

POSTER SESSION V  
Grand Ballroom, Convention Center  
Saturday Evening, 6:00–7:30

• BILINGUALISM •

(5001)

**The Relationship Between Implicit and Explicit Second-Language Processing: The Role of Cross-Language Similarity.** LEIDA C. TOLENTINO & NATASHA TOKOWICZ, *University of Pittsburgh* (sponsored by Charles A. Perfetti)—Previous research suggests that beginning adult second-language (L2) learners are implicitly sensitive to grammar and meaning in L2 despite near-chance performance on overt judgments (McLaughlin et al., 2004; Tokowicz & MacWhinney, 2005). As predicted by transfer theories (MacWhinney, 2005), this sensitivity is modulated by the degree of similarity between the native language and the L2. The present study explores the relationship between implicit and explicit L2 processing in L2 learners, and how cross-language similarity influences this relationship. The brain activity of native English speakers was recorded as they performed grammaticality judgments on Spanish sentences. The three types of agreement violations used were similar in the two languages, different in the two, and unique to L2. After a baseline assessment, we improved participants' accuracy and then retested them. We compare ERP components to overt responses before and after accuracy improvement and contrast responses to the three types of grammatical violations.

(5002)

**Bilinguals Sweating in the Lab: "Stop That" More Arousing in L1, "I Love You" in L2.** JIMMY TONG & CATHERINE L. CALDWELL-HARRIS, *Boston University*—A growing body of work documents bilingual speakers' experience of greater emotional resonance in their first language compared to their second. Mandarin–English speakers who were born in the U.S. to immigrant parents or immigrated during childhood or adulthood rated the emotional intensity of auditory phrases while skin conductance was monitored. Skin conductance responses (SCRs) were highest for taboo phrases and lowest for neutral phrases, with no differences between English and Mandarin for these phrase types. Childhood reprimands (*Stop that!* or *Shame on you!*) elicited stronger SCRs in Mandarin, the L1, than in English, the L2, replicating analogous findings in Spanish and Turkish. Whereas in a prior study of Spanish, the reprimand effect held only for late learners of English, in the present study, it occurred for all participants regardless of age-of-acquisition of the second language. A new effect was that compliments/endearaments (*Thank you*, *Good job*, and *I love you*) elicited stronger SCRs in English than in Mandarin.

(5003)

**English Words Connected Via Hebrew Morphology: L1–L2 Bidirectional Effects on Semantic Similarity.** TAMAR DEGANI, *University of Pittsburgh*, ANAT PRIOR, *Carnegie Mellon University*, & NATASHA TOKOWICZ, *University of Pittsburgh*—Semantic similarity ratings of monolingual English speakers were compared with those of proficient Hebrew and English bilinguals (English–Hebrew and Hebrew–English). Both bilingual groups rated semantically unrelated English word pairs as more similar in meaning when they shared a single translation in Hebrew. Furthermore, English word pairs whose Hebrew translations shared a morphological root were also rated as more similar than words that had morphologically unrelated Hebrew translations. The unique morphological structure of Hebrew allowed us to examine pairs that were morphologically related but semantically unrelated. For example, the word SiPuR (*story*) and the word SaPaR (*barber*) share the morphological root S.P.R. Hebrew structure exerted an influence on English semantic processing for all bilingual participants, demonstrating bidirectional influences of first and second languages for highly proficient late L2 speakers. Thus, semantic organization and processing of bilinguals are reciprocally shaped by the semantic and morphological structure of both of their languages.

(5004)

**Cross-Linguistic Syntactic Influence in Korean–English Bilingual Production: Evidence From Syntactic Priming.** JEONG-AH SHIN & KIEL CHRISTIANSON, *University of Illinois, Urbana-Champaign*—This study examined cross-linguistic influence in Korean–English bilingual sentence production through syntactic priming. Syntactic persistence across languages has provided evidence for shared bilingual syntactic processing in production. This study is the first to be conducted with two typologically different languages, touching on the question what kind of syntactic information is interactive in bilingual production: surface word order or hierarchical structural relations. Experiment 1 showed that participants were likely to produce English prepositional datives primed by Korean postpositional datives, revealing that both structure and word order of Korean primes influenced the use of alternative English structure. Also, cross-linguistic syntactic priming effects were found regardless of word order. The preliminary data from Experiment 2 showed that participants produced Korean canonical postpositional datives regardless of English primes, revealing that no cross-linguistic syntactic priming occurred from English primes to Korean targets. This asymmetry in cross-linguistic influence is discussed in terms of bilingual language dominance.

(5005)

**Natural Language Switching: Limits on the Role of Inhibitory Control.** TAMAR H. GOLLAN & VICTOR S. FERREIRA, *University of California, San Diego* (sponsored by Craig R. M. McKenzie)—Bilinguals sometimes switch languages in conversation with other bilinguals even though nothing requires them to and even though laboratory studies reveal robust language switching costs. In three experiments, we investigated whether bilinguals incur switch costs when they name pictures in an either-language condition, inviting voluntary language switching. Bilinguals also named pictures in two language-selective conditions (i.e., dominant-language only, and non-dominant-language only). Our results suggest that voluntary language mixing is radically different from published reports of cued-language mixing in some ways (e.g., responses in the nondominant language were faster in language-mixed than in nondominant-only blocks, and there was no age-related increase in switching costs). In other ways our findings validate the literature on cued-task switching in suggesting that switches between natural alternative tasks still incur some costs. We discuss why bilinguals choose to switch and pay the cost, and how our findings constrain models of bilingual control.

(5006)

**Codeswitching in Bilinguals: Testing the Triggering Hypothesis in Perception and Production.** GERRIT JAN KOOTSTRA, JANET G. VAN HELL, & TON DIJKSTRA, *Radboud University Nijmegen*—Bilinguals switch without effort from one language to another in many communicative situations, a phenomenon called codeswitching. According to the triggering hypothesis, codeswitches are more likely to occur in the neighborhood of trigger words: language-ambiguous words such as cognates (words sharing form and meaning across languages) or homophones (words sharing only form across languages). The dominant research method in the codeswitching literature is corpus research on offline codeswitches that occurred in natural discourse. We tested the triggering hypothesis in the lab, using the confederate scripting technique and a self-paced reading task in Dutch–English bilinguals. Bilinguals were presented with codeswitched or non-codeswitched sentences containing a trigger word or a control word. Preliminary results indicate that trigger words indeed facilitate codeswitching, but codeswitching is more likely to occur when trigger words have a form and meaning overlap across languages.

(5007)

**Language Switching in Picture Naming and Word Naming: The Consequences of Different and Same Script Bilingualism.** NORIKO HOSHINO, *Tufts University*, & JUDITH F. KROLL, *Pennsylvania*

*State University*—In the present study, we asked whether different-script bilinguals can suppress cross-language activation more effectively than same-script bilinguals by using a language switching paradigm. Japanese–English and Spanish–English bilinguals named pictures or read words out aloud in L1 and L2 based on the color of the background. In picture naming, the two bilingual groups were identical in L2, whereas in L1 they differed in the magnitude of switch cost and in speed. The Japanese–English bilinguals showed a greater switch cost and were slower in L1 than the Spanish–English bilinguals. In word naming, however, the two bilingual groups were similar in L1 but the Spanish–English bilinguals were faster in L2 than the Japanese–English bilinguals. These results suggest that Japanese–English bilinguals suppress their L1 more strongly than Spanish–English bilinguals and that the script difference between L1 and L2 influences reading and speaking differently. Implications for models of bilingual lexical access will be discussed.

• READING •

(5008)

**Is the Processing of Successive Words Strictly Serial During Reading?** ALBRECHT W. INHOFF, CHIN AN WANG, MATTHEW SOLOMON, & BRADLEY SEYMOUR, *Binghamton University*—Eye movements were recorded while participants read one-line sentences. Each sentence contained a critical three-word sequence with a 3-letter target word in the middle. The parafoveal preview of the target was manipulated so that it was either fully visible or masked until the eyes moved to the right of the blank space preceding it. The visibility of the posttarget word was also manipulated so that it was visible at the onset of its fixation or after a short delay. If the processing of consecutive words in the sentence was strictly serial, then skipping of a masked target should be due to oculomotor overshoot. In this case, readers should regress to the target or the skipped target is processed while it is visible to the left of the fixated posttarget location. In either case, readers should not extract linguistic information from the posttarget location immediately after it is “erroneously” fixated.

(5009)

**The Word Grouping Hypothesis in Eye Movements During Reading.** DENIS DRIEGHE, *Ghent University*, & ALEXANDER POLLATSEK, ADRIAN STAUB, & KEITH RAYNER, *University of Massachusetts, Amherst*—In an eyetracking experiment, the distribution of landing position and the duration of first fixations in a region containing either an article and a noun (e.g., *the terrorists*) or a high-frequency three-letter word and a noun (e.g., *two terrorists*) were compared. The first fixations on the blank space between the high-frequency three-letter word and the noun were fewer in number and shorter in duration as compared to the first fixations on the surrounding letters. This pattern did not occur when the noun was preceded by an article. We will model this pattern within the E-Z Reader model (Reichle, Rayner, & Pollatsek, 2003) to determine whether this pattern is solely due to the increased skipping of the article or whether it can be considered as evidence for the word grouping hypothesis (Radach, 1996) stating that an article and a noun are processed as a perceptual unit in eye movements during reading.

(5010)

**The Effect of Phonological Neighborhood on Eye Movements During Reading.** MARK YATES, JOHN FRIEND, & DANIELLE M. PLOETZ, *University of South Alabama*—Previous research has indicated that phonological neighbors speed processing in a number of isolated word recognition tasks (e.g., lexical decision, naming, and semantic categorization). The study reported here extends this research by evaluating the effect of phonological neighborhood on reading for meaning. Eye movements were recorded while participants read sentences containing target words that had either small or large phonological neighborhoods. The results show that participants fixated for less time on words with many neighbors relative to those with few

neighbors. Interestingly, the effect was evident in measures assumed to reflect early lexical processing (e.g., first-fixation duration). This is taken as an indication that phonology plays an important and quick acting role in silent reading. The results will be interpreted in terms of current models of eye movement control during reading.

(5011)

**Saccadic Targeting to Dichoptically Presented Words.** HAZEL I. BLYTHE & SIMON P. LIVERSEGE, *University of Southampton*, & JOHN M. FINDLAY & HOLLY S. S. L. JOSEPH, *University of Durham*—Liversege, Rayner, White, Findlay, and McSorley (2006) showed that both adults and children exhibit disparity between the fixation positions of the two eyes when reading, and that disparate retinal inputs are fused to form a unified percept. We varied the relative horizontal position of word or nonword stimuli that were presented dichoptically to each eye as children and adults’ binocular eye movements were measured. Participants were required to make a lexical decision. We report binocular landing position, fixation duration, vergence movement, refixation, and response accuracy data. We will discuss our results in relation to three theoretical issues: (1) the size of Panum’s fusional area for linguistic stimuli, (2) whether this changes with age, and (3) whether saccades for each eye are targeted independently during binocular saccades to dichoptically presented stimuli.

(5012)

**Eliminating the Subordinate Bias Effect With Elaboration: Evidence From Eye Movements.** JORIE COLBERT & ANNE E. COOK, *University of Utah*—When context preceding an ambiguous word instantiates the subordinate meaning of the word, readers will fixate longer on the ambiguous word compared to a control condition. This difference in fixation time has been called the subordinate bias effect (Pacht & Rayner, 1993; Rayner, Pacht, & Duffy, 1994). In most previous studies of this effect, contextual manipulations have contained very few references to either the dominant or subordinate meaning of the ambiguous word prior to the presentation of the ambiguous word. In the present study, we increased the strength of the context preceding the ambiguous word through elaboration. Data from several eye tracking measures suggest that the subordinate bias effect was eliminated when preceded by elaborated, biasing context (based on both participant and item variability). This result indicates that although effects of meaning dominance are robust, they can be mediated (or reordered) with sufficient contextual support.

(5013)

**Visual Attention in Normal Readers: Different but Similar.** CHERIE L. LA ROCQUE, TROY A. VISSER, & JENEVA L. OHAN, *University of British Columbia, Okanagan*—Numerous studies have demonstrated that reading-impaired individuals perform worse than normal readers on a variety of visual attention tasks. However, less is known about the relationship between reading ability and visual attention among normal readers. In the present study, undergraduate normal readers were given a series of measures to assess different aspects of reading ability as well as a visual attention task requiring them to identify two targets presented in rapid temporal succession. Here, second-target identification accuracy is reduced when the intertarget interval is less than about 700 msec (attentional blink; AB). As with impaired readers, we found larger ABs among less skilled normal readers. However, the magnitude of this difference was relatively small. This may suggest that once an individual has exceeded a threshold level of reading ability, visual attention does not play a significant role in reading performance as it does in reading-impaired individuals.

(5014)

**Analyses of Proofreading Efficiency and Skill.** KAZUHIKO YOKOSAWA & MICHIKO ASANO, *University of Tokyo*—During proofreading, some anomalous words can be detected easily and others with difficulty. This illustrates that many factors should affect the

anomalous word detection. Professional proofreaders and novices participated in detection experiments. Based on the behavioral data, we tried to find out the important factors of efficient proofreading by multiple regression analysis. We tested the contribution of factors like phonological or semantic similarity to the contextually correct word, location in sentence, text span needed to detect the anomalous word, etc. The results of regression analysis showed that the text span needed for anomalous word detection had large influence on proofreading. Comparison of the detection rates for professional proofreaders and novices also supported this notion. Professionals could process larger span of text at a time than novices and achieved higher anomalous word detection performance.

(5015)

**Methods of Testing and Diagnosing Model Error: Dual and Single Route Cascaded Models of Reading Aloud.** JAMES S. ADELMAN & GORDON D. BROWN, *University of Warwick*—Models of visual word recognition have been assessed by both factorial and regression approaches. Factorial approaches tend to give a relatively weak test of models, and regression approaches give little indication of sources of problems for models, especially when parameters are not optimal. A new alternative method, involving regression on model error, combines these two approaches with parameter optimization. The method is illustrated with respect to the dual route cascaded model of reading aloud. In contrast to previous investigations, this method provides clear evidence that there are parameter-independent problems with the model.

(5016)

**The Cross-Script Length Effect on Reading Aloud.** KATHLEEN RASTLE, *Royal Holloway University of London*, TAEKO WYDELL, *Brunel University*, & JELENA HAVELKA, *University of Kent*—The finding that length influences naming latency for nonwords in particular has been used to support models of reading aloud that involve serial processing. However, because length is normally confounded with consistency this finding has also been explained by parallel models as a frequency by consistency interaction. Our research resolves this issue by investigating length effects in two highly consistent biscriptal languages. Experiment 1 examined length effects in Japanese Kana when words were presented in the script in which they normally appear or in a script in which they never appear. Experiment 2 examined length effects in Serbian when participants were biased to interpret bivalent stimuli in the script in which they are words or in the script in which they are nonwords. The results in both cases showed a larger length effect when stimuli were treated as nonwords, thus offering strong support to models of reading aloud that involve serial processing.

## • LEXICAL ACCESS •

(5017)

**Visual Word Recognition: Moving Beyond the Single Syllable.** MELVIN J. YAP & DAVID A. BALOTA, *Washington University*—The extant literature in visual word recognition has been largely dominated by the study of monosyllabic words in computational models, factorial experiments, and more recently, megastudies. We present a large-scale study of pronunciation and lexical decision latencies for 9,639 monomorphemic mono- and multisyllabic words. Through hierarchical regression techniques, we explore the influence of standard variables such as phonological onsets, length, orthographic neighborhood size, phonological neighborhood size, and word frequency. Importantly, we also investigate the unique influence of other variables, including (1) number of syllables, (2) syllabically defined feedforward and feedback phonological consistency, (3) composite rank-transformed frequency, (4) new orthographic and phonological similarity measures, (5) stress typicality, and (6) semantics. Using the full set of predictors, we were able to account for substantially more variance in both pronunciation (65.9%) and lexical decision (65.6%) performance than in previous megastudies. These results provide impor-

tant new constraints for emerging models of multisyllabic visual word recognition.

(5018)

**Interpreting Chicken-Scratch: Lexical Access With Handwritten Words.** ANTHONY S. BARNHART & STEPHEN D. GOLDINGER, *Arizona State University*—Research in spoken and visual word perception shows a striking asymmetry: Studies of spoken word perception typically employ natural, human-produced stimulus tokens. By contrast, studies of visual word perception has almost exclusively employ standardized, computer-generated typefaces. Although considerable research (e.g., in computer science) has focused on “decoding” handwriting, almost no research has assessed whether signature findings in lexical access are affected by the use of naturally produced items. By only using pristine stimuli, studies of printed word perception may systematically under- or overestimate the importance of psychological variables and processes. We will report initial experiments comparing artificial and natural tokens of written words, examining effects of frequency, regularity, orthographic neighborhood density, feedforward and feedback consistency, and imageability. The results indicate that the natural physical ambiguity of handwritten stimuli slows processing, allowing effects that only appear minimally for typewritten words to be magnified, exerting stronger influences on recognition.

(5019)

**Unitization Effect in English and Chinese: Orthography and Language Experience.** LIANG TAO, *Ohio University*, & ALICE F. HEALY, *University of Colorado*—Four groups of subjects (native Chinese speakers, and native English speakers in Chinese language courses at 3 levels) identified English words and 2-syllable Chinese words from strings of letters and Chinese characters, and detected word components (the letter *t* in English, and the character “have” as a component of 2-character Chinese words) in 5 stimuli (English and Chinese scrambled-order text containing real words, English text, Chinese text in characters and in the Roman alphabet). A unitization effect (more detection errors on *t* in high-frequency words than in other words) was obtained for the English texts. The effect was larger with normal than with scrambled text. But no frequency effect was found on the bisyllable Chinese words. The findings suggest that logographic and alphabetic writing systems evoke different cognitive processes. High-frequency English words are processed as fused chunks, whereas multisyllable Chinese words are processed as loosely packed units during reading.

(5020)

**Interactive Processing Between Radicals and Word in Reading Chinese.** JOANNE LEE, *Wilfrid Laurier University*, & LEONARD KATZ, *University of Connecticut*—The majority of printed Chinese words are composed of two radicals, one providing semantic information and one providing phonologic information. The two radical also have their own “stand-alone” meanings and pronunciations which are very often different from the meaning and pronunciation of their combination (i.e., the word). Two experiments provided evidence that phonologic information in the phonological radical was activated during reading of a two-radical word, even when it differed from the pronunciation of the whole word. The more similar the pronunciations of radical and word, the slower was (1) word recognition in a lexical decision task and (2) judgments that involved the phonological radical’s meaning. The results suggest that information in radicals interacts with word-level information and may play that role in a manner that is similar to the interaction of graphemes and morphemes, on the one hand, with word-level information, on the other, in alphabetic orthographies.

(5021)

**Word Role Matters in Nonalphabetic Systems: Testing Letter Detection in Chinese.** SETH N. GREENBERG, VINCE CHUAN, &

MARK HANSELL, *Carleton College*—Investigations of letter detection behavior have yielded patterns suggesting that high frequency function words engender more detection failures than usually lower frequency content words. A variety of studies have implicated both the frequency of words as a unitizing force that denies letter access, and the role of words that inhibits detection in function morphemes because such words are deemphasized in the working representation of text. Until recently such observations had been limited to alphabetic writing systems. However, Tsao and Healy have determined that frequency differences also affect letter detection in logographic systems (i.e., Mandarin Chinese). The present work used a Chinese character that can operate either as a vacuous function morpheme or as a content morpheme, and determined that in its function role it engenders more errors in embedded radicals, indicating that in these writing systems as well letter detection is at risk in function units because of their role.

(5022)

**Morphemic Ambiguity Resolution in Processing Spoken Chinese.** YIU KEI TSANG & HSUAN-CHIH CHEN, *Chinese University of Hong Kong* (sponsored by Hsuan-Chih Chen)—Chinese monosyllables are distinct phonological units of the language because they typically represent morphemes and can be written down with individual logographic characters. A morphemically ambiguous situation occurs when a syllable is part of a compound word, but its dominant meaning bears no relationship to the word. We present results of two experiments designed to investigate meaning dominance and semantic context in morphemic ambiguity resolution using a visual world paradigm. In Experiment 1, a disyllabic word starting with an ambiguous syllable was presented, and participants were asked to judge whether it matched with the items presented on the display screen while their eye movements were recorded. In Experiment 2, a biasing context preceded the presentation of the critical word. Both meaning dominance and context showed reliable effects on the eye movement data. The results give some cues about the time course of morphemic ambiguity resolution in processing spoken Chinese.

(5023)

**Prelexical Decomposition of Compound and Pseudocompound Words.** UN-SO PARK-DIENER, GREG B. SIMPSON, GEORGE KELLAS, & APRIL FUGETT, *University of Kansas*—Many studies suggest that morphological decomposition of compound words happens early in the visual word recognition process, possibly automatically. In that case, morpheme-like constituents of pseudocompound words (e.g., *brandish*) should also be decomposed during the early stage of visual recognition, although such effects should disappear quickly, as the decomposition does not help with identification of the whole word. Priming effects of compound words and pseudocompound words on their constituents were assessed at SOAs of 150, 300, and 500 msec, using masked primes. At the earliest SOA, both word types primed their first constituents (e.g., *blackboard* primed *black*, *brandish* primed *bran*), supporting the hypothesis of early decomposition. At the later SOAs, only the compound words continued to prime their constituents, while the pseudocompound words primed their first constituents only at the longest SOA. These results are discussed in light of current theories of morphological decomposition.

(5024)

**Dissociative Effects of Prime Duration, Lexicality, and Word Frequency in Lexical Decision.** MARY L. STILL & ALISON L. MORRIS, *Iowa State University*—To investigate orthographic priming, researchers have used lexical decision tasks where targets are primed by orthographically similar or dissimilar words or nonwords. Although results are mixed, similar word primes often produce interference, whereas similar nonword primes often produce facilitation. In addition to lexicality, prime duration and word frequency also produce dissociative effects. To better understand these findings, we used three prime durations with the lexical decision task: 60, 250, and 400 msec. The data

show that similar word primes produced interference for low-frequency targets at 60 and 250 msec and for high-frequency targets at 250 and 400 msec. Similar nonword primes produced facilitation for low-frequency targets at 250 msec and for high-frequency targets at 250 and 400 msec. The results are discussed in terms of the competition hypothesis, an alternative theory of orthographic priming based on word/nonword encoding and prime–target competition, and in terms of their implications for word recognition theories.

(5025)

**Masked Priming: Manipulating the Scope of Prime Validity in Lexical Decision.** REMO JOB, *University of Trento*, & FRANCESCA PERESSOTTI & CLAUDIO MULATTI, *University of Padua*—Bodner and Masson (2001) showed that in a lexical decision task, repetition proportion influences the size of the priming effects for both words and nonwords, thus supporting a retroactive account of masked priming. In a lexical decision task, we manipulated the repetition proportion for words while holding it constant for nonwords. An account stating that context influences prime validity in a way that high prime validity induces to rely stronger on primes, predicts that repetition proportion should influence both word and nonword processing even if repetition proportion is manipulated for words only. The results showed that priming interacts with repetition proportion for words, whereas priming does not interact with repetition proportion for nonwords. New definitions of context and prime validity should be proposed.

• LANGUAGE PRODUCTION •

(5026)

**Lexical Bias in Speech Production: How Efficient Can a Lexical Editor Be?** NAZBANOU NOZARI & GARY S. DELL, *University of Illinois, Urbana-Champaign*—The lexical bias effect (the tendency for phonological speech errors to create words more often than nonwords) has been debated for over 30 years. One account attributes the effect to a lexical editor, a strategic component of the production system that examines each planned phonological string, and suppresses it if it is a nonword. The alternative explanation is that the effect occurs automatically as a result of phonological-lexical feedback. In four experiments using a new production paradigm, we explicitly asked participants to do lexical editing on their planned speech. Our experimentally created “lexical editor” needed 300 msec to recognize and suppress nonwords, as determined by comparing response times when editing was and was not required. Therefore, we concluded that even though strategic lexical editing can be done, any such editing that occurs in daily speech, which involves rates of up to 3 words/sec, occurs sporadically, if at all.

(5027)

**Phonologically Mediated Priming Resolves Tip-of-the-Tongue States.** LISE ABRAMS & LISA A. MERRILL, *University of Florida* (sponsored by Lise Abrams)—Previous research demonstrates that tip-of-the-tongue (TOT) states, the temporary inability to retrieve a known word, can be resolved following presentation of phonologically related words. The present study investigated whether phonologically mediated priming—that is, where the prime and target are only indirectly related—can also help resolve TOT states. Participants answered general knowledge questions designed to induce a TOT state and then named pictures where one was either a prime or an unrelated picture. The prime was a near-synonymous picture that corresponded to a dominant (e.g., *couch*) and secondary (e.g., *sofa*) name. The secondary name was phonologically related to the TOT target (e.g., *socialism*). Following TOT responses, producing the dominant name led to greater target retrieval than did an unrelated name, showing that the phonologically related secondary name (without being produced) primed the target. These results suggest that spontaneous resolution of TOT states in everyday life may actually reflect phonologically mediated priming.

(5028)

**Conceptual Coherence Affects Phonological Activation of Context Objects During Object Naming.** FRANK OPPERMAN & JÖRG D. JESCHENIAK, *University of Leipzig*, & HERBERT SCHRIEFERS, *Radboud University Nijmegen* (sponsored by Jörg D. Jescheniak)—Whether the not-to-be-named context object is processed up to a phonological level during speech planning is a question of continuing debate. While some studies presented evidence in favor of such a view (e.g., Meyer & Damian, in press; Morsella & Miozzo, 2002; Navarrete & Costa, 2005), other studies failed to do so (e.g., Bloem & La Heij, 2003; Bloem et al., 2004; Jescheniak et al., 2007). In a series of four picture–word interference experiments containing a target and a context object, we demonstrate that phonological activation of context objects is reliably observed if target and context object are embedded in a conceptually coherent scene and that this activation disappears if both objects are presented in arrays of arbitrary objects. This pattern suggests that details of the visual input—in particular, its conceptual coherence—have important consequences for the lexical processing of not-to-be named context objects.

(5029)

**Orthographic Morphology: Evidence From Acquired Dysgraphia.** BRENDA RAPP & SIMON J. FISCHER-BAUM, *Johns Hopkins University*—A persistent question in language production concerns the level/s of representation and processing at which morphological knowledge and processes operate. It is generally accepted that there is an abstract, amodal level of morphological representation; however, there is less consensus regarding additional modality-specific morphological representations/processes. While there is considerable linguistic, psycholinguistic, and cognitive neuropsychological evidence of morphological processes that manipulate phonological morphemes, there is little evidence regarding orthography-specific morphological processes that assemble or generate orthographic morphemes. Favoring this hypothesis would be observations of individuals with acquired language impairments who produce morphological errors (e.g., *playing* → *PLAYED*) exclusively or primarily in the written modality. We present four case studies documenting the pattern of morphological errors largely restricted to written production. We conclude that the evidence favors a cognitive architecture that includes orthography-specific morphological representations and processes.

(5030)

**Representing Verbs: An Empirical Test of FUSS.** SILVIA SBISÀ, *University of Trieste*, SIMONA COLLINA, *Suor Orsola Benincasa University*, & KINO WOLF & PATRIZIA L. TABOSSI, *University of Trieste* (sponsored by Patrizia L. Tabossi)—FUSS is a statistical model that represents the meanings of object and action words (Vigliocco et al., 2004). It assumes that word meanings are grounded in conceptual feature representations. These are bound into lexico-semantic representations that work as interfaces between conceptual knowledge and other linguistic information. A central claim of the model is that the meanings of object and action words can be modeled in a single semantic space using the same principles and tools. The present study, conducted on the Italian version of FUSS, presents a series of experiments showing that while performing reasonably well with nouns, in about 60% of cases the model represents as semantically close verbs that fail to prime one another in priming experiments and are rated as semantically far by speakers. Theoretical and methodological implications are discussed.

(5031)

**Verb-Based Effects in Long-Term Structural Priming.** JACQUELINE M. DIEHL & MICHAEL P. KASCHAK, *Florida State University*—Recent studies of structural priming have demonstrated that whereas there is evidence of verb-based effects (e.g., stronger priming when verbs are repeated between prime and target sentences) in short-term priming, such effects are absent in long-term priming. It has been

posited that this pattern is due to the operation of two mechanisms in structural priming: an implicit learning mechanism that drives structural priming in short- and long-term situations, and an explicit memory mechanism that produces the verb-based effects in short-term priming. We present evidence in support of this approach, demonstrating that verb-based effects can be observed in long-term priming situations, but only when participants show evidence of being explicitly aware of the manipulation of certain verbs in the experiment. Thus, the critical factor determining when verb-based effects are observed may not be whether the priming is short- or long-term, but how aware participants are of the priming manipulation.

(5032)

**Processing Segmental and Prosodic Information During Cantonese Word Production.** ANDUS W. K. WONG & HSUAN-CHIH CHEN, *Chinese University of Hong Kong*—Four experiments were conducted to investigate how subsyllabic, syllabic, and prosodic information is processed in Cantonese word production using a picture–word interference task. Experiments 1 and 2 demonstrated that naming responses were facilitated when the distractor shared either an identical onset or an identical rhyme with the picture name, compared with an unrelated distractor, and that no reliable effect was shown by the tone-related distractors. Experiment 3 revealed a robust syllable priming effect, as well as null effects of the onset-related and the rhyme-related distractors. Experiment 4 showed that both syllable-related and syllable + tone-related distractors facilitated naming responses, together with a reliable interaction between syllable and tone relatedness of the distractors. These results indicate that subsyllabic and tonal components of Cantonese monosyllables are represented and processed relatively independent of each other, and that the status of syllable units is more prominent than that of subsyllabic units in phonological encoding.

(5033)

**Phonological Syllables Control Segmental Encoding in Mandarin Chinese.** JENN-YEU CHEN, *National Cheng Kung University*, PADRAIG G. O'SEAGHDHA, *Lehigh University*, & KUANG-HUNG LIU, *National Cheng Kung University*—Word pair recitation is slower when the words share beginnings than when they do not. In three Chinese experiments, we observed equivalent repetition costs among disyllables whether the shared contents formed a segmental syllable, a tonal syllable, or a character. This indicates phonological competition between the discrepant second syllables of the word pairs. However, when we varied whether the shared beginnings comprised a syllable (while controlling the number of shared segments) we observed greater costs in syllable mismatch (e.g., *ken3-shi2 ke3-ni4*) than in match conditions (e.g., *ken3shi2-ken3qie4*), indicating within-syllable in addition to between-syllable competition. The additional cost of syllable mismatch did not occur in word pairs that did not share segments and so is not structural. These findings are consistent with the view that in Chinese syllables are primary planning units that control later stage segmental encoding.

(5034)

**Orthographic and Semantic Radical Effects of Picture–Word Naming in Chinese.** I-FAN SU, *University of Sussex*, QINGFANG ZHANG, *Institute of Psychology, CAS*, & BRENDAN S. WEEKES, *University of Sussex* (sponsored by Brendan S. Weekes)—Previous Chinese picture–word interference studies have shown robust orthographic effects; however, no study has yet established its loci. Weekes et al. (2002) found no interaction between orthography and phonology. Hence we speculated that orthographic effects occur between orthography and semantics via the semantic pathway. Mappings between orthography and meaning were manipulated by three levels; orthographic, opaque and transparent distractors, varying the extent that meaning was represented in relation to the shared semantic radical of the target. The results showed the greatest naming facilitation when distractor words were orthographically similar to the depicted target compared to unrelated distractors. Although slower than ortho-

graphic distractors, distractors with opaque semantic mappings also showed facilitation, proceeded by transparent semantic distractors. The observation that orthographic and semantic factors interact suggests that orthographic facilitation and semantic interference are based on a lexical–semantic conflict co-located at the lemma level via the semantic route (Roelofs, 1992; Schriefers et al., 1990).

(5035)

**The Grammatical Class Effect in Picture–Word Interference: Evidence From Chinese Classifiers.** JINGYI GENG & XI YU, *Beijing Normal University*, & YANCHAO BI, *State Key Laboratory of Cognitive Neuroscience and Learning* (sponsored by Matthew Finkbeiner)—Speech production theories generally assume that word selection is a competitive process, and that selection considers only words belonging to the target grammatical class. We present a study on Mandarin Chinese classifier production using the picture–word interference paradigm to evaluate these assumptions. Classifiers are obligatory before nouns in Chinese whenever a number or deictic is used. Participants named pictures with classifier NPs (e.g., “one /liang4/ car”) accompanied by visually presented distractors that are either another classifier (/zhi1/) or words from a nontarget grammatical class (“who”). Distractors were matched on variables including lexical frequency, visual complexity, and imageability. It was observed that the classifier produced stronger interference effects than the nonclassifier distractor, and that this grammatical class effect disappeared when the participants named the pictures with bare nouns (“car”). These results are consistent with the hypothesis that grammatical class constrains lexical selection in speech production.

(5036)

**Word Retrieval in Old Age: Integrating Functional and Structural Neuroimaging.** MEREDITH A. SHAFTO, *University of Cambridge*, EMMANUEL A. STAMATAKIS, *University of Manchester*, & PHYLLIS P. TAM & LORRAINE K. TYLER, *University of Cambridge*—Older adults suffer word-finding failures due to phonological access deficits; recent research suggests this is underpinned by atrophy in regions involved in phonological processing, including left insula. To examine the effect of this atrophy on neural activity, younger and older adults completed a picture naming task in the fMRI scanner and indicated word-finding successes and failures. If atrophy underpins older but not younger adults’ performance, older adults should have less activity during word-finding and a stronger relationship between neural atrophy and retrieval success. Both age groups activated similar regions during successful retrieval. During retrieval failures only younger adults showed additional activity in regions important for phonological processing, including left insula. Follow-up analyses confirmed that age-related atrophy was affiliated with decreased activity. Finally, only older adults showed a correlation between neural activity and retrieval failure rate, further supporting the role of neural atrophy in word-finding success in old age.

• ATTENTIONAL CONTROL •

(5037)

**Neural Correlates of Attentional Bias: How Social Experience Influences Attention to Valenced Information.** GIOVANNA EGIDI, HADAS SHINTEL, HOWARD C. NUSBAUM, & JOHN T. CA-CIOPPO, *University of Chicago*—How do neurophysiological processes mediate attention toward positive and negative emotional and social information? Are these processes modulated by individual differences in social isolation? Evidence suggests that emotional information, and in particular negative information, is more likely to orient selective attention. Additionally, research suggests that lonely individuals attend more to social information compared to socially connected individuals. We recorded event-related potentials while participants high or low in perceived social isolation performed color and emotional Stroop tasks with positive and negative social and emotional words. The analyses identified interference-related evoked po-

tentials in the centro- and right-frontal regions beginning around 350–400 msec after stimulus onset. These potentials varied as a function of both stimulus valence—positive or negative—and participants’ perceived social isolation. These results suggest that social isolation modulates the neurophysiological mechanisms underlying attention to social and emotional information.

(5038)

**Even Attentional Capture by Singletons is Contingent on Top-Down Control Settings.** LOGAN CORNETT, *Oregon State University*, ERIC RUTHRUFF, *University of New Mexico*, & MEI-CHING LIEN, *Oregon State University* (sponsored by Mei-Ching Lien)—We examined whether spatial attention is captured by object salience (e.g., singletons) or by a match to current attentional control settings (contingent capture). We measured the N2pc, a component of the event-related brain potential thought to reflect lateralized attentional allocation. A previous N2pc study found capture by singletons, but may have encouraged participants to actively search for singletons. Therefore, we looked for singleton capture when people were searching for a specific color (red or green) in the target display. On every trial, this target display was preceded by a noninformative cue display containing a salient color singleton. The key manipulation was whether the singleton had the target color or nontarget color. We found signs of attention capture (a cuing validity effect and an N2pc) only for singletons in the target color, suggesting that capture is strongly contingent on attentional control settings, not object salience.

(5039)

**Relation Between Performances and Metacognitions on Attention: Paper-and-Pencil Testing With Younger and Older Adults.** SATORU SUTO, *Chuo University*, & ETSUKO T. HARADA, *Hosei University*—In general, performances of attention tasks decline with aging from younger to older adults. However, is there any decline also in metacognition of attentional functioning, or what kind of relationship is there between performances and metacognition about attention when with two groups of different ages? Ninety-three undergraduate students (18–22 years) and 220 elderly people (60–83 years) participated in a paper-and-pencil testing experiment, in which participants executed 6 kinds of attention tasks, and also answered questionnaires about daily activities with divided attention and cognitive failures. Even though the path analysis revealed significant relationships between all measures of performance and age, there were also negative relationships between metacognitions of cognitive failure and age, and no significant relationship between metacognitions of dividend attention and age. These results suggest that the self-monitoring functions relating to metacognition decline with age, and that only objective measures or performances of attention can assess cognitive aging.

(5040)

**Is “Attention Capture” the Same as “Stimulus Control”?** DAVID A. WASHBURN & NATASHA A. BARRETT, *Georgia State University*—Many theoretical models distinguish between sources of behavioral control that are executive or intentional versus those that are reactive or automatic. In a series of experiments, we have further examined whether attention to sudden changes in the environment (of the type termed “stimulus capture”) is distinct from attention to stimuli that are prepotent as a result of conditioning (i.e., stimulus control). Summarizing across several experimental tasks (e.g., visual search, flanker), we report data showing how these environmental constraints versus experiential constraints differ with respect to the accuracy and latency of responses, and with respect to brain activity as revealed using transcranial Doppler sonography. The results favor a model of attention control that includes separable and competing sources of control from the environment, from activation or habit, and from intentions or plans.

(5041)

**Effect of Task Irrelevant Information on Forming an Attentional Set.** WILLIAM STURGILL, *Rockhurst University*—One service working

memory provides to goal directed responding is to inhibit task irrelevant information and to favor task relevant information in forming an attentional set. Problems related to failure to inhibit task irrelevant information are wide ranging. Is irrelevant information inhibited (not represented) or merely devalued (yet represented in working memory)? Evidence was gathered from a priming paradigm in which the prime and target were separated by varying SOAs. Targets were geons plus color; primes were words naming objects differing in color diagnosticity (high, low). Shape congruency to the primed concept was manipulated as was color congruency (for HCD primes). Subject's task was to name the ink color in the target. Initial results suggest that an attentional set is formed across SOA emphasizing task relevant information, and that the predictability of the irrelevant information (shape) inversely relates to how little it interferes with task relevant processing (color naming).

(5042)

**Endogenous Disruption of Exogenously Driven Prior Task Interference During Task Switching.** MARK E. FAUST, AGNES JASINSKA, CURTIS POLLARD, RICH PREVILLE, JUNAID MERCHANT, & FADEL Z. ZEIDAN, *University of North Carolina, Charlotte*—We have previously reported on a prior task interference (PTI) effect, that reflects the deleterious influence of a previously relevant, but now irrelevant, stimulus attribute (e.g., color) following a switch to a new task. This PTI effect appears to be primarily due to stimulus-driven reactivation of the prior task set during performance of the switched-to task in that it did not diminish across the first two trials of the switched-to task and was not modulated by switch delay. We report 2 new experiments demonstrating that a stop signal during the prior task, and the addition of a requirement for control on a stimulus dimension relevant for both tasks (e.g., semantic category), modulate the magnitude of the PTI effect. These results suggest the inhibitory control of stimulus-driven activation of task-irrelevant information is at a lower level in a hierarchical system of cognitive control processes.

(5043)

**Impaired Inhibitory Control in Recreational Cocaine Users.** LORENZA S. COLZATO, *Leiden University*, WERY VAN DEN WILDENBERG, *University of Amsterdam*, & BERNHARD HOMMEL, *Leiden University*—Cocaine is taking the place of ecstasy as second preferred recreational drug. Chronic use (daily consumption of cocaine) impairs response inhibition (Fillmore & Rush, 2002) but it is an open question whether and to which degree findings from chronic users extend to the “upcoming type” of recreational users (monthly base: 1–4 g). By using a stop-signal task we investigated the ability to inhibit and execute behavioral responses in adult recreational users and in a poly-drug-matched sample (controlled for age, race, gender distribution, level of intelligence). The results showed that users required considerably more time to inhibit responses to stop-signals than did nonusers, whereas the two groups did not differ in their ability to execute responses. Hence, recreational use impairs response inhibition, although to a smaller magnitude than chronic use, indicating that the degree of cocaine use is proportional to the magnitude of performance difficulties.

(5044)

**Influencing the Lingering Garden Path Effect Through Tasks of Executive Control.** EVANGELIA G. CHRYSIKOU, KATHRYN SCHERTZ, & SHARON L. THOMPSON-SCHILL, *University of Pennsylvania* (sponsored by Sharon L. Thompson-Schill)—Garden path sentences produce comprehension difficulties because they lead the reader to an initial incorrect understanding of the meaning of the sentence. Research has shown that elements of the incorrect interpretation “linger” even after one has revised the original interpretation and presumably comprehended the sentence correctly. The present research examined whether exposure to a category-generation pretask, which has been shown to involve higher order cognitive executive processes, would influence lingering garden path effects. Participants

were randomly assigned to either a category-generation or a control condition and asked to read 92 sentences. Garden path sentences were randomly presented among five types of control sentences. Following each sentence, participants responded to a follow-up comprehension question. Correct responses, time to respond, and sentence reading speeds were measured. The results revealed significant lingering garden path effects, which were more pronounced in the category-generation condition and are consistent with proposals of fatigue in cognitive control.

(5045)

**Mind Wandering Under Dual Task Conditions.** PETER DIXON & HENRY LI, *University of Alberta*—Previous research by Schooler and colleagues has demonstrated that readers can reliably detect when they are mind wandering and not fully comprehending. In particular, when readers are periodically interrupted and asked whether they are on task, their responses correlate with subsequent measures of comprehension. In the present research, readers were asked to detect the letter *e* as well read for comprehension. Consistent with previous research using this task, the letter-detection task did not have substantial effects on comprehension. However, under these dual-task conditions, there was no relationship between the responses to mind-wandering probes and comprehension. We conclude that mind wandering (as measured by probe responses) interferes with elaborative processing but not low-level comprehension.

(5046)

**Intertrial Control Overrides Top-Down Control in the Simon Task: An Event-Related Potential Study.** GAMZE ALPAY & BIRGIT STÜRMER, *Humboldt University, Berlin*—In the Simon task, responses are faster when the response location corresponds to the task-irrelevant stimulus position (compatible assignment) than when it does not (incompatible assignment). This compatibility effect diminishes after a preceding incompatible trial. We investigated whether intertrial adaptation interacts with top-down control by cuing targets in a Simon task. Event-related brain potentials were recorded, and the contingent negative variation (CNV) in the cue–target interval was analyzed as a measure of action preparation. Cues with varying validity either predicted the task-irrelevant stimulus position or the compatibility of the target (enabling intentional preparation). Cuing the compatibility with full validity accelerated responses for compatible trials. This precue benefit was only observed with preceding compatible trials, whereas there is no Simon effect after incompatible trials at all. Moreover, the CNV was largest after preceding compatible trials and full cue validity. Intratrial control, hence, appears to override top-down control in the Simon task.

• CLASSIFICATION •

(5047)

**Classifying Partial Exemplars Leads to Learning Within-Category Information.** ERIC G. TAYLOR & BRIAN H. ROSS, *University of Illinois, Urbana-Champaign* (sponsored by Brian H. Ross)—Recent work shows that category learning by classification may not result in learning some important knowledge people clearly possess, such as within-category information. However, most classification studies are conducted under narrow conditions not representative of natural classification. We compared “standard” classification to a slightly modified but more realistic task where exemplars appeared with missing features, with the idea that this change might lead to a wider distribution of attention. Typicality ratings collected after learning showed that learners who classified exemplars with absent features (Experiment 1) or occluded features (Experiment 2) were more sensitive to prototypical but nondiagnostic features (e.g., has two eyes is typical of cats but does not distinguish them from dogs) than standard classification learners. These results indicate that classification can, under some conditions, promote the learning of within-category information. Furthermore, they suggest the need to reconsider other

findings that depend on specifics of the standard classification paradigm.

(5048)

**Classification Versus Inference Tasks: Why Do They Lead to Differences in Category Representation and Use?** BENJAMIN JEE, *University of Illinois, Chicago* (sponsored by Susan R. Goldman)—Category learning research has contrasted two tasks: classification learning (CL) and inference learning (IL). In their review of this literature, Markman and Ross (2003) concluded that IL leads to prototype representations, whereas CL leads to representations around diagnostic features. This study explored why this is the case, and how these differences affect knowledge use. Participants learned about a new category through a CL or IL task. To tease apart the attentional and processing demands of these tasks, a restricted-inference learning (RIL) condition was included, in which participants performed an IL task involving only diagnostic features. The results showed that in terms of both category representation and use, performance in the RIL condition was more similar to CL than IL. Thus, differences in representation between IL and CL tasks may be due to the ways in which features are attended and encoded, rather than characteristics inherent to the learning processes themselves.

(5049)

**Conceptual Judgments of Expert Versus Novice Chemistry Students: An fMRI Study.** JAMES K. NELSON, *Dartmouth College*, RAPHAEL A. LIZCANO, *Harvard University*, LESLIE J. ATKINS, *Lesson Lab Research Institute*, & KEVIN N. DUNBAR, *University of Toronto*—Using fMRI, advanced chemistry and nonchemistry students were imaged while judging representations of molecules before and after a phase change (liquid to gas). Chemistry experts show relatively high levels of left inferior frontal activity on this task compared to novices, whereas novices show relatively high levels of inferior temporal and occipital activity compared to experts. This pattern of results is consistent with chemistry novices treating the task as a form of perceptual classification, whereas chemistry experts treat the task as a form of semantic/conceptual classification. Comparisons between this and an earlier fMRI study using a Newtonian mechanics task have implications for domain-specific differences in conceptual change in chemistry and physics education.

(5050)

**Stereotype Threat Depends on Task Reward Structure and Task Type.** LISA R. GRIMM, ARTHUR B. MARKMAN, W. TODD MADDOX, & GRANT C. BALDWIN, *University of Texas, Austin*—Research documents performance decrements in tasks resulting from the activation of negative task-relevant stereotypes. We suggest these negative stereotypes produce a prevention focus (i.e., a sensitivity to losses) that mismatches the positive feedback typically given in tasks. Performance usually suffers because this mismatch creates lower levels of flexibility than are observed in people who do not have this negative stereotype. To test this possibility, we induced a positive or a negative stereotype in participants and then gave them a complex classification task in which they either gained points or lost points. Individuals with a negative stereotype performed much better in this task when they lost points than when they gained points. In contrast, those with a positive stereotype performed better when they gained points than when they lost points. This pattern reversed when participants were given an information integration task for which cognitive flexibility is disadvantageous.

(5051)

**Domain-Specific Inquiry Strategies.** LINDSAY BLAU PORTNOY & MITCHELL RABINOWITZ, *Fordham University* (sponsored by Mitchell Rabinowitz)—Prior research shows that people distinguish cognitively between different categories—for example, animate and inanimate, causal and noncausal, and human and nonhuman. The present research investigates whether people use different patterns of

inquiry for different domains. We investigated this by asking people to generate questions about the content areas of history and biology. Seven categories of questions were identified: requests for information, questions about function, inquiries about why, questions about features, possibility statements or questions, mechanism questions, and requests for further information. Students' questions were sorted into these categories to discern patterns of inquiry. For biology, students tended to ask questions regarding function and possibilities, whereas in history, students tended to ask questions requesting additional information. These results indicate that people approach different knowledge domains with different inquiry strategies.

(5052)

**The Influence of Causal Information on Treatment Choice.** JENNELLE E. YOPCHICK & NANCY S. KIM, *Northeastern University*—Knowledge of the causal structure of a category has been shown to influence categorization (e.g., Ahn, 1998; Rehder, 2003) and diagnostic reasoning (Kim & Ahn, 2002; Kim & Keil, 2003). In two studies, we examined whether causal information presented in a causal chain (X causes Y which causes Z) affects treatment choice for mental disorders. For Study 1, artificial disorders were created using symptoms from the DSM-IV-TR (APA, 2000). These had either a biological root cause and psychological intermediate cause, or a psychological root cause and biological intermediate cause. Lay participants were asked to rate which of two fictitious treatments, a drug or a psychotherapy, would be more effective in treating each disorder. People reliably chose to map treatment choice onto the root cause of the mental disorder. Study 2 replicated this result using blank properties as symptoms. Possible implications for theory-based categorization and clinical practice are discussed.

• CONCEPTS •

(5053)

**Spatial Processing and Category-Specific Deficits.** CHRIS HOPE & LORI BUCHANAN, *University of Windsor*—There are a variety of explanations for the finding that some neurological patients are impaired at naming pictures of living things while being relatively unimpaired at naming pictures of nonliving things. Explanations range from those centered on characteristics of the objects themselves to those relating distinct naming abilities to evolutionary pressures. A series of experiments test the claims of several of these explanations. The findings are not entirely compatible with any of the extant theories but suggest a hybrid explanation that will be described in the presentation.

(5054)

**Questioning the Role of Procedural Learning in Probabilistic Categorization.** MEGAN HEFFERNAN & BEN R. NEWELL, *University of New South Wales*—The dual system account has dominated research on how people learn probabilistic categories. One widely used probabilistic categorization task is the weather prediction task (WPT), which is claimed to engage the procedural system. Two variables which are thought to impact on the procedural system differentially are memory load and delay of feedback. It is claimed that memory load does not impair the procedural system, whereas delay of feedback does. We investigated the effect of these two variables on WPT performance to assess its use as a procedurally mediated task. In three experiments results were inconsistent with this characterization. In Experiments 1 and 2, two different concurrent tasks interfered with performance on the WPT. In Experiment 3, delay of feedback did not interfere with WPT performance. These findings contradict the popular view of the WPT as a procedurally mediated task and questions its use as a demonstration of procedurally mediated learning.

(5055)

**Representing Competition Among Relations During Conceptual Combination.** CHRISTINA L. GAGNÉ & THOMAS L. SPALDING,

*University of Alberta*—Several questions have arisen concerning Gagné and Shoben's (1997) mathematical instantiation of relation availability based on their CARIN theory of conceptual combination. In particular, these questions focus on the issue of whether the notion of competition, as opposed to absolute relation frequency, is necessary, and the issue of whether the mathematical instantiation actually represents competition. First, we show that competition is indeed a critical factor in fitting the RT data. Second, we show that Gagné and Shoben's mathematical instantiation of relation availability does reflect competition among relations. Finally, we provide two new mathematical instantiations of relation availability that also fit the RT data well, indicating that the use of negative exponentials in the original formula is not critical to fitting the data, but that including a measure of competition is critical.

(5056)

**Processing Novel Conceptual Combinations in Discourse Contexts.** ERICA L. MIDDLETON, *University of Illinois, Urbana-Champaign*, & KATHERINE A. RAWSON, *Kent State University* (sponsored by Katherine A. Rawson)—A central theoretical debate in conceptual combination research concerns how people interpret novel noun–noun (NN) combinations (e.g., “bee spider”). Most of this work has focused exclusively on the processing of novel NN combinations in isolation. However, novel NN combinations encountered in nonexperimental situations are usually embedded in a discourse context. Thus, current theories may be limited to the extent that the processes involved in interpreting novel NN combinations in context are different than those involved in processing combinations in isolation. The results of two experiments suggested that the processes involved in interpreting novel NN combinations in context include but are not limited to the processes involved in interpreting novel NN combinations in isolation. Specifically, whereas processing novel NN combinations in context and in isolation both involve meaning generation processes, the processing of novel NN combinations in context can also involve anaphor resolution.

(5057)

**Learning at Multiple Levels of Abstraction: The Case of Verb Argument Constructions.** AMY PERFORIS & CHARLES KEMP, *MIT*, ELIZABETH WONNACOTT, *University of Oxford*, & JOSHUA B. TENENBAUM, *MIT* (sponsored by Joshua B. Tenenbaum)—We propose hierarchical Bayesian models (HBMs) as a framework for explaining how people can learn inductive constraints from experience. Specifically, we explore a simple HBM for the acquisition of verb argument constructions. HBMs learn at multiple levels simultaneously, inferring specific as well as general information. For instance, the model might learn which sentence constructions can be used with each specific verb, as well as constraints on how verbs in general are used: whether any given verb is likely to occur in multiple constructions or just one, or which constructions are most common in the language as a whole. Our model can acquire these two levels of knowledge on the basis of child-directed syntactic input alone, and can also explain adult performance on artificial language learning tasks that parallel the learning problem faced by children (Wonnacott et al., 2007).

(5058)

**Interacting Aliens: Inferring Causal Structures From Covariational Data.** RALF MAYRHOFFER, MICHAEL R. WALDMANN, & YORK HAGMAYER, *University of Göttingen*—Although human and nonhuman animals can undoubtedly learn causal model representations, there has been a debate about whether they can infer causal structure from covariation data alone in the absence of other cues (e.g., temporal order). Causal Bayes nets provide one rational account of how expert systems can induce structure from covariations, which has led to the proposal that humans may use related causal learning strategies. Based on the mind-reading alien paradigm introduced by Steyvers et al. (2003), we found impressive learning performance over a wide range of parameterizations for some causal structures but also systematic failures for others. We show that people's learning capacities can be ex-

plained by pattern-based, heuristic strategies, and that these heuristics do not rely on the Markov assumption, a crucial property of causal Bayes nets. Thus, the computational routines based on causal Bayes nets seem to exaggerate the information processing capacities of humans.

• PROBLEM-SOLVING •

(5059)

**Effects of Semantic Knowledge on Algebraic Modeling.** KRISTIE J. FISHER & MIRIAM BASSOK, *University of Washington*—When people solve arithmetic word problems they tend to align semantic object relations with arguments of arithmetic operations. Martin and Bassok (2005) found that such “semantic alignments” accompany mathematical modeling. They found semantic alignments in a word problem-solving task (arithmetic) that most students performed correctly, but not in an isomorphic equation-construction task (algebra) that many students performed incorrectly using a nonmodeling translation heuristic. We replicated the equation-construction task of Martin and Bassok and compared the time it took students to read aligned and misaligned relational statements (e.g., “six times as many cupcakes as trays” vs. “six times as many cupcakes as muffins,” respectively) they had to model. We found semantic alignments in students who performed the task correctly, and no semantic alignments in students who constructed incorrect algebraic equations. This interaction indicates that semantic alignments also accompany correct algebraic modeling.

(5060)

**The Roles of Learning and Working Memory in Fluid Intelligence.** ELAINE TAMEZ, JOEL MYERSON, & SANDRA HALE, *Washington University*, & JING CHEN, *Grand Valley State University*—Learning, as measured by laboratory tasks, typically correlates poorly with intelligence test scores. Recently, however, Williams and Pearlberg (2006) developed a learning task that showed an unexpectedly large correlation with the Raven's Advanced Progressive Matrices. Their task involved learning to recall ten three-word lists in response to ten different cue words (e.g., *lie: fan, rim, dry*). We examined the relation between learning on this task, working memory, and fluid intelligence. Performance on Williams and Pearlberg's learning task explained one-third of the variance in Raven's scores. Working memory (Operation Span) did not account for any additional (unique) variance. Our results, taken together with those of Williams and Pearlberg, strongly suggest that learning is a major component of what intelligence tests measure.

(5061)

**Age-Related Changes in Primary and Secondary Memory in Relation to Fluid Intelligence.** DUNEESHA DE ALWIS & JOEL MYERSON, *Washington University*, DAVID P. McCABE, *Colorado State University*, & CHRIS KUDELKA & SANDRA HALE, *Washington University* (sponsored by Joel Myerson)—Data from a cross-sectional study of 210 adults, 18–90 years of age, revealed that immediate recall of the initial and middle portions of a 16-word list declined with age whereas recall of the end portion did not. Thus, secondary memory appears to be much more age-sensitive than primary memory. Consistent with Unsworth and Engle (2006) secondary memory predicted Raven's scores, even with age controlled, whereas primary memory did not. In fact, recall from secondary memory predicted Raven's scores as well as performance on complex span tasks did. Comparison of immediate recall of the list with immediate recall of a subsequent 16-word list revealed that susceptibility to proactive interference (PI) increased with age, but most of the age-related decline in Raven's scores remained unexplained after controlling for the increase in PI.

(5062)

**Memory for Mental Disorder Categories Across Levels of Expertise.** JESSECAE K. MARSH, *Yale University* (sponsored by Woo-kyoung Ahn)—In addition to assigning patients to sometimes poorly defined diagnostic categories, mental health clinicians must remember spe-

cific information about individual patients. Expertise traditionally provides memory benefits for such specific domain-relevant information. However, expertise has been notoriously difficult to demonstrate within mental health clinicians. Does this indicate that expertise does not develop for these hard-to-define categories and there are no resulting changes across experience for memory of patients? Three participant groups (undergraduates novices, clinical student trainees, and clinicians with 10+ years experience) read passages describing mental disorder patients. Free recall performance differed across groups: Trainees recalled the most facts directly from the passages, whereas clinicians recalled more features that were absent from the passages but inferable about the patients. These results obtained despite equivalent baseline memory capacity and feature inference ability across groups. We discuss our results in relation to the medical expertise literature and to the treatment of mental disorders.

(5063)

**Strategy Use in the Raven's: Evidence for Item Subsets and the Role of Flexibility.** EMILY SWENSEN & DAVID Z. HAMBRICK, *Michigan State University*—The question of what underlies the general factor of intelligence ( $g$ ) has remained unanswered for more than a century. This study examined the role of strategy use in one highly  $g$ -loaded test, Raven's Advanced Progressive Matrices (Raven's). Concurrent think aloud protocols were used to examine what type of strategy (analytic, visuospatial, both, or indistinguishable) individuals primarily used to solve each item on the Raven's. Domain-general and task-specific components conceptualized to reflect underlying processes on the Raven's were also measured. The results indicated that there are distinct subsets of analytic and visuospatial items that are optimally solved using a matching strategy. Furthermore, a task-specific component, flexibility in strategy use, predicted Raven's performance above and beyond working memory, cognitive style, and cognitive flexibility. The findings suggest that part of what underlies performance on the Raven's, and consequently  $g$ , is the ability to detect and flexibly use strategies.

(5064)

**The Role of Implicitly Activated Associates on Intuitive Problem Solving.** JENNIFER L. DYCK & DANI MCKINNEY, *SUNY, Fredonia*—Previous studies of intuitive problem solving have found that feelings of warmth are not always predictive of ability to generate solutions. We examined the role of implicitly activated associates on ability to solve word problems. Participants were presented with dyads of triads where one triad was coherent—that is, three words all related to a solution word—while the other triad was composed of unrelated words. Solution words had either high or low connectivity of its associative network, and each word in the triad was a member of this set. Participants were to choose the correct triad, rate feelings of warmth, and generate a solution word. The results indicated that feelings of warmth were highest for items with highly interconnected networks. However, correct solutions were generated more often for items with loosely interconnected networks. Findings indicate that implicitly activated associates may help explain feelings of warmth discrepancies in problem solving.

(5065)

**Fifth Graders' Learning About Probability From Experiments They Perform.** PATRICIA BAGGETT, *New Mexico State University*, ANDRZEJ EHRENFEUCHT, *University of Colorado*, & LAURA MICHALIK, *New Mexico State University*—Probability is a difficult concept to teach, especially in elementary grades. The mathematical concepts involved are subtle and difficult even for adults, who often form misconceptions (frequently cited in the research literature). Yet statewide math standards require that data analysis and probability be included in the K–5 math curriculum. The recommended pedagogy is constructivist—namely, students are expected to form their own conclusions based on the material they study. A fifth grade class in the southwestern United States participated in hands-on experiments in-

volving chance over a three-month period, collecting and analyzing data and interpreting results. We will describe their experiments, the strategies the students used to predict outcomes, what they learned, and what misconceptions they formed. We will also suggest how lessons about probability could be designed and presented to help prevent students from forming misconceptions and to increase their understanding of the topic.

(5066)

**Time of Day Effects on Insight Problem Solving.** MAREIKE WIETH & CAMERON B. HARRIS, *Albion College*—During a person's nonoptimal time of day the ability to inhibit irrelevant information has been found to be reduced compared to their optimal time periods (Hasher, Zacks, & May, 1999). In order to solve insight problems the solver must often overcome the current representation of a problem and find an alternative way of structuring the problem space. It was hypothesized that time of day would influence participants' insight problem solving rate. Across several experiments participants were asked to solve a variety of insight problems. The results showed that participants were more successful at solving problems during their nonoptimal time of day than during their optimal time of day. The results also suggest that these findings might be due to participants' increased tendency to break mental set during their nonoptimal time of day. Perhaps participants' reduced ability to inhibit irrelevant information encouraged a variety of problem representations, leading to greater problem solving success.

• SOURCE MEMORY •

(5067)

**The Impact of Feedback at Test on Source Memory and Old/New Recognition.** SEAN LANE, STEPHANIE GROFT, & CRISTINE ROUSSEL, *Louisiana State University*—Prior work in our laboratory revealed that receiving feedback about the accuracy of test decisions during a training period reduced source monitoring errors on subsequent items. Because research (e.g., Kantner & Lindsay, 2006) has found that the effect of feedback on recognition varies by type of stimuli, it is unclear whether our findings are a function of type of stimuli or type of test decision. In the present study, we had participants study pictures and form images. At test, we varied whether participants received feedback during a training phase of the test and whether they received a source or an old/new recognition test. On the source test, the feedback manipulation significantly reduced source misattributions (images called pictures). On the old/new recognition test, the manipulation led to a liberal bias. Our results suggest that feedback about source decisions may be more effectively utilized by participants than feedback about old/new judgments.

(5068)

**A Source Misrecollection Account of Remember False Alarms.** DAVID P. MCCABE, *Colorado State University*, & LISA GERACI, *Texas A&M University*—Proponents of discrete dual-process memory theories have suggested that remember responses in the remember-know paradigm reflect a conscious recollection process, whereas know responses reflect a familiarity process. Based on this assumption, others have argued that the existence of remember false alarms is problematic for discrete dual-process theories because conscious recollection should not occur for items that were not studied. We propose a source misrecollection account of remember false alarms that explains these responses in a manner consistent with the principles of discrete dual-process theories. According to the source misrecollection account, recognition probes, whether old or new, can elicit recollection of studied items, features of studied items, or items from a context other than the experiment. Two experiments are reported demonstrating the plausibility of this account, showing that subjects were more likely to give remember responses to distractors that had been encountered in a "preexposure" phase, than to experimentally novel distractors.

(5069)

**The Effects of Complexity on Source Memory ROCs.** LINDA J. MURRAY, COLLEEN M. PARKS, & ANDREW P. YONELINAS, *University of California, Davis* (sponsored by Andrew P. Yonelinas)—Source-memory receiver operating characteristics (ROCs) are typically flatter than those seen in item recognition, and they are U-shaped in *z*-space. There is considerable debate, however, regarding why the *z*ROCs are U-shaped and what conditions are necessary to observe these effects. In the present study, we examined whether source *z*ROCs become more linear as the complexity of the study event increases by manipulating stimulus type (simple or complex) and source type (simple or complex) in a fully crossed design. Preliminary results show source *z*ROCs that are U-shaped in the simple stimulus–simple source condition, somewhat flatter in the two conditions with one simple and one complex factor, and almost perfectly linear in the complex stimulus–complex source condition. This pattern indicates that increasing stimulus complexity or source complexity leads source *z*ROCs to become more linear. Whether these effects reflect changes in recollection or familiarity is discussed.

(5070)

**Effects of Study Task on the Neural Correlates of Encoding Operations Supporting Successful Source Memory.** HEKYEONG PARK, MELINA R. UNCAPHER, & MICHAEL D. RUGG, *University of California, Irvine*—The present study investigated whether the neural correlates of successful source memory vary according to the nature of study processing. Participants studied visually presented words, each displayed in one of two background contexts. At test, participants were asked to make old/new recognition and source memory judgment. In one study–test cycle, the study words were subjected to animacy judgments, whereas in another cycle the study task required a judgment about number of syllables in each word. fMRI was employed to contrast the neural activity elicited by study words that attracted accurate source judgments on the later memory test, as opposed to words that were later forgotten or for which source information was unavailable. In both tasks, study words that were later assigned to the correct source elicited enhanced activity in ventral extrastriate cortex. In addition to these common effects, task-selective effects were observed, including animacy-specific medial temporal lobe subsequent memory effects. These findings extend previous studies by demonstrating that the neural correlates of successful encoding differ according to study task when the later memory test emphasizes source rather than item information. The findings add further support to the proposal that neural activity supporting successful episodic memory encoding varies according to the online processing engaged by an episode as it is experienced.

(5071)

**Children's Encoding Focus and Later Source Monitoring Decisions.** STACIE L. CRAWLEY, NORA S. NEWCOMBE, & HANNAH BINGMAN, *Temple University* (sponsored by Nora S. Newcombe)—Generally speaking, source monitoring decisions are made by reviewing the qualitative characteristics associated with a memory and determining whether there is a sufficient amount of information to attribute the memory to a particular source. Previous work on children's encoding focus and source monitoring decisions has shown that when children focus on a speaker's emotions during encoding, there is improvement between the ages of four and six in source memory and, more specifically, in memory for particularly helpful source-identifying information (Kovacs & Newcombe, 2006). Two studies are presented that test the role of different encoding instructions and their effect on later source monitoring. When children reflect on a speaker's emotions at encoding, source monitoring improves. However, when the focus is turned inward or on other features, such as semantic and perceptual information, source monitoring declines. Implications for the development of source monitoring and strategy are discussed.

(5072)

**Source Memory, Subjective Awareness, and the Word Frequency**

**Mirror Effect.** JASON L. HICKS, BENJAMIN A. MARTIN, & NOELLE L. BROWN, *Louisiana State University*—We examined the relative contribution of recollection and familiarity in source decisions. Subjects encoded low- and high-frequency words on either the left or right side of a computer monitor. The SM-first group first made a left/right/new source decision, followed by a recollect/familiar decision. The RF-first group made decisions in the opposite order. Compared to the SM-first group, the RF-first group was more likely to use the “recollect” claim and less likely to use the “familiar” claim for targets, but not for lures. Compared to the RF-first group, the SM-first group had better source memory for items “recollected” and a trend of better source memory for items deemed “familiar.” Both groups had better source memory in the state of recollection as opposed to familiarity, but in the familiarity state source memory was above chance. The low-frequency advantage was present in the states of recollection and familiarity, rather than in recollection only.

• EMOTION AND MEMORY •

(5073)

**Emotional Memory Enhancement: A Meta-Analysis.** BRANDY A. BESSETTE-SYMONS & WILLIAM J. HOYER, *Syracuse University*—Emotional material is remembered better than neutral material, the emotional memory enhancement effect (EME). We report the results of a series of meta-analyses based on 67 samples that describe the magnitude of EME for positive and negative stimuli. EME was larger for negative stimuli ( $d = .81$ ) than for positive stimuli ( $d = .58$ ) when analyses were based on free recall, cued recall, and recognition hit rates. Stimulus type (pictures, words) was a significant moderator for negative EME but not for positive EME. The analysis based on accuracy and corrected recognition scores (hits/FA) revealed EME for negative stimuli ( $d = .49$ ) but not for positive stimuli ( $d = .15$ ). Regarding R/K differences, both negative ( $d = 1.2$ ) and positive ( $d = .46$ ) stimuli showed more R responses than did neutral stimuli; in contrast, only negative stimuli ( $d = -.6$ ) differed from neutral stimuli for K responses. Theoretical implications are discussed.

(5074)

**Binding Theory Predicts Memory Performance in RSVP Picture Lists.** GREGORY E. DEVORE, DAVID GILSDORF, & PAUL HAERICH, *Loma Linda University*—Binding Theory predicts enhanced memory performance for negative emotional stimuli in heterogeneous lists combining negative and neutral stimuli at sufficiently fast presentation rates. Counterintuitively, it also predicts no difference in memory performance for negative and neutral stimuli in homogenous lists. These results have been previously supported using taboo and neutral lexical stimuli. We tested the predictions of binding theory using neutral or negative images selected from the International Affective Picture System. Subjects were presented six homogenous lists of 9 items each. The results indicate no significant differences in recognition or temporal memory between negative and neutral picture stimuli presented in homogenous lists ( $ps > .40$ ). Subjects displayed greater confidence for correctly as compared with incorrectly answered recognition and temporal memory items ( $ps < .001$ ); however, confidence did not vary with valence ( $ps > .17$ ). Taken together, these results support the predictions of Binding Theory for homogenous lists of images.

(5075)

**Killing Good Memory for Emotional Words.** STEPHEN R. SCHMIDT, *Middle Tennessee State University*—Memory for negative affect emotional words (e.g., *kill*, *hate*, *died*) often exceeds memory for matched neutral words. This effect may be due to the emotion evoked by the words, or to some factor confounded with word type. To explore the role of emotion in memory for emotional words, participants read sentences that activated either highly emotional meanings of target words (*Shane DIED in his car last night*), or low emotional meanings of the targets (*Shane's old car DIED last night*). One

group of participants rated the targets on several dimensions, and a second was asked to freely recall the targets. The high emotional contexts led to higher levels of emotion, but poorer recall, than did the low emotional contexts. In an item analysis, rated distinctiveness, but not rated emotion, was positively correlated with recall. These results suggest that distinctiveness, rather than emotion, is responsible for good memory for emotional words.

(5076)

**Response Bias in “Remembering” Emotional Stimuli: A New Perspective on Age Differences.** AYCAN KAPUCU, CAREN M. ROTELLO, REBECCA E. READY, & KATHARINA N. SEIDL, *University of Massachusetts* (sponsored by Caren M. Rotello)—Older adults sometimes show a free recall advantage for emotionally positive, rather than neutral or negative, stimuli (Charles, Mather, & Carstensen, 2003). In contrast, younger adults respond “old” and “remember” more often to negatively valenced materials in recognition tests. Both recognition effects are due to response bias changes rather than enhanced memory accuracy or the use of recollection (Dougal & Rotello, 2007). We presented older and younger adults with emotional and neutral stimuli in a remember-know paradigm. Signal-detection and model-based analyses showed that memory accuracy did not differ for the neutral, negative, and positive stimuli, nor was recollection used. However, both age groups showed large and significant response bias effects of emotion: Younger adults tended to say “old” and “remember” more often to negative words compared to positive and neutral words, whereas older adults responded “old” and “remember” more often to both positive and negative words than to neutral stimuli.

(5077)

**Cognitive Basis of the Positivity Effect in Old Age.** CHRISTIE CHUNG, MEREDITH BROWN, NAVINE NASSER-GHODSI, & SUZANNE CORKIN, *MIT*—The tendency of older adults (OA) to remember positive information better than negative information is well-documented, but its cognitive basis awaits deeper examination. We examined the cognitive mechanisms supporting this positivity effect using the think/no-think paradigm (Anderson & Green, 2001). Young adults (YA) and OA learned negative, positive, and neutral word pairs. They were asked to recall the second member of some of the studied pairs (think condition), but to suppress their memory for others (no-think condition). They then recalled the second members for all studied pairs. YA showed enhanced memory for negative and positive words in the think condition, and stronger suppression of these words compared to neutral words in the no-think condition. OA displayed similar patterns for positive words, but showed no significant enhancement or suppression for negative words. The positivity effect may stem from OA’s overall decreased cognitive control for negative but not for positive information.

• VISUAL PERCEPTION AND IMAGERY •

(5078)

**Cognitive and Autonomic Measures of Object Familiarity.** FRANK M. MARCHAK, TANNER L. KEIL, PAMELA S. WESTPHAL, DAVID M. BECHBERGER, & JENNIFER E. TIERNEY, *Veridical Research and Design*—Altoff and Cohen (1999) found differences in eye movement measures to images of novel and repeated faces and attributed this effect to differences in the underlying cognitive processes involved in face perception. This effort examined the relationships among skin conductance and pupil diameter—measures of autonomic arousal—and cognitive measures of eye movement and reaction time when viewing images of familiar and unfamiliar objects. Thirty subjects viewed 40 images of objects, half familiar and half unfamiliar, while measures were taken of eye movements, mean pupil diameter, electrodermal activity (excursion, rise time), and reaction time. A within-subjects MANOVA was conducted using object familiarity as a factor. There was a significant overall effect of prior exposure [ $F(7,424) = 20.537, p = .000$ ]. The implications of these find-

ings are discussed in terms of the relationship between measures of cognitive and autonomic activity.

(5079)

**A Technique for Measuring Single-Item Identification Efficiencies.** AMI EIDELS, JASON M. GOLD, JAMES T. TOWNSEND, & BRIANNA CONREY, *Indiana University, Bloomington* (sponsored by Jason M. Gold)—Thresholds and corresponding efficiencies (ideal/human thresholds) in identification tasks are typically computed by collapsing data across all items (stimuli) within a given task in order to obtain a “multiple-item” summary measure of performance. However, some stimuli may be processed more efficiently than others, and such differences are not captured by such conventional multiple-item threshold measurements. Here, we present a simple technique for measuring “single-item” identification efficiencies. The resulting efficiencies describe the ability of the human observer to make use of the information provided by a single stimulus item within the context of the larger set of stimuli. We applied this technique to the identification of several different classes of complex patterns embedded in noise, including 3-D rendered objects and Roman letters. Our results show that efficiency can vary markedly across stimuli within a given task, demonstrating that single-item efficiency measures can reveal important information lost by conventional multiple-item efficiency measures.

(5080)

**Looking as if You Know: Implicit Identification Guides the Eyes in Object Recognition.** LINUS HOLM, JOHAN ERIKSSON, & LINUS ANDERSSON, *Umeå University* (sponsored by Timo Mäntylä)—Sometimes we seem to look at the very objects we are searching for, without consciously seeing them. Does attention to an object precede conscious object recognition? We addressed this question in two recognition experiments involving pictures of fragmented objects. In Experiment 1, participants preferred to look at the target object rather than a control region 25 fixations prior to explicit recognition. Furthermore, participants inspected the target as if they had identified it around 9 fixations prior to explicit recognition. In Experiment 2, we investigated whether semantic knowledge might explain the systematic object inspection prior to explicit recognition. Prior knowledge about target name increased participants’ scanning efficiency. The control region was rejected faster when the participants knew the target’s name. The findings suggest that semantic memory is involved in gaze control during visual recognition, guiding the eyes to diagnostic regions before we become aware of the target’s identity.

(5081)

**A Statistical Model for Discriminating Between Subliminal and Near-Liminal Performance.** RICHARD D. MOREY, JEFFREY N. ROUDER, & PAUL L. SPECKMAN, *University of Missouri, Columbia*—The concept of a psychophysical threshold is foundational in perceptual psychology. In practice, thresholds are operationalized as stimulus values that lead to a fairly high level of performance such as .75 or .707 in two-choice tasks. These operationalizations are not useful for assessing subliminality—the state in which a stimulus is so weak that performance is at chance. We present a hierarchical Bayesian model of performance that incorporates a threshold that divides subliminal from near-liminal performance. The model provides a convenient means to measure at-chance thresholds and therefore is useful for testing theories of subliminal priming. We show that the model performs well in simulation and apply it to a subliminal priming experiment.

(5082)

**Face Scanning Strategies in Monkeys (*Macaca mulatta*): An Eye Movement Investigation.** CHRISTOPH D. DAHL, CHRISTIAN WALLRAVEN, HEINRICH H. BÜLTHOFF, & NIKOS K. LOGOTHETIS, *Max Planck Institute for Biological Cybernetics* (sponsored by Heinrich H. Bühlhoff)—It has been demonstrated that monkeys

process conspecific faces holistically—unlike human or marmoset monkey faces (Dahl et al., *Proc.R.Soc.B*, accepted). Face inversion or blurring systematically affected the proportion of fixation and viewing time. Here, we describe the scanning characteristics on monkey and human faces using a nonreinforced paradigm. Upright and blurred monkey faces elicited initial fixations and refixations of eyes, before transferring to lower facial parts. For human faces, an initial fixation in the upper face regions was followed by an unspecific saccade to other regions. Inversion elicited an initial fixation on the upper quadrants of monkey faces, followed by fixations across the whole face. Inverted human faces, however, differed relatively little from upright human faces. Depending on the presentation condition of a face, the same face can trigger a different scanning behavior, which in turn is specific to the species affiliation, indicating a high-level influence.

(5083)

**Feature Migration in the Standing Wave Illusion.** ELISABETH HEIN & CATHLEEN M. MOORE, *University of Iowa*—A bar flickering in counterphase with two flanking bars can disappear, leaving the perception of two jittering flanking bars—the standing wave illusion. It has been observed informally that surface features of the invisible central bar “migrate” to the flanking bars. If the central bar is gray and the flanking bars are white, then when the central bar is invisible, the flanking bars can appear grayish. This feature migration suggests the assignment of features to currently represented objects in the scene through object-mediated updating processes. The aim of this study was to measure feature migration in the standing wave illusion formally. We obtained reports of both the visibility of the central bar and of perceived surface features of the flanking bars as a function of flanker duration. The results are consistent with the phenomenology. We are now in a position to test an object-mediated updating account of feature migration.

(5084)

**Can Memory Effect Visual Perception?** DAVID MARSHALL & PAUL ATCHLEY, *University of Kansas*—Reentrant processing within the visual system allows for the possibility that pattern-level memory information can affect visual processing at the object formation level. This possibility was explored by manipulating the number of possible target identities in an alternative forced choice target identification task using a simultaneous onset masking paradigm. Identification accuracy scores between a two-alternative forced choice (AFC), a four AFC task, and a response control condition (used to control for possible response level effects) were compared. Accuracy scores were significantly higher in the four AFC task, indicating that pattern level memory information did affect visual perception. The results could not be explained by response-level effects.

(5085)

**Limits of Coactivation: Redundancy Gain in Three-Dimensional Visual Stimuli.** SONJA ENGMANN & DENIS COUSINEAU, *University of Montreal* (sponsored by Denis Cousineau)—Response times of participants in a visual object recognition task decrease significantly if targets can be distinguished by several redundant attributes. Race models predict a gain due to redundancy, but models of coactivation give a much better approximation of the strength of this gain. Evidence of a redundancy gain has previously been found for stimuli from three different modalities (tactile, auditory, and visual). However, these results are difficult to replicate with purely visual stimuli. A series of several experiments with varying stimulus attributes revealed the limits of processing redundant stimuli. Although we found evidence of a redundancy gain for three-dimensional stimuli, this gain cannot always be attributed to coactivation. We argue that the variability in size of the redundancy gain is related to the structure of the visual system, and depends strongly on the type of stimulus attributes. Alternative models, with properties of both race and coactivation models, are proposed to accommodate differences in processing for visual attributes.

(5086)

**Imagery Skills in Members of Different Professions and Gifted Children.** OLESYA BLAZHENKOVA & MARIA KOZHEVNIKOV, *George Mason University* (sponsored by Maria Kozhevnikov)—This research was conducted to investigate differences in imagery between different professional groups. Scientists ( $n = 24$ ), visual artists ( $n = 11$ ), architects ( $n = 15$ ), and humanities professionals ( $n = 23$ ) completed spatial imagery tests assessing abilities to process spatial relations, and object imagery tests assessing abilities to process visual appearances of objects in terms of color and shape. Whereas visual artists showed above average object imagery but below average spatial imagery abilities, scientists showed an opposite pattern. To investigate developmental aspects of such dissociation in imagery ability, three groups of children 8–18 years old, with strong interest to one of the above fields (science, visual arts, or humanities), were compared on a similar battery of spatial and object imagery tests. The results were consistent with those obtained from adult professionals, supporting the existence of the trade-off between object and spatial imagery abilities.

(5087)

**Discriminability and the Preferred Level of Face Categorization.** CHRISTOPHER J. D’LAURO, *University of Colorado*, JAMES W. TANAKA, *University of Victoria*, & TIM CURRAN, *University of Colorado* (sponsored by Tim Curran)—People usually categorize objects more quickly at the basic level (e.g., “dog”) than at the subordinate (e.g., “Collie”) or superordinate (e.g., “animal”) category levels. Notable exceptions to this rule include objects of expertise, faces, and atypical objects (e.g., “penguin”), all of which show faster-than-normal subordinate level categorization. We hypothesize that the subordinate level reaction time advantage seen for faces is the result of their high discriminability. First, we replicated the subordinate-level advantage for faces (Experiment 1) and then showed that a basic-level advantage for faces can be elicited by increasing the perceptual similarity of the face stimuli, making discrimination more difficult (Experiment 2). Finally, we repeated both effects within subjects, showing individual faces were slower to be categorized in the context of similar faces and more quickly categorized among diverse faces (Experiment 3). These data suggest a common framework for face and object categorization.

• SKILL ACQUISITION •

(5088)

**Learning With Practice: To Speed Up, or Not to Speed Up?** EMILY E. BOHLSCHIED, SCOTT D. BROWN, & ANDREW J. HEATHCOTE, *University of Newcastle* (sponsored by Andrew J. Heathcote)—When given extended practice on a cognitive task with instructions to be both fast and accurate, participants typically become faster while maintaining constant accuracy (Heathcote, Brown, & Mewhort, 2000). However, when Dutilh and Wagenmakers (unpublished data) emphasized either speed or accuracy in a between-subjects manipulation they found that some participants in the speed stress condition improved accuracy while maintaining a constant speed. We used the same task, lexical decision, and tested a larger number of participants using a within-subjects design to manipulate the instructions given to participants (speed vs. accuracy emphasis). Most participants displayed a constant error rate accompanied by decreasing RT in both speed and accuracy emphasis blocks, with only a few participants who started with speed emphasis instructions displaying a fairly constant RT and increasing accuracy with practice. We discuss the implications for criterion setting in speeded choice models (e.g., Brown & Heathcote, 2005; Ratcliff & Smith, 2004).

(5089)

**Improving Mathematics Learning by Rearranging Practice Problems.** DOUG ROHRER & KELLI TAYLOR, *University of South Florida*—Although mathematics students typically devote most of

their study time to practice problems, little is known about how mathematics learning is affected by even the simplest changes in practice strategy. In the experiments reported here, subjects were assigned the same practice problems, and only the practice schedule was manipulated. Once practice was complete, subjects were tested between one day and four weeks later. Tests scores increased sharply if (1) different types of practice problems were interleaved and not grouped together, or (2) practice problems of the same type were distributed across practice sessions. In each experiment, the less effective schedule was the one used in a majority of mathematics textbooks.

(5090)

**Effects of Difficulty, Specificity, and Variability on Training to Follow Navigation Instructions.** VIVIAN I. SCHNEIDER & ALICE F. HEALY, *University of Colorado*, IMMANUEL BARSHI, *NASA Ames Research Center*, & LYLE E. BOURNE, *University of Colorado*—Subjects were trained to follow navigation instructions telling them to move in grids on a computer screen simulating a 3-dimensional space. They repeated and then followed the instructions by mouse clicking on the grids. They were trained, given a short distractor task, and then tested. There were three groups differing in the message lengths received during training: easy (short lengths), hard (long lengths), and mixed (all lengths), with all subjects given all lengths at test. There was a significant interaction of condition and message length at test. The mixed group was best on most lengths, and the easy group was better than the hard group on short lengths, whereas the hard group was better than the easy group on long lengths. The results support the advantages of both specificity and variability of training but do not support the hypothesis that difficult training would lead to overall best performance at test.

(5091)

**The Impact of Item-Focused and Relational Processing on Episodic Memory and Artificial Grammar Knowledge.** THOMAS WATKINS, ROBERT MATHEWS, & SEAN LANE, *Louisiana State University* (sponsored by Robert Mathews)—Two artificial grammar learning experiments were conducted to study the acquisition of episodic and grammar knowledge with manipulations designed to enhance one or the other type of knowledge. In the first experiment, subjects were trained to recognize specific exemplars (item-focused emphasis) or to identify patterns of family resemblance (relational focus), and then participants were given both an episodic (specific exemplar recognition) and a grammar (valid string identification) test. The item-focused emphasis led to better episodic knowledge and equivalent grammar knowledge. The second experiment investigated the same training types over a longer training period and under presence or absence of interference from different study lists. The results confirmed that the two types of knowledge can be independently manipulated and that both types of knowledge are used together whether it is beneficial or not for overall performance. The results are not consistent with current exemplar models or single system abstraction models.

(5092)

**Timing Is Everything: Effects of Attention and Modality on Statistical Learning.** LAUREN L. EMBERSON, *Cornell University*, CHRISTOPHER M. CONWAY, *Indiana University*, & MORTEN H. CHRISTIANSEN, *Cornell University* (sponsored by Morten H. Christiansen)—Previous studies have pointed to both attentional (Turke-Brown et al., 2005) and modality-specific (Conway & Christiansen, 2006) effects on statistical learning. Here, we demonstrate that these effects of modality and attention interact, modulated by the timing of stimulus presentation. We presented participants with sequential input by interleaving a stream of auditory syllables with a stream of visual shapes, with the order of presentation determined by separate statistical relations in each modality. Participants were asked to only attend to stimuli in one modality. The rate of stimuli was manipulated across attention and modality conditions. For long presentation rates, attention facilitated visual but not auditory statistical

learning. In contrast, short presentation rates resulted in the opposite pattern: Attention facilitated auditory but not visual statistical learning. Thus, presentation rate differentially modulated the effects of modality and attention on statistical learning, pointing to separate modality-specific mechanisms for auditory and visual statistical learning.

(5093)

**Implicit Learning and its Relation to Language: Evidence From Adults, Children, and Deaf Children With Cochlear Implants.** CHRISTOPHER M. CONWAY, JENNIFER KARPICKE, & DAVID B. PISONI, *Indiana University*—Immediate memory span is typically assessed using unstructured lists (e.g., digit span or nonword repetition tasks). However, some studies have shown that memory for structured lists improves as compared to random or unstructured patterns, and that this increase in immediate memory span can be a useful measure of implicit learning. Here, we report data from a structured sequence learning task obtained from three groups of participants: adults, children, and deaf children with cochlear implants. The results show that implicit learning for visual sequential patterns is strongly associated with language abilities in all three groups. In addition, visual sequence learning in the group of children with cochlear implants was worse compared to normal-hearing age-matched children, suggesting that a period of sensory deprivation (profound deafness) results in a disturbance to implicit sequence learning skill. These results have important theoretical, clinical, and methodological implications for understanding implicit learning and its relation to language.

(5094)

**Sleep Does Not Enhance Motor Sequence Learning.** DENISE J. CAI & TIMOTHY C. RICKARD, *University of California, San Diego* (sponsored by Timothy C. Rickard)—Motor sequence skill is believed to be enhanced by sleep consolidation. A replication of earlier experiments, however, demonstrates that the sleep enhancement effect can be explained as a consequence of data averaging. In a second experiment that equates time-of-day and time-since-sleep for both the training and testing sessions, no effect of sleep was observed, suggesting that earlier results suffered from a confound involving one or both of those factors. These findings invite a substantial reevaluation of the role of sleep in motor skill learning.

(5095)

**A Full Night's Benefit From a Mere Nap: Consolidation of Perceptual Learning of Synthetic Speech.** KIMBERLY M. FENN, DANIEL MARGOLIASH, & HOWARD C. NUSBAUM, *University of Chicago* (sponsored by Howard C. Nusbaum)—Performance in a synthetic speech learning task improves immediately after training, but appears to deteriorate over the course of a day. After a 12-h waking interval, performance levels decline to approximately half of the initial learning. However, after a subsequent night of sleep, performance is restored to posttraining levels. If sleep occurs prior to a waking interval, no learning is lost due to time awake; sleep inoculates learning against subsequent waking degradation (Fenn et al., 2003). Here, we show that participants who were permitted to nap for 1.5 h in the afternoon showed no significant change in learning after a 12-h retention interval ( $p > .3$ ), whereas control participants, not permitted to nap, lost about half of their initial performance gain ( $p < .0001$ ). This suggests that in a generalized speech task, a nap can function to aid learning in much the same way as a full night of sleep.

(5096)

**A Diffusion Model Account of Practice.** GILLES DUTILH, *University of Amsterdam*, JOACHIM VANDEKERCKHOVE & FRANCIS TUERLINCKX, *University of Leuven*, & ERIC-JAN WAGENMAKERS, *University of Amsterdam* (sponsored by Jeroen G. W. Raaijmakers)—When people repeatedly perform the same cognitive task, their response times (RTs) invariably decrease. This effect has been extensively studied in the past, with most research focusing on the specific

question of how the RT mean decreases with practice. In order to provide a more general account of the practice effect, we applied the Ratcliff diffusion model to data from a 10,000-trial lexical decision task. The diffusion model estimates parameters that represent psychological processes by describing the practice-induced changes for both entire RT distributions and the proportion of errors. The data show that practice leads to improvement on RT when participants are instructed to respond accurately, and leads to improvement on accuracy when participants are instructed to respond quickly. A diffusion model analysis suggests that the effect of practice is to enhance the speed of information processing, to decrease response caution, and to decrease peripheral processing time.

• ASSOCIATIVE LEARNING AND MEMORY •

(5097)

**The Effect of Tobacco Abstinence on Text Comprehension.** ADAM COBB, PAUL S. MERRITT, & LUKE MOISSINAC, *Texas A&M University, Corpus Christi*, & ELLIOT HIRSHMAN, *George Washington University* (sponsored by Paul S. Merritt)—Previous research has shown reductions in memory performance following 24 h of abstinence from tobacco use. (Hirshman et al., 2004). However, no research has been conducted regarding tobacco abstinence and text comprehension. This study was conducted to explore the effects of tobacco abstinence on text comprehension. We tested 25 moderate to heavy smokers when smoking normally (ad lib) and after 24 h without tobacco use (abstinent). Participants read two SAT passages in each condition (at the beginning and end of each session). Following each reading, participants completed standard SAT questions designed to assess text comprehension, followed by 5 min of free recall. Recall was analyzed using latent semantic analysis. No significant main effect of tobacco abstinence was found for text comprehension or free recall; however, there was a significant interaction between smoking condition and time of assessment in which performance declined from Test 1 to Test 2 during the abstinent session.

(5098)

**The Tenacious Nature of Binding Errors for Arousing Pictures.** DEANNA L. NOVAK & MARA MATHER, *University of California, Santa Cruz* (sponsored by Margaret Wilson)—Arousal associated with an item enhances memory for its location and other intrinsic details (Mather, 2007). However, arousal-enhanced memory binding might have a cost when initial binding is incorrect and needs to be updated. To examine whether misbindings are more difficult to correct for arousing items than for nonarousing items, we asked participants to study a slide show sequence of 64 picture–location conjunctions and then to recall the location of each picture. Participants repeated this study–test sequence until they were able to accurately recall the locations of all 64 pictures. Initially, participants were able to recall significantly more negative than neutral picture locations, consistent with previous studies. However, in subsequent learning blocks the advantage reversed. Participants were more likely to repeat mistakes for negative images than for neutral images. This reveals a trade-off for arousing items: fast learning but impaired flexibility in memory binding.

(5099)

**The Effects of Emotional Association and Intervals on Evaluation of Advertised Products.** KEN MATSUDA & TAKASHI KUSUMI, *Kyoto University*—This study investigates the causal factors of J-curve effect by evaluation and recognition of advertised products paired with affective pictures. Participants were shown advertisements with pictures that varied in emotional valence from negative to positive. Five minutes or 1 week later, two groups of participants rated old and new products on liking, purchase intention, and recognition or recognized association between advertisements and images, respectively. Although liking and purchase intention ratings at the 5-min delay showed a monotonic increase from negative to positive valence, the

ratings at the 1-week delay showed a J-curve effect; both liking and purchase intention received higher ratings at both ends of the valence, relative to the middle. In addition, memories of products were maintained, but the association between affective pictures and advertisement decreased. The J-curve effect was explained by the decrease of association between affective stimuli and products, and by maintenance of affective intensity.

(5100)

**The Effect of a Concurrent Memory Load on the Directed Forgetting of Emotional Pictures.** MASANOBU TAKAHASHI, *University of the Sacred Heart*—In a list-method directed forgetting task, midway through presentation of the lists, directed forgetting participants are instructed to forget the first half of the list and remember only the second half of the list. In contrast, control participants are instructed to remember both first and second halves of the list. At recall test, all the participants are required to recall all previously learned items. Typically, as for the first list, the directed forgetting participants show lower recall performance than do control participants. However, previous studies demonstrated that such a directed forgetting effect disappeared with a concurrent memory load during the presentation of second list. In the present study using emotionally negative pictures, the directed forgetting effect emerged (Experiment 1), but the effect was not disrupted by the concurrent memory load (Experiment 2). These results suggest that a different mechanism underlies the directed forgetting effect in the negative pictures.

(5101)

**Searching for Interference Effects in Proper Name Learning.** LORI E. JAMES, KETHERA A. FOGLER, & SARAH K. TAUBER, *University of Colorado, Colorado Springs*—Interference or competition effects have been suggested as a possible cause of the notorious difficulty of learning proper names for previously unknown individuals. In several name-learning experiments, we included manipulations aimed at maximizing the potential for interference. For example, in one experiment we forced some participants to make guesses aloud about uncertain names, whereas for other participants we strictly prohibited guessing, with the expectation that guessing would increase interference, and in another experiment participants learned ambiguous (confusable) and unambiguous name and occupation pairs, with the expectation that ambiguity would increase interference. We also compared performance of young and older participants, because older adults appear highly susceptible to disruption from interference on other memory tasks. However, we found no evidence that the manipulations designed to elicit interference effects increased the difficulty of name learning. Altogether, our findings indicate that interference is not the mechanism underlying the difficulty of name learning.

(5102)

**Emotion and Delay Effects on False Memories.** CAGLA AYDIN & CHARLES J. BRAINERD, *Cornell University*, MARK L. HOWE, *Lancaster University*, & VALERIE F. REYNA, *Cornell University* (sponsored by Valerie F. Reyna)—It has recently been found that the induction of positive affect elevates false memories, whereas the induction of negative affect may reduce them. To date, however, such findings have only been obtained with immediate memory tests. In the present experiments, the memory effects of emotion induction were measured on 1-week delayed tests, as well as on immediate tests. In addition, emotion induction sometimes occurred before target materials were studied (a storage manipulation), while at other times, emotion induction was interpolated between study and test (a consolidation manipulation). The induction procedure, a word-rating task, equated the distance between positive, neutral, and negative affect. The conjoint-recognition procedure was used on both the immediate and delayed tests, and the parameters of the conjoint-recognition model were estimated to determine the process-level effects of emotion induction on both true and false memories.

(5103)

**Encoding Versus Retrieval Processes in False Recognition.** STEPHEN A. DEWHURST & EMMA BOULD, *Lancaster University*—Two experiments investigated the roles of encoding and retrieval processes in the memory illusions produced by associated (DRM) and categorized lists. Smith et al. (2002) argued that the DRM effect is caused by associations made at encoding whereas the category repetition effect is caused by associations made at retrieval. In contrast to this view, we found parallel effects of both encoding and retrieval manipulations on the DRM and category repetition illusions. In Experiment 1, explicit instructions to generate associates at study increased false recognition using both list types. In Experiment 2, test-induced priming had no effects on false recognition. These findings suggest that memory illusions produced by both DRM and categorized lists are primarily the result of associative processes at encoding.

(5104)

**Learning Theory From a Hazard Function Perspective.** LARA N. SLOBODA, RICHARD A. CHECHILE, & RAYMOND S. NICKERSON, *Tufts University* (sponsored by Raymond S. Nickerson)—Hazard functions are a general tool for examining stochastic models. In this poster we explore learning theories in terms of a hazard function analysis. In particular we investigate the general Weibull class of hazard models. This function allows (depending on a shape parameter) for either decreasing, constant, or increasing hazard. An example of a constant hazard function is the classic operator model for learning that posits a fixed proportion of the still unlearned items are conditioned on each study trial. We also show that this learning model nonetheless results in a monotonic decreasing hazard rate if there is inhomogeneity of either individuals or items. Fitting available learning data on an individual basis we find support for a decreasing hazard function for learning. Implications for these findings on existing theories of learning are explored.

(5105)

**Fast Mapping as a Mechanism for Semantic Learning in Healthy Adults and Amnesia.** TALİ ATIR, *Haifa University*, MORRIS MOSCOVITCH, *Rotman Research Institute, University of Toronto*, & RACHEL TOMER & ASAF GILBOA, *Haifa University*—Fast Mapping (FM) is an incidental associative learning mechanism which enables children to acquire new vocabulary and semantic concepts following a single exposure. Information acquired through FM is thought to be independent of the episodic memory system. Little is known about FM in adults. We used FM to teach adults novel word–picture and word–fact–picture associations (e.g., facts and names of exotic birds) in an incidental learning paradigm. Participants saw and heard sentences requiring them to select one of two pictures (one familiar and one novel). Free and cued recall of novel labels was poor. Cued recall of semantic facts was very good, as was forced-choice recognition of the novel associations, despite equal familiarity with both lures and targets. Memory performance remained unchanged after a week. Learning of semantic associations through FM is supported by the adult brain, and we also explore whether FM supports new semantic learning in hippocampal amnesia.

• FALSE MEMORY •

(5106)

**The Modality Effect in False Recognition: Evidence From the Critical Recollection Task.** BENTON H. PIERCE, *Texas A&M University, Commerce*, & DAVID A. GALLO, *University of Chicago*—Previous studies have shown that false recognition of semantic associates is greater following auditory than visual study. We asked whether this modality effect generalizes beyond the DRM false memory task. Subjects studied unrelated concrete words, with some words presented auditorily and others presented visually. At test, subjects had to selectively search their memory for the recollection of one modality or the other (the criterial recollection task; Gallo, Weiss, &

Schacter, 2004). Using visual presentation at test (Experiment 1), subjects made fewer false recognition responses when searching memory for visual recollections compared to auditory recollections, thereby replicating previous findings. However, inconsistent with previous studies, we found this same effect when using auditory test presentation (Experiment 2). These results suggest that the effect of study modality on false memories generalizes beyond the DRM false memory task, and that study modality may exert a larger influence than test modality on retrieval monitoring processes.

(5107)

**True and False Memories of Children and Adults for Verbal and Written Presentation of DRM Lists.** MAYA M. KHANNA, *Creighton University*, & MICHAEL J. CORTESE, *University of Nebraska, Omaha*—True and false recall of children and adults was examined via the DRM paradigm. Lists were presented verbally in Experiment 1 and in written form in Experiment 2. In all experiments, lists were composed of semantic associates, phonological associates, or a hybrid of both associate types. Lists consisted of words that are well-known by children and adults. In the verbal presentation modality, children were found to produce higher ratios of false to true memories than were adults in all three list types. However, in the written presentation modality, children and adults produced similar ratios of false to true memories across list types. This interaction of presentation modality and age is due to the children engaging in lower levels of semantic processing in the written condition as compared to the verbal condition. Taken together, the results are more easily explained via the activation monitoring framework than by the fuzzy-trace theory.

(5108)

**The Role of Activation in Creating False Memories of Perceptual Experience.** JASON ARNDT, EMILY READ, MERCEDES HUFF, CHAK FU LAM, & YINA NG, *Middlebury College*—We investigated the role of activation processes in producing false memories for lure items in the Deese/Roediger–McDermott paradigm. Each theme related to a lure item was presented in a single, unusual looking font. We manipulated variables that should influence critical lure activation (e.g., MBAS; number of associates of a lure that were studied), as well as whether lures were shown in the same font used to study their associates. In general, more errors were committed when lures were shown in a font used to present their associates during encoding. Furthermore, the size of the increase in errors was greater when lures were presented in a font that was associated with conditions that increased lure activation. These results suggest that lures become associated with features of presentation context, and that activation processes play a critical role in generating those associations, consistent with the claims of activation-monitoring theory (Roediger et al., 2001).

(5109)

**Time Pressure at Retrieval After Gesture Encoding: Diminishing the False Memory Suppression Effect.** JENNIFER L. TOMES, KAREN G. NICHOLSON, & KATHYRN I. POWLES, *Mount Allison University*—Previously we found that, relative to hearing list items, viewing distinctive representational gestures when studying items suppresses false memory creation in the DRM. We recently examined whether this suppression effect is related to encoding processes or a retrieval strategy by comparing the effect across self-paced and time-pressure conditions. If the suppression effect is related to encoding processes it should be comparable across conditions, whereas if the effect reflects a retrieval strategy it should be eliminated under time constraint. Relative to hearing words, studying words with gestures suppressed false memory creation, but only in the self-paced condition. In contrast, relative to hearing words, studying words with gestures led to an improvement in the recognition of studied words and a reduction in false alarms for new unrelated words, which was comparable across conditions. The results suggest that the false memory suppression effect that occurs with viewing distinctive gestures reflects a retrieval strategy.

(5110)

**Differential False Memory Effects of Phonological and Semantic DRM Lists.** CHI-SHING TSE & W. TRAMMELL NEILL, *University at Albany*—In a variation of the DRM-list procedure (after Deese, 1959; Roediger & McDermott, 1995), subjects studied word lists that were associated phonologically or semantically to a “critical item” (CI). Some lists included the CI, allowing measurement of hit rates as well as false-alarm rates on a subsequent recognition memory test. Replicating previous results, semantically related lists produced lower discrimination ( $d'$ ) and more false alarms for CIs than yoked list associates. Although phonologically related lists also increased false alarms to the same CIs, discrimination was higher than for yoked list associates, and was increased relative to the same CIs in unrelated study lists. The results suggest that implicit associative activation cannot account for false-recognition effects of phonologically related lists.

(5111)

**Retrieval Inhibition Versus Encoding Explanations of (List-Method) Directed Forgetting.** SAMEER BAWA, BARBARA A. SPELLMAN, & CHAD S. DODSON, *University of Virginia*—Two types of accounts have been offered to explain list-method directed forgetting: encoding disparities (across lists) and retrieval inhibition. Our evidence supports the latter. Experiment 1 tested retrieval inhibition against a differential encoding account (Sahakyan & Delaney, 2003). Participants were instructed to encode both lists in the same way. We manipulated whether the second list created proactive interference. With encoding strategies equated, directed forgetting effects did in fact emerge, but only when proactive interference was present, consistent with retrieval inhibition. Experiment 2 tested retrieval inhibition against a selective rehearsal account (Benjamin, 2007) using a recognition task. We manipulated whether encoding strategies were controlled across lists. Equating encoding strategies eliminated directed forgetting effects in recognition, again consistent with retrieval inhibition. Our findings suggest that researchers should control how participants encode study items in list-method directed forgetting, but that retrieval inhibition nonetheless best accounts for its effects.

(5112)

**Effects of Backward Associative Strength on the False Recognition of Words.** MARIA A. ALONSO, *University of La Laguna*, & EMILIANO DIEZ & ANGEL FERNANDEZ, *University of Salamanca*—Two experiments explored the effect of associative-strength manipulations on false recognition, using the DRM paradigm. In both experiments, list items were selected on the basis of their backward-association relationship with their corresponding critical words. The results of Experiment 1 replicated the general finding that false recognition tends to increase as the number of studied associates also increases. More interestingly, the results of Experiment 2 demonstrated that, when the overall associative relation between list items and the critical word was kept constant, variations in the number of associates did not significantly affect levels of false recognition. These results suggest that false recognition is dependent on total activation rather than on the number of independent contributors, and they are consistent with current activation-based accounts of false memory phenomena.

(5113)

**Is Forced Confabulation More Dangerous Than False Memory Implantation?** JENNIFER K. ACKIL, *Gustavus Adolphus College*, & MARIA S. ZARAGOZA, *Kent State University*—That witnesses can be led to report details that are suggested or implanted by an interviewer is well established in the eyewitness memory literature. The forced confabulation effect extends this finding by demonstrating that false memories can also arise from misinformation that witnesses are knowingly forced to confabulate themselves (Ackil & Zaragoza, 1998). The present study assessed the relative consequences of these two suggestive interview techniques (memory implantation vs. forced confabulation) following tests of source memory or free recall. After

viewing video events, all participants were knowingly forced to confabulate answers and read experimenter provided answers in response to an interviewer's blatantly false questions. Two weeks later, false memory was assessed using either a source memory or free recall test. Whereas memory implantation and forced confabulation both led to false memories, the relative danger of these suggestive interview techniques varied with the type of memory test employed.

(5114)

**Font Reinstatement Encourages, and Sometimes Discourages, False Recognition.** SHARON D. LYNN & JASON L. HICKS, *Louisiana State University* (sponsored by Jason L. Hicks)—We studied the error-inflating and error-editing potential of font reinstatement in an associative false memory paradigm. List “themes” ranging from 2 to 6 items were encoded in a unique visual font. For each theme, either a studied word or the critical lure was tested via recognition, with half of each in the corresponding study font and half in a switched (but studied) font. False recognition was higher when font was reinstated, but not for theme list lengths of 2. Speeding recognition decisions eliminated this interaction, producing generally greater false memory for reinstated font and for longer list lengths. When asked the reason for rejecting critical items, a recall-to-reject mechanism was selected more often when font was reinstated and when list length was short. We conclude that font reinstatement inflates false recognition, but also promotes the feeling that people can recall studied items and therefore reject critical lures.

(5115)

**True and False Memory for Color Information.** ANDREA N. ESLICK, *Duke University*, & ANNE M. CLEARY, *Colorado State University* (sponsored by Anne M. Cleary)—The present study used a modification of the Deese/Roediger–McDermott (1995) false memory paradigm to investigate true and false memory for color related stimuli. Participants were presented with control and color related words (e.g., RUBY, CRIMSON, BLOOD) and participants false alarmed more to critical (e.g., RED) than to noncritical color names. The second experiment investigated whether or not false memory would emerge for the actual color that the word represents. Participants were shown control and color related words in different font colors (e.g., RUBY, CRIMSON, BLOOD shown in yellow, orange, and gray font, respectively). Of interest was whether participants would false alarm to the critical color. The results indicate that participants false alarm to critical color names at significantly higher rates than to noncritical color names. However, this effect did not extend to the actual colors themselves. Presenting the words in colored fonts actually worked to reduce false memory for noncolor control lists.

(5116)

**Effects of Stress on Suggestibility to Misinformation.** MINE MISIRLISOY, *Florida State University*, & KATINKA DIJKSTRA, *Erasmus University Rotterdam*—Stress is a variable that usually accompanies the situations in which consequences of false memories are crucial, such as courts, therapy sessions, and/or phone scams. The aim of the present study was to investigate the potential effects of stress on suggestibility to misinformation, in younger and older adults. The experiment involved the participants watching a clip of a burglary and listening to a narrative that described the event, followed by a recall test of their memory. The narrative was either a correct reflection of the event or it included some critical misinformation. Stress was induced to half of the participants right before recall, using the Trier Social Stress Test (Kirschbaum, Pirke, & Hellhammer, 1993). Older adults who received misinformation had higher false recall rates when they were under stress than when they were not. However, induced stress did not affect false recall rates of younger adults.

(5117)

**Age-Related Increases in False Memory Under an Item-Specific Processing Strategy.** KARIN M. BUTLER, *University of New Mexico*,

MARK A. McDANIEL, *Washington University*, DAVID P. McCABE, *Colorado State University*, & COURTNEY C. DORNBURG, *Sandia National Labs*—Internally generating an item-specific characteristic for each studied word from DRM lists (Deese, 1959; Roediger & McDermott, 1995) decreases false memory in young adults (McCabe, Presmanes, Robertson, & Smith, 2004). Theoretically, the item-specific characteristics act as additional unique source information bound to each studied item at encoding, and at retrieval young adults can use its absence to reject nonpresented associated words that might otherwise be falsely recalled. In two experiments, we examined whether older adults could use this strategy to reduce their false memory in the DRM paradigm. Remarkably, older adults' memory accuracy was not improved by item-specific encoding, a finding consistent with poorer distinctive processing in older adults.

(5118)

**Semantic Basis of the False-Memory Illusion.** YI YANG & CHARLES J. BRAINERD, *Cornell University*, MARK L. HOWE, *Lancaster University*, & VALERIE F. REYNA, *Cornell University* (sponsored by Charles J. Brainerd)—In the DRM paradigm, a short list of words creates an illusory memory of an unstudied but associatively related word. What accounts for list differences in the strength of this illusion? Previous research has identified only two factors: mean backward associative strength (MBAS) and level of true recall. In a multivariate study, we analyzed the ability of an expanded set of semantic variables (e.g., synonymy, antonym, concreteness, categorizability,

emotional valence, emotional arousal) to predict list differences in illusion strength. Multiple regressions showed that (1) list variance was satisfactorily explained by a subset of these semantic variables, (2) MBAS did not explain any of the variance in false recognition, and (3) MBAS explained significant variance in false recall but so did semantic variables. Thus, DRM false memory has a strong semantic basis. It is a truly meaning-driven illusion.

(5119)

**Mindshare Matters in Comparative Advertising: When it Pays to Compare.** SARA L. APPLETON-KNAPP, *San Diego State University*, & ANTONIA KRONLUND, *Brock University*—Exposure to low-share brands causes illusory recollection of high-share competitors (Kronlund et al., 2007). We tested advertisements in which a low-share brand was directly compared to a high-share brand or to “the leading brand.” Participants falsely recalled the high-share brand when it was not named, and they recalled the low-share brand at significantly lower levels than when the high-share brand was named or than when the low-share brand was advertised alone. We believe that participants generated the high-share brand when it was not named and that this generation contributed to the false recall of that brand, at the expense of recall for the low-share, advertised brand. We argue that such illusory recollection occurred because generation of the high-share brand acted as a learning event (Bjork, 1988), increasing recall of the high-share brand, but taking cognitive resources away from encoding of the low-share advertised brand.