu; Haskins Laboratories), Laura Conway Palumbo, Brook Swainson, and Dorothy Gavalis. *Acquisition of sight word and analytic word knowledge in kindergarten.*

A longitudinal training study assessed kindergartners' response to phoneme awareness and sight word instruction. Results indicate a direct link between explicit instruction and the acquisition of sight words, with teacher implementation overwhelming initial individual differences among children, and virtually no transfer to untrained words. In analytic reading and spelling tasks, children performed better with phonemes in which they received explicit instruction, but showed substantial transfer to untaught phonemes. Instructional factors accounted for most of the variation in reading outcome, whereas spelling outcome depended heavily on initial letter knowledge, rapid serial naming, and confrontation naming.

**Judith Foy** (mjfoy@gte.net; Loyola Marymount University, United States). *Second language proficiency effects on speech perception in adult bilinguals.*

The relation between second-language proficiency and speech perception is examined in this study of English-Spanish bilingual adults. Speech perception of beginning, moderately proficient, and highly proficient bilinguals for sounds phonemically contrastive in Spanish but not English (/r/ vs. /rr/) and in English but not Spanish (/s/ vs. /z/) is contrasted, and compared with monolinguals matches. The results reveal important relationships between speech perception, vocabulary, letter-sound knowledge, and phonological awareness and may help us to understand the predictors of phonological awareness, well known to be one of the most important predictors of reading ability in children.

**Mary Kienstra Frese** (frese3@gatewaynet.com; Loyola University-Chicago). *Differential effects of summer vacation on reading and vocabulary growth for same-aged kindergartners and first graders.*

Using the school cutoff method, the present study examined the effects of summer vacation on growth in reading recognition and receptive vocabulary for same aged old kindergarten and young first graders. Results of the present study confirm previous work on school year effects revealing that, first grade instruction, as well as, lack of instruction during summer break, had a large impact on reading, but not vocabulary skills. Young first graders made more progress than old kindergartners both during the school year and over the summer in reading, but not vocabulary. In addition, for reading recognition, young first graders evidenced a greater decline in growth rates over the summer vacation than old kindergartners.

**Uta Frith** (u.frith@ucl.ac.uk; University College London, United Kingdom) and Sarah Griffiths. *Articulation awareness in adult dyslexics.*

We administered a test of articulation awareness (AA) and found that well compensated adult dyslexics were significantly impaired while they were at ceiling on a test of phoneme manipulation. The opposite had been found for adult illiterates, tested in Portugal by Cary and her colleagues. This pattern suggests that it would be profitable to look for a cross-modal integration deficit in dyslexia involving proprioception, vision and audition. Given the results with illiterates, such a deficit is likely to be cause rather than effect of reading failure.

**Uta Frith** (u.frith@ucl.ac.uk; University College London, United Kingdom) and Maggie Snowling. *Cognitive links between parents and children at risk for developmental dyslexia.*

As part of a longitudinal study of children at genetic risk of dyslexia in the UK information was also collected on parental literacy and phonological skills. The at risk group was compared with a control group of the same socioeconomic and educational status. The main question of interest is whether in the dyslexic group the affected parent's performance on phonological and literacy tasks can predict the child's performance on similar tests.

**Douglas Fuchs** (doug.fuchs@vanderbilt.edu; Vanderbilt University) and Lynn S. Fuchs. *The respective contributions of phonological awareness and decoding to reading development in Title I and Non-Title I schools.*

This study's purpose was to replicate Hatcher, Hulme, and Ellis's (1994) basic design, but with kindergarten teachers rather than researchers implementing the treatments in their classrooms. Our 4 study groups were (a) no-treatment control, (b) phonological awareness (PA), (c) PA and decoding, and (d) decoding. All treatments were largely peer-mediated. 32 teachers were assigned randomly and equally to the 4 groups so that, for each group, 4 teachers were in Title I schools and 4 were not. 442 kindergartners were pre- and post-tested on a battery of reading measures. In non-Title I schools, the PA and decoding group performed reliably better than other groups; in Title I schools, the decoding group did best. Observational and interview data suggested that the combined PA and decoding treatment required more classroom management skills than many Title I teachers seemed to have.

**Lynn S. Fuchs** (lynn.fuchs@vanderbilt.edu; Vanderbilt University) and Douglas Fuchs. *Evaluating a peer-mediated approach to increase reading fluency in Title I and Non-Title I schools.*

Participants were 30 teachers assigned randomly to 3 groups with 10 per group; within each group, 5 of the 10 teachers were in a Title I school. 14 students in each class were pre- and post-tested, such that 6, 4, and 4 were low, average, and high achievers, for a total of 420 children. There was a no-treatment control group and two treatment groups: Peer-Assisted Learning Strategies (PALS)-Fluency and PALS-Standard. Students in both treatments worked in pairs on letter-sound correspondence and reading sight words, decodable words, and short stories. Only the PALS-Fluency students played a series of "speed games." Treatment lasted 22 weeks. The two treatment groups outperformed controls on letter sound knowledge, word identification, blending, and spelling. Only PALS-Fluency students did better than controls on a near-transfer text-reading task. On segmentation, word attack, and far-transfer text-reading tasks, Title I PALS-Fluency students did better than controls, whereas non-Title I PALS-Fluency students did not.

**Javier Gayan** (javier.gayan@colorado.edu; University of Colorado at Boulder) and Richard K. Olson. *Genetic and environmental influences on group deficits in reading disability.*

Data from identical and fraternal twins were analyzed to estimate the proportions of genetic and environmental influences on group deficits in accuracy and, when available, speed for printed word recognition, and for related skills in phonological decoding, orthographic coding, and phoneme awareness. Both genetic and environmental influences were significant. In addition, bivariate genetic analyses were employed to estimate the degree of shared genetic influence on group deficits across these different reading and language skills. About half of the group deficits in each of the skills were due to genetic influences, and the genetic origins were largely shared among the measures ( $r_{\{g\}} = .67-.99$ ), except for those between orthographic coding and phoneme awareness ( $r_{\{g\}} = .28-.39$ ). Implications of the results are discussed for models of reading disability and remediation.

**Astrid Geudens** (astrid.geudens@ufsia.ac.be; Fund for Scientific Research Flanders/University of Antwerp, Belgium) and Dominiek Sandra. *Not all biphonemic syllables are alike: Some reveal more about phonological awareness and early reading than others.*

This study focuses on the relationship between Dutch prereaders' segmentation and substitution ability on CV-syllables (/pa:/) versus VC-syllables (/a.p/) and their early reading skills during the first year of reading instruction. Despite superior performance on VC-syllables, our data suggest that only CV-performance measures phonemic awareness and is a better predictor of later reading. The entire data pattern demonstrates that perceptual and articulatory factors play an important role in prereaders' access to sounds but do not guarantee access to phonemes. These findings may be of direct relevance to educational practice: the natural development of sound awareness, the construction of tools for diagnosing phonological awareness and for instructional materials.

**Esther Geva** (egeva@oise.utoronto.ca; The Ontario Institute for Studies In Education of the University of Toronto, Canada) and Zohreh Yaghoub-Zadeh. *Reading comprehension in ESL children: What develops?*

This presentation will focus on the development of reading comprehension in ESL and a comparison group of English-as-a-first-language (EL1) children, whose language and reading development have been tracked for 4 years, beginning in Grade 1. A Structural Equation Modeling framework is used to compare and discuss the relative contribution of oral language proficiency indices, basic word recognition skills, phonological processing and indices of speed and fluency to reading comprehension in ESL and EL1 elementary school children.

**Vincent Goetry** (vgoetry@ulb.ac.be; Laboratoire de Psychologie Expérimentale, Belgium), Régine Kolinsky, and Philippe Mousty. *The influence of the language-specific orthographic representation on the conceptualization of the phonological structures of words: A cross-linguistic comparison between pre-readers and readers.*

This study investigated the effects of orthographic knowledge on the conceptualization of the phonological structures of words in French and Dutch. The phonological (syllabic) judgments on words displaying optional vowels was compared both across pre-readers and adults and across French and Dutch, two languages that display different orthographic representations of the optional vowels. The available comparisons suggest that the orthographic representations of words shape the conscious representations of their phonological structures. Implication of these findings for the representation of complex syllables in these two languages will be addressed.

**Vincent Goetry** (vgoetry@ulb.ac.be; Laboratoire de Psychologie Expérimentale, Belgium), Régine Kolinsky, and Philippe Mousty. *Metaphonological development and literacy acquisition in bilingual children: A longitudinal comparative study.*

The present longitudinal study compared the metaphonological and literacy skills of bilingual children attending school in a second language (French vs. Dutch) to those of French and Dutch monolinguals. Such design was aimed at disentangling the effects of bilingualism from those of the language-specific phonological and orthographic characteristics on the development of these abilities. The results of metaphonological and reading tests showed no

effects of bilingualism, but revealed cross-linguistic differences that may reflect the phonological peculiarities and the differences in orthographic transparency between French and Dutch. The implications of these findings are discussed.

**Alexandra Gottardo** (agottard@wlu.ca; Wilfrid Laurier University, Canada), Mary Harmon, David Acevedo, Heidy Stanish, and Michael Wolfe. *The development of English reading in Spanish-speaking children.*

Thirty-eight children with Spanish as their first language (L1) were tested in first grade. Measures of reading and phonological processing were administered in English and Spanish. Reading level and phonological processing were related. The strongest predictors of English word reading ability were English vocabulary and L1 phonological processing, while English pseudoword reading performance was predicted by phonological measures. This finding points to the importance of vocabulary knowledge in supporting partial phonological recoding skills in beginning readers (Share, 1995; Share & Stanovich, 1995). Finally, phonological processing skill in a child's L1 is related to reading acquisition performance (Gottardo, Yan, Wade-Woolley & Siegel, 1999).

**Noel Gregg** (Knoelgregg@aol.com; University of Georgia), Roswitha Romonath, Robert B. Stennett, Cheri Hoy, Deborah Knight, and Nancy Mather. *Phonological and orthographic coding profiles of German and United States adolescents and young adults with and without dyslexia.*

Structural equation modeling (SEM) was used to investigate the contributions of phonological and orthographic processing to the reading decoding and spelling of adolescents and young adults in Germany and the United States. The study compared the fit of a model of orthographic and phonological coding in samples of adolescents and young adults with and without learning disabilities in Germany and the United States. Implications for future research, assessment and intervention across the two orthographies explored will be presented.

**Noel Gregg** (Knoelgregg@aol.com; University of Georgia), Christopher Coleman, Robert B. Stennett, and Mark Davis. *Relationship of discourse complexity to the comprehension and production of written text.*

The purpose of this study was to examine specific word-and sentence-level features most frequently produced in the expository writing of four groups of college writers with and without disabilities, as well as the relationship of these linguistic features to their comprehension of expository text. Computer-based analysis and structural equation modeling were used to group specific linguistic features identified in the expository essays across all four groups. Four communication dimensions (factors) were identified for the four groups of writers. The relationship of these linguistic features to the verbosity, quality and lexical complexity of the student's production of expository text, as well as their comprehension of expository text was then investigated.

**Elizabeth A. Griffin** (egriff1@wpo.it.luc.edu; Loyola University-Chicago) and Frederick J. Morrison. *Narrowing the gap in reading: Instructional promise and peril.*

The influence of time devoted to reading-related classroom experiences on word decoding skill was evaluated for first grade children with lower versus higher IQs. A model of reading instruction that distinguished time devoted to teacher-directed activities from time spent in child-directed activities was developed. Each type of classroom experience affected growth in word decoding skill, but these effects were not evenly distributed by IQ group. Specifically, child-directed activities, the predominant type of experience observed, contributed to growth in word decoding skill for high IQ children. Teacher-directed activities had markedly greater effects on low IQ children's growth in word decoding skill.

**Yvonne M. Griffiths** (ymg100@york.ac.uk; University of York, United Kingdom), Charles Hulme, Lynne Weighall, and Margaret J. Snowling. *Verbal short-term memory deficits in dyslexic adults.*

A recent model of normal verbal short-term memory span (Hulme, Newton, Cowan, Stuart & Brown, 1999) was used as a framework to examine the processes of short-term memory in a sample of dyslexic adults. Immediate memory span and speed of memory search were assessed for words and nonwords of short and long spoken duration. The within-subject relationships between measures of memory search, memory span and the timing of memory span responses, were examined in these dyslexic individuals. Analyses also examined how these relationships vary according to the lexical status or length of items that are to be remembered. Results are interpreted within a model of verbal short term memory span in which trace selection from a short term memory store and the reintegration (restoration) of degraded phonological traces both occur in the pauses between saying successive items.

**Elena L. Grigorenko** (elena.grigorenko@yale.edu; Yale University, United States and Moscow State University, Russia) and Leonard Katz. *Familiarity of reading skills in Russian.*

This study has investigated cross-generation patterns of reading performance indicators in Russian families. To our knowledge, it was the first study of familial patterns of reading-ability indicators in a sample of Russian families. The research was conducted on a sample of 300 children and their parents. This sample provided, for the first time, an opportunity (1) to verify the current model of reading achievement in Russian; (2) to estimate heritability coefficients of reading-related processes; and (3) to investigate patterns of transmission of reading-related cognitive processes in a family sample of native Russian speakers.

**Peter J. Hatcher** (ph20@york.ac.uk; University of York, United Kingdom), Charles Hulme, and Margaret Snowling. *Training rhyme and phoneme skills facilitates reading through phoneme awareness.*

We investigate the effectiveness of four theoretically motivated programmes for the teaching of reading at school entry, Reading (plus phonics), Reading plus rhyme and phoneme, Reading plus rhyme, and Reading plus phoneme. The phonological awareness training was successful but was not associated with significant gains in reading. For those at risk of delay in acquiring reading, phonological skills training yielded significant gains in both phoneme, but not

rhyme, skills and in reading. At school entry, intervention to boost phonological skills needs to be targeted at children at risk of reading- delay with the aim being to enhance phoneme-grapheme association.

**Connie Suk-Han Ho** (shhoc@hkucc.hku.hk; University of Hong Kong, China), David Wai-Ock Chan, Suk-Man Tsang, and Suk-Han Lee. *The cognitive profile and multiple-deficit hypothesis in Chinese developmental dyslexia.*

The present study was conducted to examine the cognitive profile and multiple-deficit hypothesis in Chinese developmental dyslexia. Thirty Chinese dyslexic children in Hong Kong were compared with 30 average readers of the same age (CA controls) and 30 average readers of the same reading-level (RL controls) in four rapid naming tasks, four visual tasks, five phonological tasks and three orthographic tasks. The results showed that Chinese dyslexic children performed significantly worse than the CA controls but similarly to the RL controls in most of the cognitive tasks. The rapid naming deficit was found to be the most dominant type in Chinese dyslexic children. Over half of the dyslexic children exhibited deficits in three or more cognitive areas and there was a significant association between the number of cognitive deficits and degree of reading and spelling impairment. The present findings support the multiple deficit hypothesis in Chinese developmental dyslexia.

**Rosalind Horowitz** (rhorowitz@utsa.edu; University of Texas-San Antonio). *Repetition in classroom discourse: Functions in teacher-child talk about and interpretation of a literary text.*

Repetition has been studied by reading researchers as a means for building automaticity and fluency in reading. But repetition of text language and content or peer input also serves important functions in classroom talk about text. In this paper, I summarize current research that shows the role of repetition in student talk in achieving meaning and higher level interpretations. Often repetition of a text's language and ideas has been viewed negatively in the context of the classroom. Teachers admonish students for their repetitive and incomplete utterances, which are also viewed as a mark of ineffective thinking. In recent research, we hypothesized that repetition in classroom conversations by children might signal increased involvement with a text and might serve several functions: as a means to increase comprehension possibilities, cohesion in discourse, to connect the listeners in a group and carry or propel the learner to the next expression of thought and ultimately higher interpretation of a text. Mexican American 5th graders, 150 miles from the Mexican border, who were exploring cultural identities, read a Novell which was discussed in 4 conversations across a 2-week time period. The children in the study used repetition to serve a number of purposes as they attempted to explain the meaning of the novel. We looked at the use of repetition and how it evolved and changed across the four conversations. The turns in self repetition increased significantly between conversations one and two and between three and four. Turns in verification repetition increased across conversations two and three. The turns in emphasis repetition increased between conversations one and four. The turns in persistence repetition increased between conversations one and two and between one and four. The study demonstrated that repetition is used by students as specific linguistic-cognitive strategies functioning as means for increasing text interpretation. As the conversations continued, the students moved from text-focused talk to personal-focused thinking, reflecting on their own lives and beliefs about survival and acculturation.

**Michelle K. Hosp** (michelle.hosp@vanderbilt.edu; Peabody College of Vanderbilt University, United States) and Lynn S. Fuchs. *The use of word reading rate and accuracy as an indicator of reading comprehension.*

Fluency is often defined as the rate and accuracy at which a student reads. Fluency is highly correlated with comprehension, making it an important skill to measure. Rate is commonly measured using passages to calculate the number of words read correctly in one minute. Accuracy is usually measured with word lists to calculate the percentage of words read correctly. However, rate can also be measured using word lists and accuracy can be measured using passages. The purpose of this poster is to present a literature review comparing the correlations of rate and accuracy using both word lists and passages with criterion measures of comprehension.

**Cheri Hoy** (cherihoy@coe.uga.edu; The University of Georgia), Noel Gregg, Deborah Knight, and Robert B. Stennett. *Word knowledge, phonological and orthographic coding in the reading and spelling of college students with and without learning disabilities.*

The literature on decoding and spelling contains numerous studies considering the phonological and the orthographic contributions to performance of these skills. There is less information about the contribution of word knowledge to decoding and spelling achievement. This study investigated the contribution of word knowledge, phonology and orthography to the decoding and spelling performance of college students with and without learning disabilities using structural equation modeling. The fit of the model for the two populations was also compared.

**Charles Hulme** (ch1@york.ac.uk; University of York, United Kingdom), Peter J. Hatcher, Kate Nation, Angela Brown, John Adams, and George Stuart. *Phoneme awareness is a better predictor of early reading skill than onset-rime awareness.*

We present the results of a short-term longitudinal study. Children in the early stages of learning to read (5 and 6 year olds) were administered three different tasks (deletion, oddity and detection) tapping four levels of phonological awareness (initial phoneme, final phoneme, onset and rime). Measures of phoneme awareness were the best concurrent and longitudinal predictors of reading skill with onset-rime skills making no additional predictive contribution once phonemic skills were accounted for. The findings are related to recent controversy over the role of large versus small phonological units as predictors of children's reading skills.

**Florian Hutzler** (Florian.Hutzler@sbg.ac.at; University of Salzburg, Austria) and Heinz Wimmer. *Computational modeling of learning to read German and English.*

The recently documented advantage of young German readers over their English peers can be attributed to the higher grapheme-phoneme consistency of German or, alternatively, to the reliance on phonics teaching in German schools. The present work used German and English variants of the connectionist model of Plaut et al. (1996) to examine the role of consistency. The German network reached asymptotic performance faster and - corresponding to empirical findings - showed better generalization to nonwords. This was particularly the case when rather irrelevant errors of vowel length were neglected.

**Galit Ishaik** (gishaik@watarts.uwaterloo.ca; University of Waterloo, Canada), Patricia Bowers, and Richard Steffy.

*Phonological awareness tasks dissected.*

Research has begun to address demands made by standard phonological awareness (PA) tasks. The current study investigates the contribution of rapid automatized naming (RAN), short-term memory and working memory (WM) to PA tasks. In a sample of 74 Grade Three students, a WM task (Digit Backwards) and RAN-Letters emerged as significant unique predictors of the PA tasks (Auditory Analysis Test and the Sound Categorization Task). Although the short-term memory task, a second WM task, and RAN-Digits were also predictive of these PA tasks when entered first into a regression analysis, the variance they accounted for was subsumed by either RAN-Letters or the Digit Backwards task.

**Nancy E. Jackson** (nancy-jackson@uiowa.edu; University of Iowa) and Heidi L. Doellinger. *When do university students who are poor decoders comprehend text adequately?*

We screened 194 university sophomores and juniors to select the 17 poorest decoders. Of these, 6 were average and 11 were poor text comprehenders. Few had been identified as disabled readers. Those poor decoders who were good comprehenders differed from the poor comprehenders in performance on oral measures of phonological recoding and in academic history, but not in any component reading or spelling skills. When compared to comprehension-matched typical readers, the 6 poor decoders who comprehended well tended to read text more slowly, but these two groups did not differ on any comprehension measure derived from two think-aloud protocols.

**Annette R. Jenner** (jenner@haskins.yale.edu; Haskins Laboratories and Yale School of Medicine), Kenneth R. Pugh, W. Einar Mencl, Ann E. Fowler, Donald P. Shankweiler, Bennett A. Shaywitz, Sally E. Shaywitz, Stephen Frost, and John C. Gore.

*Neuronal pathways associated with phonologic-to-orthographic mappings (spelling).*

In well-compensated adults spelling problems persist as spelling relies heavily on phonologic-to-orthographic mapping, a skill dyslexics have difficulty with. The current fMRI study was designed to examine the neuronal pathways responsible for phonologic-to-orthographic mapping in skilled readers and examine these results in terms of spelling ability. Contrast maps revealed activations in left inferior frontal cortex including Broca's area, left angular and supramarginal gyri, as well as the left inferior temporal lobe at the junction of the inferior temporal and middle occipital gyri. Differences between words and non-words as well as brain/behavioral relations will also be discussed.

**Cynthia Jonsson** (Cynthia.Jonsson@fredonia.edu; SUNY Fredonia) and Penny Chiappe. *The effects of context on speech perception for good and poor readers.*

This study will examine the relationship between speech perception and context for good and poor readers. The decoding, phoneme identification, and phonological awareness of 120 students in grades 1 – 3 will be assessed. Speech perception will be examined using the minimal pairs bath – path with the contextual frames "She needs hot water for the...", and "She likes to jog along the..." We expect good readers will show more clearly defined categorical perception, with context affecting the category boundary. For poor readers, who may show less clearly defined categorical perception, we expect context to influence speech perception throughout the VOT continuum.

**R. Malatesha Joshi** (MJOSHI@COE.TAMU.EDU; Texas A&M University), P.G. Aaron, Regina Boulware-Gooden, and Rajni Chengappa. *Is spoken language a contributor to spelling difficulties children experience?*

There is ample research evidence to indicate that phonology of a language has a very significant influence on spelling. If phonology plays a major role in spelling, then the nature of spelling errors committed by children to whom English is introduced first as a written language would be expected to differ from those committed by children who acquired English as a spoken language first. The hypothesis is that children who acquire English first in its spoken form are likely to spell words the way they are pronounced. This will lead to phonetic spelling errors of unfamiliar words. In contrast, children who acquire English first in its written form are not likely to commit such phonetic errors. Consequently, there will be qualitative differences in their spelling errors by these two groups of children. To test this hypothesis, written spellings of American children were compared with those of Indian children who attend English medium schools. The difference between the two groups is that American children spoke English at home and the Indian children did not speak English at home. A list of preselected words was administered as a spelling test to children and their written responses were collected. Quantitative and qualitative analyses showed that there was a difference between the two groups in the number of correct responses as well as in the degree of phonological approximation to the target words.

**Leonard Katz** (Katz@uconnvm.uconn.edu; University of Connecticut, United States) and Elena L. Grigorenko. *Acquisition of reading fluency in Russian.*

The underlying premise of this research is that the child's ability to consciously separate the spoken word into phonemes is critical for his/her acquisition of reading. Decoding is the term that describes the process of converting the letters of a printed word into some approximation of their possible phonemic representations (their "sounds") and blending these discrete representations together to form a holistic representation similar to the spoken word. This

study focuses on the phase of reading development in which the child moves from initial decoding, which is labored and slow, to fluent, automatic decoding. The orthography of the Russian language is particularly well suited for the study of this transition because nearly all children will eventually achieve error free decoding (unlike children who read English), but not all children will achieve fluent word recognition. This research addresses two hypotheses about the reading characteristics that facilitate fluent decoding. Both hypotheses recognize the need to understand the cognitive structure of the reader's knowledge of how letters and letter clusters relate to a particular language. One theory is that, during the transition to skilled reading, the decoding process becomes rapid and automatic; it occurs without selective attention. In this view, skilled reading is just a faster version of beginning reading. There is no qualitative difference; the only difference is quantitative (i.e., speed of reading). An alternative hypothesis is that the skilled reader's transition to fluent decoding results from a change in the nature of decoding—in which the reader acquires print-to-sound relations of increasingly larger size, involving larger clusters of letters (larger "grain-sizes"). Here, skilled word recognition does not involve an analysis of each individual letter—sound relationship in the word, but rather an analysis of spelling—sound relationships at the level of letter clusters, syllables, or even the whole word itself. In evaluating the evidence for these two alternatives, this work characterizes the transition for Russian but also provides a plausible model for the transition in English. In addition, this study assesses the hypothesis that the good reader, but not the poor reader, is characterized by an ability to consciously attend to the phoneme building blocks that comprise a spoken word. This ability is termed phonological awareness and is hypothesized to be critical to the development of initial decoding ability. All study participants were assessed using standard tests of phonological awareness and reading ability. Here, we have confirmed for Russian what has been found for English: good readers have phonological awareness but poor readers do not.

**Janice M. Keenan** (jkeenan@du.edu; University of Denver) and Rebecca S. Betjemann. *Combinatorial priming in skilled reading and dyslexia.*

Combinatorial priming can show whether dimensions of lexical representations function modularly or interactively. The combinatorial influences of graphemic, phonological, and semantic priming were examined in the lexical decision task. Targets (e.g., BOAT) were responded to faster when a prime combined graphemic, phonological, and semantic relatedness (e.g., FLOAT) than when it represented only one dimension (e.g., SAIL). Several experiments found the effects of combinatorial priming to be additive, suggesting independent activation modules. However, a prime duration of only 34 msec eliminated significant priming from one-dimension primes, but still produced combinatorial priming, suggesting interactivity. Dyslexic readers showed the same combinatorial effects.

**Maureen Kessenich** (mkessen@luc.edu; Loyola University-Chicago), Fred Morrison, and Fred Bryant. *Precursors of early literacy development: Multiple pathways to the development of three-year-old children's cognitive and language skills.*

Recent studies have demonstrated substantial variability and stability in young children's cognitive and language skills. The present study utilized structural equation modeling (SEM) to evaluate the fit of two models (an initial and alternative model) that integrate several sources of this early developmental variability, namely, child IQ and social skills, and maternal stimulation and sensitivity. While the alternative model fit the data better than the initial model from a statistical perspective, the initial model offered a theoretically compelling pattern of findings. Differences were found in the pattern of variables that predict expressive versus receptive language at three years of age.

**John R. Kirby** (kirbyj@educ.queensu.ca; Queen's University, Canada), Rauno Parrila, and Shannon Pfeiffer. *Naming speed, phonological awareness, and reading development.*

Four groups of children were identified in kindergarten/grade 1 on the basis of oral language scores: one with slow naming speed but adequate phonological awareness; one with low phonological awareness but adequate naming speed; one with low phonological awareness and slow naming speed; and one with adequate phonological awareness and naming speed. The reading and spelling development of these children was observed annually up to grade 5. The paper will (a) describe the performance of these four groups and (b) investigate the relationships between naming speed deficit and the surface subtype of reading difficulties.

**Deborah F. Knight** (dknight@udel.edu; University of Delaware), Noel Gregg, Cheri Hoy, and Robert B. Stennett. *Listening comprehension or verbal ability: Does it matter which measure is used in the identification of reading disability?*

This study investigated the influence of verbal ability and listening comprehension on reading comprehension in samples of college students with and without learning disabilities through structural equation modeling. The unidimensionality of the constructs of verbal ability and listening comprehension was evaluated. The direct influence of both verbal ability and listening comprehension on reading comprehension was determined. In addition, the extent to which their influence was mediated by decoding and working memory was examined. Multigroup analysis permitted an examination of the influence of verbal ability and listening comprehension in students with and without learning disabilities.

**William Labov** (labov@central.cis.upenn.edu; University of Pennsylvania) and Bettina Baker. *Beyond phonemic awareness: The problem of recognizing abstract sound/meaning relations for African American struggling readers.*

Studies of reading errors of inner city African American children show low frequencies for single segments but higher rates for complex syllable structures. In an individualized reading program, initial and final clusters were given equal attention and taught at the same time. Error rates for initial clusters dropped sharply after training, but error rates for final clusters showed no significant change. Since final clusters are regularly simplified in speech, readers must infer

their existence from the patterns of more complex words. Proficient decoding for African-American struggling readers therefore demands cognitive activity at a higher level of abstraction than awareness of phonemes.

**Karin Landerl** (Karin.Landerl@sbg.ac.at; University of Salzburg, Austria). *Findings from a representative study on reading deficits in Austrian 9-year olds.*

Until now, research on reading acquisition and dyslexia in children who acquire German orthography was confined to studies with rather small sample sizes so that effects due to specific sample characteristics or methods of sample selection cannot entirely be ruled out. In May and June 2000 a large sample of 2689 third graders representative for Austrian 9-year olds were confronted with a reading comprehension and a reading fluency test. Additionally, all children within the lowest quartile on the reading comprehension test (N=680) were assessed individually with tests of word and nonword reading and word spelling as well as verbal-phonological and visual skills.

**Annukka Lehtonen** (annukka.lehtonen@psy.ox.ac.uk; University of Oxford, United Kingdom) and Peter Bryant. *Phoneme duration is important in spelling Finnish.*

Orthographies differ in their characteristics, and the problems encountered by beginning spellers may also vary. Finnish uses the duration of phonemes to distinguish between meaning; both single and double letters appear in text. We asked children in years 1-3 to do two dictation tasks to investigate whether geminates (double consonants) are more difficult to spell than other consonant clusters. The results showed that geminates, especially continuants, cause significantly more errors. Also the position of the geminate in the word mattered. There was a significant developmental effect between years 1-3 only in geminate spelling. Implications for spelling development are discussed.

**Che Kan Leong** (leong@sask.usask.ca; University of Saskatchewan, Canada) and Pui Wan Cheng. *Effects of orthographic complexity and phonologic consistency of constituent characters on the visual identification of two-character Chinese words.*

The Interactive Consistency Model (Perfetti & Tan, 1999; Tan & Perfetti, 1999) proposes that in the visual identification of Chinese words orthographic forms are connected to phonological forms as well as to semantic possibilities. The analysis of stroke number and printed frequency of characters and words are the first phase in the visual input. Also, orthographic-phonological form-form mapping at the character or word level is more reliable than the form-meaning mapping. Forty-three Cantonese speaking Chinese college students made accurate and rapid lexical decision of 60 two-character Chinese words, compared with 60 control pseudo-words, according to lexicality, stroke complexity and printed frequency. There were significant main effects of lexicality, stroke complexity and frequency and stroke complexity x frequency interaction. The results are discussed in terms of the activation of the orthographic and semantic forms and the retrieval of the phonological form. Study 2 with another group of 42 Chinese university students focused on the activation of characters' phonology resulting from phonological consistency or inconsistency. The students made lexical decision of 36 two-character Chinese words in 4 phonological consistency conditions with either inconsistent characters on the left or on the right. There were corresponding control words and pseudo-words. The results showed greater efficiency in lexical decision of words with phonological inconsistent characters on the right rather than on the left and both sets of inconsistent characters were processed faster than their control two-character words. These results are discussed in terms of Tan and Perfetti's (1999) activation-selection account within the Consistency Model.

**Betty Ann Levy** (Levy@McMaster.ca; McMaster University, Canada). *Making orthography visible.*

Bowers, Wolf and colleagues have shown that children with the worst prognosis for reading failure are those who perform poorly on tests of both phonemic awareness and rapid automatized naming. I will describe a training study for such children in Grade 2 that used Dr. Seuss-type books that were produced to make orthographic units more visually distinctive within the print. These 'visibility' manipulations improved learning of new words encountered during storybook reading for these poor readers. These results suggest that the orthographic problems suffered by these children are malleable and may be related to visual attentional processes.

**Sylvia Linan-Thompson** (sylvialt@mail.utexas.edu; University of Texas) and Sharon Vaughn. *The long-term effect of group size on the reading outcomes of struggling readers.*

The effects of three grouping formats, 1:1, 1:3, and 1:10, on the reading outcomes of monolingual English and ELL second-graders who were struggling with reading were investigated. Students received 57 supplemental reading intervention sessions. Outcome measures were obtained at 4 points in time during the academic year. Trend analysis of data is in progress. Preliminary results suggest that, after adjusting for pre-test measures, students in all groups made significant gains in comprehension, phoneme segmentation, and fluency following the intervention and gains were maintained over time. The effects of grouping format were most pronounced on word attack and comprehension, both 1:1 and 1:3 outperforming the 1:10.

**Kim Abkarian Lindsey** (lindsey@rcf.usc.edu; University of Southern California-Los Angeles), and Franklin Manis. *Early prediction of reading skills in bilingual children.*

The primary purpose of this study was to determine how well a short battery of tests given in Spanish at the beginning and end of kindergarten was able to predict English reading ability at the end of first grade in a sample of 297 bilingual children. The results indicate that Spanish language measures can be used to predict later reading skill in English in this population. The most important predictors were letter knowledge, phonological awareness and rapid object naming.

**Ying Liu** (liuying@pitt.edu; University of Pittsburgh), Charles Perfetti, and Lesley Hart. *Event related potentials comparisons of English and Chinese word processes I: Chinese results.*

Two Event Related Potential (ERP) experiments compare word processing in Chinese and English, focusing on the time course of visual, phonology and semantic information. Subjects made decisions about meaning and pronunciation relations between two words, with ERP recordings from the onset of the second word. In Chinese experiment, both semantic and phonological similarity (YES trials) produced smaller N400 component than did unrelated (NO) trials. Graphically similar pairs (NO trials) had smaller P200 in both homophone and semantic task compared to control pairs (NO response), further more, smaller N400 in semantic task.

**Linda J. Lombardino** (llombard@csd.ufl.edu; University of Florida), Sarah T. Ahmed, and Henriette Le Grand. *Reading fluency and accuracy following intensive phonemic decoding and rate intervention.*

Pre and post intervention testing of 15 students with developmental dyslexia was conducted to examine degree of changes in rate of word identification, word decoding, connected text reading, and rapid naming following an intensive phonemic decoding and rate intervention program. Significant improvement was noted for both accuracy and fluency on several pre and post test measures. Findings underscore the importance of integrating phonemic decoding with fluency interventions to enhance reading efficiency.

**George Marsh** (gmarsh@csudh.edu; California State University-Dominguez Hills) and Peter Desberg. *On the road to Phoenicia.*

Most of us want our children to grow up to be Phoenicians who are fully conversant with an alphabetic writing system. This study looks at two routes to achieve that goal in a phonemic blending task. Our theory (Marsh et al, 1981) suggests that the direct route may not be the fastest route. We compared a group which took a route through Egypt (words) and Sumer (syllables) paralleling the evolution of writing systems (Gelb, 1952) with a group that took a direct route (phonemes). The race was a tie. We were disappointed that our group did not win, but we gratified that it did not lose despite their circuitous journey.

**Catherine Marshall** (c.marshall@psych.york.ac.uk; University of York, United Kingdom), Margaret J. Snowling, and Peter J. Bailey. *The effect of a verbal labeling strategy on rapid auditory processing: Evidence from normal and dyslexic readers.*

The phonological difficulties of dyslexic children have been attributed to rapid auditory processing deficits, as measured by the Auditory Repetition Task (ART; Tallal, 1980). This paradigm requires children to reproduce sequences of non-verbal tones presented at various rates. The present paper describes two experiments which investigated the effects of using a verbal labeling strategy on the ART, in both normal and dyslexic readers. Explicit encouragement to assign verbal labels to the stimuli facilitated the performance of normal readers. In contrast, the ART scores of dyslexic children did not improve with a verbal strategy. The results suggest that children's propensity to label stimuli in a 'non-verbal' task influences performance. The extent to which performance is facilitated by such a verbal strategy may be determined by underlying language ability.

**Hisashi Masuda** (masuda@info.human.nagoya-u.ac.jp; Nagoya University, Japan) and Hirofumi Saito. *Whole word versus subword activation in reading Japanese Kanji character words: Evidence from good and poor readers.*

In this study, we focused on phonological relationships among Japanese Kanji characters, their sub-components (phonemic radicals) and neighbor characters including the same phonemic radicals (radical-neighbors), and examined differences of the phonological processing of Kanji characters between good and poor readers using naming task. The results suggest that good readers can extract phonological information from a whole Kanji pattern and can ignore its radical-neighbors if they are not useful, while the poor readers have a difficulty to differentiate the phonology between the critical words and their radical-neighbors.

**Nancy Mather** (nmather@u.arizona.edu; University of Arizona) and Elizabeth A. Allen. *Using adapted rapid naming formats to predict varied aspects of reading and writing in elementary age children.*

This study examined the relationship between two types of rapid naming tasks (letters and words) and reading and writing performance in a sample of over 1,000 children in Grades K-6. Although previous research has established that rapid naming provides independent contributions to prediction of reading ability, few studies have included a broad set of cognitive and linguistic tasks. The results of this study support several broad conclusions: (a) naming speed is independent of linguistic processes and should be categorized separately from linguistically-based deficits, (b) other cognitive/linguistic abilities are better predictors of good and poor reading ability, and (c) different linguistic abilities play a greater role at different age levels.

**Catherine McBride-Chang** (cmcbride@psy.cuhk.edu.hk; Chinese University of Hong Kong, China) and Robert Kail. *Components of beginning reading across cultures: Correlates and controversies.*

We looked at correlates of beginning Chinese character and English word recognition among 165 Hong Kong students (ages 4-6 years) and 109 American students (Ages 5-6 years). Structural equation modeling revealed that, across groups, speed of processing contributed to reading skill through its influence on phonological awareness. Processing speed was strongly associated with untimed visual skills, but visual skills did not predict reading across groups. Relative to a subgroup of age-matched American peers, Hong Kong students were superior on tasks of speed, visual skill, letter name knowledge, and syllable deletion, and poorer on tasks of English speech perception and number-naming. Results suggest both "universals" and culturally specific properties of the associations of component skills with beginning reading.

**Megan M. McClelland** (mmcclel@luc.edu; Loyola University-Chicago) and Michelle A. Skertich. *The home literacy environment: Links to emergent literacy skills in preschool children.*

Recent research has indicated that the home literacy environment uniquely predicts academic skills such as general information, vocabulary, and reading skills (Griffin & Morrison, 1997; Stewart, 1995). This study examined the importance of the home literacy environment on emergent literacy and academic skills (vocabulary, reading, and math) in three-year-old children. Results of hierarchical regressions indicated that the home literacy environment uniquely predicted early vocabulary and math skills, but not early reading skills. Overall, findings from the present study highlight the contribution that the home literacy environment makes to early academic skills.

**Megan M. McClelland** (mmcclel@luc.edu; Loyola University-Chicago) and Emily E. Hansen. *A follow-up of children with poor work-related skills: Do problems persist at the end of elementary school?*

Recent research indicates that children's work-related social skills (including the domains of independence, responsibility, self-regulation, and cooperation) are an important aspect of early school success (Cooper & Farran, 1988). Results of the present study extended earlier research (McClelland, Morrison, & Holmes, in press) to find that children with poor work-related skills were significantly behind an overall group of children on reading and mathematics between kindergarten and sixth grade. In addition, hierarchical regressions revealed that math and reading scores for the low work-related skills group at first grade predicted sixth grade math scores, and third grade reading scores. Overall, results demonstrate that children entering kindergarten with poor work-related skills remain significantly behind their peers in reading and math skills at the end of sixth grade.

**Jan Mejdning** (mejdning@dpu.dk; Danish University of Education, Denmark). *The influence of a large scale international reading literacy survey on the national reading literacy level.*

In 1991 Denmark participated in the IEA International Reading Literacy Study and the results for 9-year-olds (3rd grade students) were surprisingly low compared to the results from the other Nordic countries. This paper will present the results from a year 2000 replication of the IEA-RL study with a 1500 student large representative sample of Danish 9-year-olds. Have changes occurred in reading literacy level during the last nine years and what can be said about the relation between this situation and the present state of reading education in Denmark?

**Shelley Miller-Shaul** (Haifa University, Israel) and Zvia Breznitz (zviab@construct.haifa.ac.il). *Speed of visual-orthographic and auditory-phonological processing as a factor in dyslexia: A comparison between young and adult dyslexics by means of electro-physiological measures.*

Current research shows that the difficulty of developmental dyslexics in word identification is a result, amongst other factors, of slow speed of information processing in one or more of the processing modalities relevant to reading. Most of the research work on dyslexia has been carried out among the young population and raised the question whether the characteristics of young dyslexic are similar to those of adult dyslexics. The research utilized behavioral measures that provide information on accuracy and reaction time and electro-physiological measures that permit testing of on-line brain activity. Four groups of subject were tested in this research project: two groups of fourth graders, dyslexic and normal readers, and two groups of adult students, compensated dyslexics and normal readers. Comparison of the differences in research measures between the dyslexics and the control group, in each age group indicates clearly that the difference between the regular readers and the dyslexics is significantly smaller in the adult group on orthographic tasks (behavioral and electro-physiological). The difference increases among the adults on phonological tasks in behavioral and electro-physiological tasks.

**Valerie Muter** (Val19@nationwideisp.net; University of York, United Kingdom), Charles Hulme, and Margaret Snowling. *Phonemes and rimes as predictors of early progress in learning to read: Evidence from a longitudinal study.*

We present a longitudinal study of 94 children in the first two years of learning to read. In particular, we contrast the impact of children's sensitivity to rimes and of phonemes on their early progress in learning to read; the relative importance of these phonological abilities has generated much recent controversy in the scientific literature. Our study clearly demonstrates that it is sensitivity to phonemes not rimes which fuels children's early reading progress. Early letter knowledge in combination with phonemic awareness accounts for most of the variance in beginning reading development. We consider the theoretical and pedagogical implications of these findings.

**Hossein Nassaji** (nassaji@bilkent.ed.tr; Bilkent University, Turkey). *Divergent and convergent patterns of spelling growth in learning English as an L2.*

This longitudinal case study explored the spelling growth of a young ESL learner from grade one to grade four. Spelling data from the learner's free writings and his dialogue journals were closely analyzed. Statistical analyses showed evidence of gradual growth over time. Moreover, significant differences were found across the different time periods and between and among the mean proportions of different types of misspellings. The results seem to provide support for a stage-based description of spelling development in L2. However, findings from qualitative analysis of word types showed patterns which seemed to support a spelling development model that integrates a stage-based with a strategy-based account of spelling growth.

**Kate Nation** (k.nation@psych.york.ac.uk; University of York, United Kingdom). *Reading and language skills in children with autism-spectrum disorder.*

Autism is a complex and pervasive developmental disorder that is characterised by a constellation of impairments in social understanding, imagination and communication. Despite these handicaps, many children with autism-spectrum disorder (ASD) develop relatively advanced word recognition skills although their reading comprehension remains

poor - a pattern of reading behaviour described as hyperlexia. This talk will describe the incidence of hyperlexia in a representative sample of children with ASD, and will present experimental evidence concerning its cognitive and linguistic correlates.

**Tom Nicholson** (t.nicholson@auckland.ac.nz; University of Auckland, New Zealand) and Yi Li Huang. *Reading miscue analysis of Chinese and European children with good and poor reading attainments.*

The study compared the oral reading accuracy and reading comprehension of 20 European and 20 Chinese children, all of them 6- to 7-year-olds. All children read from passages that were either at their instructional level (95% accuracy) or somewhat more difficult (90% accuracy). Results showed that poor readers made miscues that were not graphically similar to the correct words. They relied on grammatical cues. They made more non-meaningful word substitutions than did good readers. Their miscues were real words rather than attempts based on "sounding out". In contrast, good readers made more non-word substitutions than poor readers, indicating that good readers were "sounding out" difficult words. These data suggest that poor readers do not have the same high level of word identification ability compared with good readers. Poor readers are more dependent on context clues for word identification. Chinese poor readers, like European poor readers, had difficulties with reading accuracy. But Chinese children in general were worse than European children in comprehension of easy stories. This suggests that language comprehension is a problem for all Chinese children in schools, compared with native-speakers of English, whereas reading accuracy is only a problem for Chinese poor readers, not for Chinese good readers.

**Tom Nicholson** (t.nicholson@auckland.ac.nz; University of Auckland, New Zealand) and I-Ching Lee. *The effects of phonological discrimination instruction on five-year-old children's phonological skills.*

The idea for this study came from a research article by Hurford (1990). Hurford found that speech discrimination difficulties might occur in poor readers. It was argued that this was a language problem, and best treated with training that was specifically linguistic (i.e., phonemic discrimination training). Children in the present study (N=23 five-year-olds) were identified by teachers as making average or below-average progress in reading, though it turned out that the vast majority (85%) of these 5-year-old children were behind their peers in reading. Children were randomly assigned either to a control group who did not receive training, or an experimental group who received training. The training involved asking children to decide whether two spoken syllables were the same (e.g., ba-ba) or different (e.g., ba-da). There were 64 syllable pairs. The rationale was that some "at risk" children do not discriminate differences between similar phones very well. For example, if the teacher said, "This letter "b" makes a beh sound", a child who did not clearly hear the difference between beh and deh might confuse the phonemic representation for the letter "b". The purpose of this training was to eliminate such possible confusions. The training time was 10-15 minutes a day for five days. It had specific effects on onset-rime awareness, and on phonemic spelling, though not on reading. It could be argued that similar results might have been obtained if the training had been more directly at the phoneme level, as in phonemic awareness training. On the other hand, it may be that training of this kind provides a foundation for further phonemic awareness training, so that acquiring phonemic awareness becomes an easier task for beginning readers. This training was quite short, yet it produced positive results. The results suggest that further work on this topic could be of value.

**Roderick I. Nicolson** (r.nicolson@sheffield.ac.uk; University of Sheffield, United Kingdom). *Reading: Insights from the scientific study of learning.*

The report of the US National Reading Panel is an outstanding example of application of scientific method to the study of reading. In this talk I present complementary information, taken from the well-established scientific literature on learning. I will consider issues of skill learning, skill transfer, learning complex skills, part-whole skill transfer, fluency, automatising, deliberate practice, distributed training, learning plateaux, skill internalisation, progress from feedback to feedforward, models of learning, neural mechanisms underpinning learning, and last but not most, motivation and affect. All these concepts are directly relevant to the scientific study of reading.

**Terezinha Nunes** (Oxford Brookes University) and Peter Bryant. *Morpho-syntactic awareness and reading: An intervention study.*

We tested the hypothesis that morpho-syntactic awareness is causally related to progress in literacy using an intervention study. The children (age range 7 to 8 years) in four intervention groups (N=218) and a control group (N=225) were pre-tested in word-reading and spelling, IQ and mathematics (a control for general effects of training). They were post-tested in word-reading and spelling, and mathematics. Two of the intervention groups received training in phonological awareness and two in morphological awareness; in each type of training, one group performed only oral tasks and the other co-ordinated language awareness training with literacy. Analyses of co-variance with age and IQ as covariates indicated that all intervention groups performed significantly better than the control group in reading. In spelling, only the group receiving phonological training with writing performed significantly better than the controls. No differences were found in mathematics. We conclude that the study supports the hypothesis of a causal link between morpho-syntactic awareness and literacy.

**Erin O'Donnell** (Queen's University, Canada), Melissa J. Bell (7mjb1@qmlink.queensu.ca), Lesly Wade-Woolley, and John Kirby. *Literacy acquisition in grade 1 French immersion students.*

This paper will report on the performance of Grade 1 early French Immersion (FI) students, whose literacy instruction is in L2 only, on specific measures of literacy acquisition. Recent studies have suggested that Francophones may rely almost exclusively on phonological mediation in the early stages in literacy acquisition, due in part to the transparent

nature of the French language (Sprenger-Charolles, Siegel, and Béchennec, 1997). The goal of this study is to compare FI students to their English-only peers to determine if aspects of their literacy development resemble that of Francophones, despite the FI students' exposure to ambient English.

**Alyssa Goldberg O'Rourke** (agoldbe1@emerald.tufts.edu; Tufts University), Tamar Katzir-Cohen, and Beth O'Brien. *What's in a RAN? A comparison of two measures of rapid automatized naming.*

A substantial body of research clearly documents that children with dyslexia are slower than most other readers to access and retrieve verbal labels for visually-presented stimuli. Several versions of rapid automatized naming (RAN) tasks are currently being administered in clinical and research settings. The purpose of this study is to compare two versions of RAN letter tasks. Participants were 60 children in Grades 1-3 identified as at-risk for reading problems. Students were administered measures of word reading and orthography, in addition to the RAN tests. Although both tasks elicited similar naming speeds (time per letter), they differed in the number of children who were identified as having naming-speed deficits. Implications for diagnosis and intervention are discussed.

**William J. Owen** (owenw@duke.usask.ca; University of Saskatchewan, Canada) and Ron Borowsky. *Assessing assembled phonology: An examination of the pseudohomophone naming advantage and base-word frequency effects.*

Pseudohomophones (i.e., non-words that "sound-like" real words; e.g., BRANE) have been utilized in reading research to investigate whether assembled phonology also activates whole-word phonology. The pseudohomophone naming advantage over non-words does support this hypothesis. However, the pseudohomophone naming advantage does not co-occur with the classic marker of lexical access, that being a base-word frequency effect. Several experiments reveal that a pseudohomophone disadvantage provides a better index of lexical access than the pseudohomophone base-word frequency effect.

**Tanya Patel** (t.patel@psych.york.ac.uk; University of York, United Kingdom), Maggie Snowling, and Peter De Jong. *Concurrent predictors of reading skills among normal readers of English and Dutch.*

This paper will report a cross-linguistic study of children learning to read in English (an inconsistent orthography) and in Dutch (a consistent orthography). Concurrent predictors of reading skills in the two orthographies will be compared. Hence, in each language word and nonword reading accuracy and reaction time was assessed and related to performance on tests of phonological awareness and rapid naming. For English, the results indicated that only phonological awareness was a significant predictor of word reading accuracy. The implications of the cross-linguistic results for theories of reading development will be discussed within a connectionist framework.

**Linda M. Phillips** (Linda.Phillips@ualberta.ca; University of Alberta, Canada). *Words: Interpreting meaning from content and context.*

To recognize the distinction between the mental world and the observable world is particularly important when we consider that language is used not simply to refer to things that we see but to refer to things, thoughts, feelings, and events that we cannot see, or that happened in the past, or may happen in the future. These distinctions are often loose, indistinguishable, and sometimes combined. I propose to address some of these distinctions through an appeal to my own empirical research and a philosophical inquiry of what it means to know a word.

**Jorgen Pind** (jorgen@hi.is; University of Iceland, Iceland) and Aldis Gudmundsdottir. *The acquisition of reading and spelling in Iceland: A new research project.*

Iceland is usually considered a highly literate society, with a literary tradition going back to the 12th century. Until quite recently reading difficulties were not considered a significant problem --- though, interestingly, spelling difficulties have long been recognized. In the last 5--10 years 'dyslexia' has, however, come to be considered a significant problem. We will discuss a new research program on reading and spelling acquisition and difficulties in Icelandic. The talk will briefly discuss the nature and history of Icelandic writing, special features of the orthography, the background to our own research project, current status and future tasks.

**Yolanda V. Post** (ypost@neuhaus.org; Neuhaus Education Center), Suzanne Carreker, and Ginger Holland. *Final spelling patterns as anchor for final sounds.*

A short spelling intervention study with first graders showed that explicit linguistic instruction improved spelling and speed of reading over implicit linguistic instruction in the spelling of five final letter patterns in a group of monosyllabic words. The representation of one sound with two letters did not confuse the first graders as much as the discrimination and representation of two sounds with two letters. The results suggest that, in contrast to reading, the difficulty for beginning spelling does not necessarily lie in the letter pattern they have to remember, but in the sound sequence that is represented by letters. Therefore, the results seem to support sound-based spelling instruction.

**Padakannaya Prakash** (prakashp9@hotmail.com; Texas A&M University), Chandana M.V., and Suma S.. *Orthographic awareness, phonemic awareness, and developmental dyslexia.*

The proposed paper would present two experimental studies conducted on developmental dyslexics in Kannada language which has a semisyllabic script. The studies had a pre and post test design. In Study One, a group of developmental dyslexics were divided into Experimental and Control groups matched on reading and writing scores as measured by Standard Kannada Reading and Writing Tests. The children in the Experimental group were given an intervention (in the form of games) to boost their orthographic awareness. The intervention was for 12 sessions of one hour each and lasted for about a month. At the end of the intervention, the children of both Control and Experimental groups were reassessed on their reading and writing skill. There was a VERY VERY SIGNIFICANT improvement in the children of Experimental group. In Study Two, the same procedure as the Study One was followed. The only

difference was that the children in the Experimental group were given an intervention (again in the form of games) to boost the phonemic awareness. The post test scores revealed that the intervention was not successful in improving reading and writing in Kannada. We would like to discuss the results keeping in view the special relationship of phonemic awareness with alphabetic literacy. We also would like to argue how the phonemic awareness could be a part of a broader construct 'orthographic awareness' that would help us in delineating universal and script specific aspects of literacy.

**Sharon Qi** (Sharon\_qi@hotmail.com; Center for Education and Human Services-SRI International), Anna Bosch, and Julia Song. *Correlation study between Spanish kindergarten children's home literacy environment and their early reading skills development.*

A study was conducted with 45 Spanish-speaking K children and their parents exploring the relationship between home literacy environments and development of early literacy skills. As a replication study, the results of the current study were basically consistent with the findings from two previous studies that were conducted with Asian language-speaking children, although the pattern did not remain exactly the same. The study again suggested that home literacy environment factors including language factor played an important role for naturally developing young children's early reading skills. However, the results of this study should be interpreted with caution due to smaller sample size.

**John P. Rack** (jrack@dyslexia-inst.org.uk; Dyslexia Institute, York, U.K.). *Differential response to intervention as a function of phonological skill and general conceptual ability: Initial findings from SPELL IT.*

The Study Programme to Evaluate Literacy Learning through Individualized Teaching (SPELL IT) is a government supported national research programme being conducted by the Dyslexia Institute. In it, we are evaluating three intervention programmes which involve specialist withdrawal teaching (SWT), home support (HS) activities or a combination of the two. All the programmes are structured with the emphasis on development of phonological skills, letter-sound decoding and the application of decoding skills in word reading. A sample of 244 pupils has been recruited who are, on average, 7 ½ years old with reading and spelling ages at the 6 years level. No pupils have been excluded for low IQ scores but all show evidence of specific literacy difficulties. Four matched groups have been created with one group serving as a waiting list control (WLC). Behavioural ratings and data on school and family background have also been collected. This paper will present analyses of the mid-term test outcomes after 24 hours of intervention for Withdrawal Teaching and Home Support groups in relation to the Waiting List Control. The sample characteristics and recruitment procedures will also be described. Significant treatment effects have been found on WRMT-R Word Attack and Passage Comprehension and on a Structured Spelling test. Individual differences in phonological skill predict outcome in spelling and word attack and individual differences in IQ predict outcome in reading comprehension, after controlling for autoregressive and treatment group effects. The results provide further evidence for the efficacy of structured multisensory teaching programmes. Individual differences analyses are consistent with the phonological deficit model of dyslexia but, consistent with an interactive model, they indicate that there is a role for general conceptual ability (IQ) in reading comprehension. Further individual differences analyses in relation to measures of attention and socio-economic factors, and analyses from the Combined programme, will be available by the time of the conference.

**Franck Ramus** (f.ramus@ucl.ac.uk; University College London, United Kingdom), Stuart Rosen, Steven Dakin, and Uta Frith. *Cognitive profiles in developmental dyslexia.*

We will present the results of a large-scale ongoing project aiming to evaluate within the same subjects the different hypotheses concerning the cognitive/neurological deficit underlying developmental dyslexia. Participants are high-achieving dyslexic adults and a matched control group. They are currently being tested across a large range of domains: psychometric tests, standard phonological tasks, auditory & phonetic processing, visual processing and motor control. This design should help us address the issues of subtypes of dyslexia, associations and dissociations between deficits, causal links and co-morbidity, and hopefully evaluate the competing hypotheses.

**Tali Raviv** (traviv@luc.edu; Loyola University-Chicago), Maureen Kessenich, and Frederick J. Morrison. *A mediational model of the association between socioeconomic status and preschool language abilities: The role of parent and child factors.*

The mechanisms by which socioeconomic status (maternal education and income-to-needs ratio) influences preschool language abilities was examined in a sample of 1016 families from the NICHD Study of Early Child Care. Linear multiple regressions indicated that a substantial portion of the variance in expressive and receptive language abilities at 36 months was explained by proximal factors (parenting and children's cognitive abilities). In addition, after accounting for the role of these proximal variables, the unique contribution of SES was drastically reduced, in some cases to non-significance. Finally, regressions indicated that parenting and child cognitive skill were significant mediators of the impact of SES on language outcomes.

**Noya Regev** (zbrenitz@hotmail.com; University of Haifa, Israel), and Zvia Breznitz. *Locating the sources of brain activity when processing phonological information in reading: A comparison between dyslexic and normal readers.*

A large amount of research points to a phonological processing deficit as a core deficit in dyslexia (i.e., Stanovich, 1993; Rack, Snowling & Olson, 1992). In an attempt to determine the origins of phonological deficits, recent studies have used fMRI measures. Data have indicated that dyslexics differed from normal readers in the intensity of brain activation and, to some extent, in the regions where activity occurred when processing phonological information (i.e., Paulesu et al., 1996; Shaywitz et al., 1998). However, fMRI is limited as a time resolution measure and is unable to provide online information about temporal activity in the brain during phonological processing. Recently a program

was developed (LORETA: Pascual-Marqui et al., 1994) which allows estimation of brain source localization based on online cortical activity (from ongoing EEG) during performance of any given task. The current study was designed to estimate the brain source locations during phonological processing of dyslexics as compared to normal readers. 30 adult readers participated in the study: 15 dyslexics and 15 chronological age-matched normal readers. The subjects first performed a series of tests to establish their classification into the experimental and the control groups. Phonological processing was then examined using two experimental tasks: a discrimination task at the phoneme level (lower level processing) and a discrimination task at the word/pseudoword level (higher level processing). Behavioral and electrophysiological measures were employed. The localization of brain sources of the two groups of subjects during phonological processing was estimated by using the LORETA program. Results indicated several differences between the two groups of subjects: 1) The speed and the intensity of brain activation in the temporal regions were more pronounced among the normal readers; 2) The brain activity of the dyslexics in the two tasks indicated more extensive use of areas on the right side of the brain; 3) For the dyslexics brain activation started in the right side of the brain and then shifted to the left; among the normal readers activation started in the left side of the brain. The data of this study make a potential contribution to our understanding of the origins of dyslexia.

**Erik D. Reichle** (reichle@pitt.edu; University of Pittsburgh) and Charles A. Perfetti. *Modeling lexical constituent availability during visual word identification.*

A computational model of word identification was developed to evaluate two hypotheses: (1) word identification involves accessing a word's orthographic, phonological, and semantic representations; and (2) the quality, or integrity, of these representations affect the rate and reliability of word identification, and thus reading ability. The model was used to simulate the results of a homophone semantic-judgment task (Hart & Perfetti, in press) and to predict performance in a semantic priming task in which both the prime mask lexical status and prime-mask similarity were manipulated (Reichle et al., in preparation). This work provides further supports for the lexical constituency and lexical quality hypotheses.

**Pieter Reitsma** (preitsma@psy.vu.nl; PI Research Amsterdam, Netherlands). *The fragments of spelling Dutch.*

Spelling is an inherently complex cognitive and linguistic process and errors can have multiple etiologies. It is hypothesized that learning to spell can be considered as the acquisition of skill in representing the phonological forms of words and in addition the acquisition of knowledge about specific rules, regularities and irregularities. Initial knowledge structures about the orthography consist of an unstructured collection of small knowledge elements. The major development of spelling ability is one of collecting and systematizing the fragments of knowledge into consistent and interrelated schemes. Analyses of spelling errors of about 1800 beginning spellers are used to obtain preliminary evidence for this theoretical account.

**Ralph E. Reynolds** (ralph.reynolds@cmail.nevada.edu; University of Nevada), Gale M. Sinatra, and Dale S. Niederhauser. *The relationship between efficient word identification processing and efficient comprehension processes: A preliminary study.*

The purpose of this study is to determine if a significant relationship exists between efficient lower-level processes and the allocation of attentional resources to comprehension processes. Fifth graders are being used as subjects. The study employs a 2X2X2 factorial design, with comprehension ability (higher vs lower) and skill in lower-level processing (efficient vs inefficient) as the between-subject factors, and type of text information (important vs less-important) serving as the within-subject factor. Dependent measures are: attention duration (as measured by reading time), word naming times, standardized comprehension test scores, and learning from text as measured by short-answer posttests. Participant interviews will be used to triangulate the on-line data and the learning data (Schnieder, 1985). Two types of analyses will be conducted: mixed-factorial MANOVA and causal regression analyses (Reynolds & Anderson, 1982). It is expected that the findings will indicate that efficient word-level processing is related to efficient allocation of attention for comprehension. Efficient allocation of attentional resources to comprehension will, in turn, be related to effective learning and recall of text information.

**Jeremiah Ring** (ring@psych.colorado.edu; Texas Scottish Rite Hospital, Dallas Texas). *Repetition priming effects form spelling production on lexical decision performance.*

Two experiments explore factors that might explain previously reported priming from a blind spelling task to lexical decision performance. Experiment 1 investigated visual imagery and the data suggest that imagery can play a role in priming; however, it does not seem to be dependent on access to visual working memory. Experiment 2 explored the effects of adding nonwords to the spelling task and found significant priming for real words, but not nonwords. The results are discussed in relation to the locus of the blind spelling priming effect and models of the representations that support skilled reading and spelling.

**John P. Sabatini** (sabatini@literacy.upenn.edu; University of Pennsylvania). *Reading difficulties in low literate adults: What's rate got to do with it?*

A study was conducted of the component reading processes of adults. Using hierarchical regression with word recognition ability (WRAT) as the dependent variable, 74% of the variance was accounted for by accuracy in a basic decoding task and the (inverse) speed of naming relatively frequent words. Speed of naming real words was a strong predictor itself and contributed 11% unique variance. Results are interpreted as consistent with a hypothesis that speed of processing of linguistic codes is critical to acquisition of automatic word recognition, regardless of whether a general speed of processing deficit exists.

**Mark Sadoski** (msadoski@tamu.edu; Texas A&M University) and Maximo Rodriguez. *Effects of rote, context, keyword, and context/keyword methods on vocabulary learning.*

This study involves vocabulary instruction. The effects of rote rehearsal, context, keyword, and a combined context/keyword method on immediate and delayed retention of English as a second language (ESL) vocabulary was examined. Eight intact ninth-grade ESL classes were randomly assigned to one of those four learning conditions. Individual differences in both native language vocabulary and English vocabulary were measured. Cued recall was assessed either immediately or after a one-week delay. Results showed that the context/keyword method produced recall far superior to the other methods after one week regardless of individual differences. Both practical and theoretical issues will be discussed.

**Javier S. Sainz** (jsainz@psi.ucm.es; Universidad Complutense de Madrid, Spain) and Carmen Villalba. *Illusory words in word recognition: Role of top-down and bottom-up constraints in lexical substitution.*

One of the most elusive phenomena in reading is lexical substitution. Although rarely present, lexical substitution is involved in the most severe cases of dyslexia. Parallel research has shown evidence that seems to support that analogy-based processes might be playing a major role in these type of errors in word recognition. In fact, generating a phonological code from a visual input is actually a rather complicated process in which phonological, orthographic and, maybe, output codes seem to simultaneously intervene, and memory-based representations sharing orthographical, phonological, and semantic cues with the to-be-recognized word might alter in crucial ways the recognition process. In reading, readers might be taking advantage of spelling-to-phoneme correspondences to sound a word out, activating phonological segments and integrating them to construct a phonological code for the word, a type of process known as assembled phonology (Patterson & Coltheart, 1987) or, phonological recoding. The primary aim of this contribution is to study lexical substitution in a series of four experiments by using a migration error paradigm. After being too briefly presented with a two-word display, subjects were induced to commit migration errors as they were forced to choose a target word displayed among items of a distractor set. The probability of reporting an illusory conjunction was indirectly manipulated by presenting along with the target orthographically-, phonologically-, or semantically-similar distractors. A migration error is described as an interaction among items in a multi-word display that takes the following form: Reports of a word present in the display often contain letters coming from another word present as well, that is, letters present in one word in the display often show up in reports of the other word. For example, given the tachistoscopic display SAND LANE (in Spanish, e.g., BATO, RATA), subjects postcued to report the item on the left often report LAND (in Spanish, e.g., BATA) or SANE (in Spanish, e.g., RATO) instead of SAND (in Spanish, e.g., BATO), there being a similar tendency to make migration errors when the item on the right is cued as well. As found in some studies, physical similarity cannot entirely account for the pattern of interference usually obtained as an effect due to the activation of competitive codes at different levels of processing. Whenever stimulus information is encoded into a structural description, it immediately functions as a cue or source pattern providing activation for any preexisting memorial representations with which it has been paired in the past. Word recognition should be depending on how its identity is uniquely determined. On this rationale, the hypothesis we test is that poor word recognition might be due to cross talk between the content of the lexicon and the phonologic and graphemic contents being activated by competitive cues in the process. In the first three experiments automatically-adjusted exposure times of the target set, error rates and response latencies were taken. In the fourth experiment besides the usual measures brain evoked potentials (ERPs) were taken to determine the recognition potential that allows us to separate mere physical similarity from lexical similarity according to the variables being involved: orthographical similarity as a subject has to distinguish between a lexically plausible targets and a lexically unplausible target that sound alike; phonological similarity as a subject tries to distinguish between the targets and homophonic foes; and, semantic similarity as a subject uses meaning to filter out the targets from semantically-related candidates becoming plausible competitive targets. We find that migrations depend on the abstract, structural similarity of the strings, but not on the physical similarity; on whether the strings are words, orthographically plausible or unplausible, and on whether the possible migration responses are words, homophonic or non-homophonic. Filtering costs of a target were caused by the processing of events rather than by the mere presence of irrelevant items, the entire decision being modulated by how much computation is needed to uniquely distinguish the candidate target from the memory representations evoked by the target and competitive distractors. Results show that orthographic and phonologic migration errors and semantic-based migration errors are distinct although both seem to depend on how a word is structured in the lexicon. The results challenge a common view of a rule-based account of word reading. Our findings are interpreted in terms of a model in which word strings simultaneously access high-level structural knowledge there activating competitive knowledge about what sequences of letters fit together to form familiar words.

**Hirofumi Saito** (saito@info.human.nagoya-u.ac.jp; Nagoya University, Japan), Hisashi Masuda, and Masahiro Kawakami. *Phonological and semantic activation of subwords in recognition of Japanese Kanji characters.*

In this study, we focused on the phonological and the semantic similarity between Japanese Kanji characters and their subwords (phonemic radicals or semantic radicals), and examined the effects of the phonological and the semantic activation of radicals using visual matching task. The results were taken as support for the idea that the phonological and the semantic information of subwords are devoted to word recognition in a different way: The phonological information gives cues for retrieval of neighborhood words, while the semantic information is used to enhance the distinctiveness of the critical word from its neighbors.

**Dominiek Sandra** (domineik.sandra@ufsia.ac.be; University of Antwerp, Belgium), James Booth, Astrid Geudens, and Charles S. Perfetti. *Identifying the locus of rime effects in reading tasks: Cross-linguistic and cross-task comparisons.*

Orthographies differ in the consistency of their grapheme-to-phoneme mappings. GP mappings are rather inconsistent in English (*beat, bear*) but quite consistent in Dutch. In English, consistency between orthography and phonology increases considerably at the rime level (*fight, light*). Such cross-linguistic differences might explain why rime effects were not found in Dutch (Geudens & Sandra, 1999). However, Booth & Perfetti's (submitted) results suggest that even in English, rime effects do not reveal early recognition units (no effect in brief identification) but depend on phonological assembly processes for reading aloud (effect in naming). We systematically studied this issue by comparing effects in English and Dutch and tapping into different stages of the processing time course (brief identification, immediate naming, delayed naming). In a priming paradigm we compared CV and VC primes for CVC target words. The patterns of between-task differences within languages and within-task differences between languages is used to identify the locus of rime effects.

**Marie-Anne Schelstraete** (schelstraete@exco.ucl.ac.be; Université catholique de Louvain, Belgium), Guy Denhière, and Florence Briquet. *The role of integration mechanisms in verbal long-term working memory on reading comprehension in children*

Verbal working memory is assumed to play a crucial role in reading comprehension and to account for some inter-individual differences among adult skilled readers and among children and teenagers. The present research aimed to study the use of a verbal Long-Term Working Memory (LT-WM) in children (grade 5 and 6) and its links with children performances in sentence and text comprehension and in other measures of WM. Verbal LT-WM (Ericsson & Kintsch, 1995) is defined as an extension of the WM such as usually conceived and it is assumed to develop with practice; it is supposed to contain information from the text in an organized structure easily, quickly and reliably available to the reader.

**Latrice Seals** (Latrice.M.Seals@uth.tmc.edu; University of Houston), Barbara R. Foorman, David J. Francis, and Kimberly Wristers. *To what extent does sensitivity to African-American Vernacular English affect phonological awareness testing?*

This study investigated examiner's sensitivity to the dialect of African American Vernacular English (AAVE) when administering phonological awareness subtests to AAVE-speaking children. Inner-city AAVE-speaking children were given phonological awareness subtests while one AAVE and one Standard American English (SAE) assessor rated each student. We hypothesized that AAVE assessors would differ in the way that they scored children compared to SAE assessors and that this difference would be greater with AAVE-sensitive items compared to non-AAVE-sensitive items. Findings suggest that AAVE assessors may assign higher overall scores, however, only moderate differences in scoring were found between sensitive and non-sensitive items.

**Joseph Shimron** (shimron@research.haifa.ac.il; University of Haifa, Israel), and Vered Vaknin. *Regular and irregular plurals in the mental lexicon: Evidence from Hebrew.*

The Hebrew noun may be inflected to mark gender, number, and possession. Pluralization of a masculine noun is achieved by suffixing the singular noun with */-im/*, pluralization of a singular feminine noun is achieved by suffixing the singular noun with */-ot/*. With very few exceptions, these are the only ways to form plurals in Hebrew. However, these rules apply mostly to *+animate* nouns, for all *-animate* nouns the choice of plural suffixes (*/-im/* or */-ot/*) is quite arbitrary. In light of this arbitrariness, one would expect associative memory, rather than morphological procedures to predominate as an organizing factor in the Hebrew mental lexicon. Our data provide support for the opposite prediction.

**Louise Spear-Swerling** (ras-lcs@snet.net; Southern Connecticut State University). *Fourth-graders' performance on two different measures of reading comprehension.*

This study examined fourth graders' performance on two reading comprehension measures, one involving a question-answering format and the other a cloze format, that are part of a state-mandated assessment. Although performance on the two formats was closely related, children with word-level reading difficulties---whether defined using nonwords, real words, or speed of word reading---were more likely to do well on the question-answering measure than on the cloze measure. The results suggest that test format should be considered in interpreting comprehension performance and also underscore the need to assess specific component abilities in reading, such as word decoding and vocabulary.

**Deborah L. Speece** (dlspeece@wam.umd.edu; University of Maryland), Christina Mills, Kristen Ritchey, and Elgen Hillman. *The role of letter-sound fluency as a predictor of early reading problems.*

We will examine the role of letter-sound fluency skills measured in kindergarten in the prediction of letter and word skills measured in first grade. Forty kindergarten children received a battery of tests that tapped several reading-related skills. They will receive reading measures in first grade (March, 2001). The kindergarten results demonstrated that the letter-sound fluency measure was reliable and valid and accounted for unique variance in kindergarten reading skills along with letter name knowledge and phonological awareness ( $R^2 = .73$ ). The kindergarten battery will be used to predict first grade reading scores and to determine which combination of predictors best identifies children with reading problems in first grade.

**Rhona Stainthorp** (r.stainthorp@ioe.ac.uk; London University Institute of Education, United Kingdom) and Diana Hughes. *An illustrative case of precocious reading ability.*

This poster presents a case study girl who was identified as being a precocious reader at the age of 4 years. She is a participant in a longitudinal study documenting the literacy development of a group of 15 such children. The student

who forms the basis of this illustrative case study has been chosen at random for the cohort of 15. Evidence includes her performance on standardised assessments of language, phonological awareness, reading, writing and spelling; performance on experimental tasks of phonology, language, reading and writing; transcripts from interviews with her, her parents and teachers; and artefacts from her self generated writing and school reports.

**Rhona Stainthorp** (R.Stainthorp@ioe.ac.uk; London University Institute of Education, United Kingdom) and Diana Hughes. *Are precocious readers still ahead by the age of 11 years?*

This paper presents some preliminary results of a follow-up study of a group of 14 children in their eleventh year who were identified as being fluent readers at the age of 5 years. The focus of the paper is their performance on a rhyme judgment reaction time task. The data show that they are faster overall than a control group and also slowed down significantly less when making judgments about orthographically similar non-rhyming pairs (move-cove). The data suggest that the precocious readers have significantly more extensive visual/orthographic lexicons than the control group. These are discussed in the light of contemporary models of reading development.

**G. Brian Thompson** (brian.thompson@vuw.ac.nz; Victoria University of Wellington, New Zealand), Vincent Connelly, Michael F. McKay, and Claire M. Fletcher-Flinn. *The acquisition of orthographic word storage in diverse instructional environments: Implications for practice and theories of processing.*

This is a report of a microtraining study of the acquisition of word storage by low progress English-speaking 6-year-olds from three school environments, in New Zealand, Australia and the UK, that varied in the extent of explicit phonics instruction. Spelling training for acquisition of word storage was ineffectual compared with reading training. Spelling performance by transfer from reading training was at least as effective as direct spelling training. Children without explicit phonics instruction were restricted to word storage that was lettercase-specific. Implications for both teaching practice and for understanding explicit and implicit processing as they affect word storage are discussed.

**Rebecca Treiman** (rtreiman@sun.science.wayne.edu; Wayne State University), Brett Kessler, and Derrick Bourassa. *Children's own names influence their spelling.*

Spellings produced by kindergartners (N = 115), first graders (N = 104), and second graders (N = 77) were analyzed to determine whether children's own names influence their spelling. Kindergartners tended to overuse letters from their first names. Those with long names, who had more own-name letters available for intrusions, tended to produce longer spellings than did other children. The spellings of kindergartners with long names tended to contain a lower proportion of phonetically reasonable letters than the spellings of children with short names. Children's own names, and other frequent letters, play a special role in the acquisition of literacy.

**Joanna K. Uhry** (uhry@fordham.edu; Fordham University). *Longitudinal predictors of reading: Rapid serial naming and phonemic awareness revisited.*

There is current controversy about exactly what it is that rapid serial naming measures. Constructs in the research literature include speed of phonological retrieval (Wagner & Torgesen, 1987), processing speed (Denckla & Cutting, 1999), rapid orthographic processing (Bowers, Sunseth, & Golden, 1999) and sensitivity to arbitrary orthography (Mannis, Seidenberg, & Doi, 1999). The goal of this study was to follow second graders (Uhry, in press) into Grade 4 and to repeat hierarchical multiple regressions in order to explore differences in the unique predictions made by Grade 2 phonemic awareness and rapid serial naming on a series of Grade 4 literacy measures. The inconsistency in results across time suggest a model of rapid naming which is multifaceted and which reflects multiple processes at various points in time as children develop reading accuracy and fluency.

**Vered Vaknin** (veredv@hotmail.com; University of Haifa, Israel) and Joseph Shimron. *The dual-route theory of the mental lexicon: Evidence from regular and irregular plurals Hebrew.*

The purpose of this study was to test the **dual-route** vs. **associative** models of lexical representation with regard to Hebrew nouns. Many Hebrew nouns have irregular plural forms. The associative storage model assumes that regular and irregular nouns are stored alike. The dual storage model assumes one storage for regular nouns, where pluralization is achieved by a default rule, and another storage for the irregular nouns where pluralization is achieved via associations only. We examined this issue with online pluralization and singularization naming tasks. Participants were presented with regular and irregular singular and plural nouns and were asked to name their plural form if presented in the singular form or to name the plural form if presented with singular form. According to the associative model, holding frequency constant, the two tasks shouldn't differ in latency or error rate. According to the dual-storage model, assuming a priority for the default rule, pluralization should take a longer time because it requires the identification of the noun's gender before adding the correct suffix. Singularization may take a shorter time because all it takes is stripping the noun from its plural suffix. In addition, according to the dual-route model, the processing of irregular nouns should be harder than the processing of regular nouns because of the conflict between the noun's gender identity and its irregular suffixation. Forty adult Hebrew speakers participated in this study. They were presented with 154 nouns comprised of regular and irregular forms. The results indicate a significant difference between the two tasks for the irregular nouns group. The pluralization task was found more difficult than the singularization task. In addition, irregular nouns were processed more slowly than regular nouns. These results seem to support a dual storage model of noun storage in the Hebrew mental lexicon, and, correspondingly, a dual-route mechanism of pluralization.

**Wim van Bon** (W.vanBon@ped.kun.nl; University of Nijmegen, Netherlands), Ben Maassen, and Rob Schreuder.

*Pseudoword repetition by poor and normal readers: An error analysis.*

Children with poor reading and spelling scores (mean CA 10;1) and literacy score matched children at normal performance levels (mean CA 7;11) participated in a pseudoword repetition task. Pseudowords differed in their length (1 to 4 syllables) and in the frequency (low, high) with which their syllables occur in everyday language. Effects of length and syllable frequency were found, no interaction appeared to exist with literacy status of the participants. Error analyses as to place and type of the wrongly reproduced speech sounds and characteristics of the speech products also did not show literacy group differences. The results are in conflict with some current hypotheses.

**Victor H. P. van Daal** (vhp.van.daal@bangor.ac.uk; University of Wales, United Kingdom). *Orthographic processing in a deep orthography.*

In the present research an orthographic processing test was trialed with English beginning readers. It was examined whether English beginning readers do rely more heavily on orthographic processing due to the orthographic depth of their writing system.

**Kees P. van den Bos** (k.p.van.den.bos@ppsw.rug.nl; University of Groningen, Netherlands). *Reading speed, naming speed, and general processing speed.*

A domain-specific theory of decoding speed development predicts (1) an increasing relationship between word reading speed and naming speed (of alphanumeric symbols especially), and (2) no relationship between word reading speed and general processing speed. These predictions were tested with random reader samples (n's around 50) at the age levels of 8, 10, and 12 years of age. Participants were administered various reading tasks which differed in word type and degree of item repetitiveness, rapid-naming tasks with digits, letters, colors, and pictures, and Visual Matching and Cross-Out tasks (Woodcock-Johnson TCA) as operationalizations of general processing speed. Results support prediction (2), and partially support prediction 1. A developmental increase of the reading-naming speed relationship was found for the reading task with the highest degree of item-repetitiveness only.

**W. van den Broeck** (wim.van.den.broeck@pandora.be; University of Leiden, The Netherlands). *The role of contextual information in the development of word recognition ability.*

In this study a prediction derived from Share's hypothesis about the disambiguating role of contextual information in word decoding was tested. Using a longitudinal design, the facility to use contextual information was only slightly correlated with decoding accuracy one year later, but not with decoding fluency.

**Julie Van Dyke** (jvandyke@pitt.edu; University of Pittsburgh), D.J. Bolger, Nicole Landi, Charles A. Perfetti, and Barbara Foorman. *Contributions of word decodability and text predictability in first grade oral reading and printed word learning.*

We suggest that decodability percentage of words in a text is only a rough approximation of readability which ignores important text characteristics. In this study we seek to understand better what affects "decodability tolerances"-- characteristics of the text and the reader that buffer comprehension processes against specific word obstacles. Data to address this question includes oral reading of 1st graders in an explicit decoding curriculum and a student-directed curriculum on texts with contexts making target words predictable or not. Two assessment points allow a comparison of the relative contributions of decoding skills and text predictability for students' word form acquisition.

**Julie Van Dyke** (jvandyke@pitt.edu; University of Pittsburgh), Nicole Landi, D.J. Bolger, and Charles A. Perfetti.

*Decodability as a text factor: Alternative approaches to characterizing word predictability.*

Research has shown that decoding skill, defined by students' ability to apply letter-sound correspondences, is the single best predictor of reading comprehension (Stanovich, 1990; Vellutino, 1991). Consequently, decodability has been studied from the point of view of the child (e.g. phonemic awareness skill) and of words (e.g. letter-sound predictability, consistency, frequency, etc.) Yet words come embedded in texts and thus far, the contribution of text-level factors as contributors to decodability has been ignored. This work compares several formulations of text-level predictability, suggesting that texts can be more or less decodable despite a child's letter-sound decoding skills or a word's consistency.

**Ludo Verhoeven** (L.Verhoeven@ped.kun.nl; University of Nijmegen, The Netherlands), Rob Schreuder, and Kirsten Dors.

*Units of analysis in reading bisyllabic nonwords.*

Two experiments have been conducted in order to explore children's units of analysis in reading Dutch bisyllabic nonwords. Although Dutch orthography is highly regular, several deviations from one-to-one correspondence occur. In polysyllabic words the grapheme E may represent three different vowels: å, e, or ù. In Experiment 1, 33 children in grade 6 were given 8 word lists of bisyllabic pseudowords: words with two times the grapheme E, the first syllable being a morpheme (1), a prefix (2), or a random string (3); words with E in the first and another vowel in the second syllable, the first syllable being a morpheme (4), a prefix (5), or a random string (6); and words with a random string in the first and E in the second syllable with (7) or without (8) a morpheme in the first syllable. It was found that the both the pronunciation and stress assignment of pseudowords was dependent on word type, showing that morpheme boundaries and prefixes are being identified. However, the identification of prefixes could also be explained from the fact that in the present word set prefix boundaries coincide with syllabic boundaries. In order to exclude this alternative explanation a follow-up experiment with the same group of children was conducted contrasting pseudowords with two times the grapheme E, with a prefix in the first part of the word not coinciding with syllable boundaries versus similar pseudowords with no prefix. The results of the first experiment could be replicated in that

the children identified prefixes and assigned word stress accordingly. The results will be discussed with reference to a parallel dual-route model of word decoding.

**Lesly Wade-Woolley** (wadewool@educ.queensu.ca; Queen's University, Canada), Erin O'Donnell, and John R. Kirby. *English-speaking children learning to read in French Immersion classrooms.*

In Canada, many English-speaking parents choose to have their children educated both in French and English. In many cases, formal literacy instruction is conducted only in French until grade three. This paper reports the results of the first year of a three-year longitudinal project studying acquisition of English reading skills in English-speaking children enrolled in French immersion classrooms. Phonological awareness, phonological memory, and naming speed at the beginning of grade one are used to predict English and French reading ability at the end of grade one. Results of teacher observations and parent interviews are used to account for additional variance.

**Min Wang** (minwang@pitt.edu; University of Pittsburgh), Ying Liu, and Charles Perfetti. *Learning to read a logographic system by alphabetic readers: The role of visual, phonological and semantic processes.*

Learning to read entails mastery of association between the print form and spoken form of the language. Learning to read in a second language (L2) may present a case where the mapping between spoken form and print form of the L2 is weak and/or indirect due to the mediation of the first language (L1). This hypothesis is tested in the present study on a group of English L1 adults learning Chinese as L2. The subjects are tested on English (L1) language and reading skills, visual-reasoning skill and a set of experimental tasks on Chinese character recognition. These experiments are aimed at examining the role of visual, phonological, and semantic information in learning to read a logographic system by alphabetic readers, and comparing it with findings in Chinese L1 reading literature. The similarity and difference between L1 and L2 reading would inform the relationship between oral language and literacy in reading in general.

**Victor L. Willson** (v-willsony@tamu.edu; Texas A&M University), William H. Rupley, Ronald D. Zellner, and Malatesha R. Joshi. *Kindergarten-grade 1 reading development in rural-poor and metropolitan-semi-affluent school districts.*

This research reports the results of a longitudinal study the reading development of children entering kindergarten in four schools from three school districts differing in ethnic composition, affluence, and urban-rural setting. Diagnostic fall testing was conducted in 1998, summative testing spring 1999, grade 1 testing for the same student pool fall 1999 and again spring 2000. Variables included (for kindergarten): letter recognition, print awareness, letter sounds, word recognition; and for grade 1, letter sounds and combinations (clusters, diphthongs, etc.), rimes, context clues in word identification and meaning, directions, and story sequence. Teacher instructional reading practices were documented for each classroom in each school during kindergarten and grade 1. Developmental processes and instructional practices are evaluated in a longitudinal model for beginning reading development.

**Heinz Wimmer** (heinz.wimmer@sbg.ac.at; Universität Salzburg, Austria) and Heinz Mayringer. *Subtypes among German dyslexic children?*

We expected that the typical reading rate problem of German dyslexic children may be due to an impoverished orthographic lexicon. To examine this possibility, reading accuracy for exception words (foreign English words) was related to nonword reading accuracy in a sample of reading rate-disabled 10-year-olds. However, the subtyping showed that only about 30% of rate-disabled children exhibited specifically impaired exception word reading, whereas about 40% showed average performance on exception word reading and also on orthographic spelling. We conclude that slow speed of prelexical phonological processing is the main impairment of German dyslexic children.

**Caroline Witton** (caroline.witton@physiol.ox.ac.uk; Oxford University, United Kingdom), Joel B. Talcott, Catherine J. Stoodley, Peter C. Hansen, and John F. Stein. *Auditory and visual dynamic processing in developmental dyslexia.*

This study investigated how auditory and visual dynamic processing skills might relate to phonological decoding and orthographic skills in adult developmental dyslexics and controls. The dyslexics were less sensitive than controls to visual coherent motion (but not coherent form), to auditory 2-Hz frequency (FM) and 20-Hz amplitude (AM) modulation (but not 2-Hz AM or 240-Hz FM). Multiple regression analyses showed that coherent motion detection predicted variance in orthographic skills, and thresholds for 2-Hz FM and 20-Hz AM accounted for independent variance in phonological decoding skills. Thus, visual and auditory dynamic processing could contribute separately to variance in component reading skills.

**Maryanne Wolf** (mwolf@emerald.tufts.edu; Tufts University), Tami Katzir-Cohen, Robin Morris, and Maureen Lovett. *fluency, phonology, and naming-speed in subtypes of dyslexia.*

Two large areas of question motivate this study: first, the nature of the relationships between the best known core deficits in developmental dyslexia phonological and naming-speed processes -- and reading fluency; and second, whether subtypes of impaired readers defined by these two deficits have differences in fluency at particular levels (e.g. letter, word, and connected text). Toward these ends, we will apply the criteria used in the Double-Deficit Hypothesis (DDH) framework (Wolf & Bowers, 1999) to subtype 163 Grade 2 and 3 severely impaired readers in Boston, Atlanta, and Toronto. Replicated extensively, this hypothesis has two central premises: that processes underlying naming speed and phonology represent two independent sources of reading failure; and that three subtypes of readers can be characterized by the presence, absence, or combination of these two deficits. Children will be assessed on a variety of fluency measures and reading subskills. For our first set of questions, regression analyses will be used to explore the relationships of phonological awareness and naming speed measures to two outcome measures-- fluency in word recognition and in connected reading. The second goal of the study is to determine whether significant differences are

found among reader subtypes on fluency-based measures at the letter, word, and passage level. Implications for diagnosis and intervention will be discussed.

**Clare Wood** (c.p.wood@open.ac.uk; The Open University, United Kingdom) and Pav Chera. *Animated, multimedia 'talking books' can promote phonological awareness in beginning readers.*

Studies of computer software have shown its potential to enhance phonological awareness in children with reading difficulties, but none have examined its use with young children. This paper describes an intervention study where software, designed in consultation with teachers and children, was used to promote phonological awareness in children beginning to read. Children were given ten, ten-minute sessions with the software over four weeks, while a matched control group completed normal classroom activities. The intervention group showed significantly higher increases in phonological awareness than the control group did, but there were no significant benefits observed for word reading.