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It's been a great year for the Psychology Department!

The department currently has 31 tenured, tenure-track, and teaching-track staff, with areas of expertise spanning biological, clinical, cognitive, developmental, health, social, and quantitative psychology.

New staff who joined us last semester include A/P Leher Singh, Dr. Stephen Lim, and Dr. Travellia Tjokro. In terms of student numbers, we currently have 619 single psychology majors and 66 double psychology majors, yielding a total of 685 majors. The graduate program continues to expand, and we presently have 34 graduate students in the Master's by research program, 18 students in the PhD by research program, and 25 clinical graduate students.

Two of our staff, A/P Mike Cheung and Dr. So Wing Chee, also recently received approval for Tier 1 research grants from the Faculty Research Committee (FRC). A/P Cheung will be working on "Methodological Advances in Testing Mediating and Indirect Effects", while Dr. So will be working on "Effects of early maternal employment on cognitive and behavioral development". Congratulations, Mike & Catherine!

In the remainder of this newsletter, we will be describing recent work done by different members of our department. In this first issue, we will be focusing on members of the cognitive/neuroscience, developmental, and social clusters. Future issues will examine work carried out by colleagues in the other areas of psychology.

Research Overview: *Social Psychology*

Au Kin Chung, Al

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Al's current research interests are in interpersonal processes in conflict, negotiation, and other communication contexts in the workplace. In particular, Al takes an interpersonal perspective emphasizing the dynamics and interactive nature of these behaviors as a result of a system with ongoing interactions between parties. An example of current research he is involved in is trying to understand conflict behaviors as a function of both conflict party's orientation and opponent's behaviors.

Hong Yee Shiun, Ryan

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For most people, feeling anxious about problems and difficulties is a common experience. We all, from time to time, will experience elevated levels of anxiety and the accompanying bodily sensations such as trembling, dizziness, breathless, and palpitations. Usually, we do not think much about these bodily sensations as we know that they are part and parcel of being anxious. However, sometimes, we may begin to interpret whether these sensations can have harmful consequences (e.g., interpreting palpitations to mean that a heart attack is imminent). If we entertain such maladaptive thoughts (which is termed as anxiety sensitivity thoughts), we are likely to become even more anxious and subsequently develop a panic attack.

Ryan wanted to explore if such a link between anxiety sensations and anxiety sensitivity thoughts occurs naturally in the day-to-day lives of people. In addition, he hypothesized that people who are high on Neuroticism (compared to people who are low on that personality trait) would engage in more anxiety sensitivity thoughts on days when they felt anxious than on days when they felt less stressful. Using an online diary method in which 100 Canadian undergraduate students reported their anxiety symptoms and anxiety sensitivity thoughts daily over a one month period, he found the hypothesis to be supported. That is, high Neuroticism individuals were more likely to report increased levels of anxiety sensitivity thoughts on days when they felt anxious than on days when they didn't feel anxious. For low Neuroticism individuals, that anxiety-anxiety sensitivity link was not that strong. Ryan suggests that high Neuroticism individuals are at risk for making maladaptive thoughts about their anxiety sensations and that sets them up for possible subsequent panic attacks.

Schirmer, Annett

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If Annett asked you to tell her about a recent interaction between you and your best friend, you'd likely tell her what you talked about. In contrast, you would be less likely to tell her how this information was communicated – what your facial and vocal expressions were and how you looked at and possibly touched each other. This is because we express and perceive these and other non-verbal signals so automatically that they feature little in our conscious perception of social exchanges. Nevertheless, they are very important and researchers are only now beginning to understand the conditions that elicit certain nonverbal behaviors and the means by which these behaviors influence interaction partners.

In her research, Annett has aimed to contribute to this understanding. For example, she has studied whether messages spoken with an emotional tone are remembered better than messages spoken with a neutral tone. Although she found this not to be the case, she observed that the messages themselves assimilated the emotion of the speaker. Compared to words heard with a neutral voice, words heard with a negative or positive voice are later rated more positively or negatively, respectively. This is true even if listeners are unable to explicitly remember a speaker's emotion. With her students, Annett is currently exploring the neural mechanisms that support this effect.

Another interest has been the role of touch in human interactions. Research has shown that individuals are more cooperative when they are touched as compared to when they are not touched. Among others, Annett and her team try to determine which aspect of the somatosensory system is responsible for biasing touch recipients in this way and to elucidate how this bias comes about. Moreover, they explore the way touch perception interleaves with other mental processes using a range of behavioral and neuronal markers in both human and non-human animal participants. For more details, please visit: http://blog.nus.edu.sg/bblab/.

See Ya Hui, Michelle

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Michelle's research examines how people's meta-bases (i.e. subjective perceptions regarding their attitudinal bases) influence their attitudes and behavior. Much research has established that we do not have accurate access to our psychological processes. For example, we tend to overestimate how skilled we are. Michelle's research demonstrates that we are just as clueless when it comes to estimating whether our attitudes are driven more by our affect or by our cognition. In other words, our meta-bases do not correspond to our structural bases (i.e. objective indicators of our attitudinal bases). Importantly, despite our meta-bases being inaccurate, they still guide our attitudes and behavior. For example, general meta-bases influence (1) reliance on the affective versus cognitive

attributes of objects in determining choices, (2) attention to affective versus cognitive information, and (3) attitude change in response to affective versus cognitive persuasive attempts. Furthermore, meta-bases are especially likely to be influential when people are being thoughtful in forming preferences or making decisions. This research has implications for designing persuasive attempts. For example, people tend to perceive that they have moderate attitudes toward Chemistry due to their neutral feelings toward Chemistry. Such moderate attitudes exist despite positive beliefs about studying Chemistry. This means that people might be more persuaded to study Chemistry by information on the exciting aspects of studying Chemistry rather than information on its usefulness. Currently, Michelle is examining differences in processing motivation and ability as a function of individual differences in meta-bases and structural bases. She is also investigating how meta-bases and structural bases are relevant for various categories of attitude objects (e.g., in person perception). In addition, she is examining the meta-structural distinction for other bases of attitudes such as social-adjustive and value-expressive functions of attitudes.

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Tong Mun Wai, Eddie

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Eddie has been involved in a number of studies investigating the relationships between emotion and appraisal. His recent research focused on two aspects of appraisal theories. First, he examined how individual differences in emotions can be explained by appraisals. Appraisals are neither sufficient nor necessary for negative emotions, and appraisal theories have proposed that emotional experiences are dependent not just on how events are appraised but also on how strongly appraisals are related to emotions. For example, there are significant individual differences in appraisal-emotion relationships as a function of neuroticism, such that those who are high in neuroticism tend to show stronger emotional reactivity to their appraisals.

Second, Eddie also examined automatic appraisal-emotion effects. Appraisals are largely quick and non-conscious processes that elicit emotional responses in automatic fashions. Eddie's studies have shown that subliminal presentations of appraisal primes can elicit the corresponding emotional responses and that such effects typically occur without the participants being aware of changes in their emotional responses.

He has also found that emotion primes can exert automatic effects on appraisals. For instance, subliminal presentations of anger and sad faces can elicit agency-other and agency-situation appraisals, respectively. His future work will focus on merging these two lines of research by examining individual differences in automatic appraisal-emotion effects.

Tsai Fen-Fang
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Fen-Fang's research interests include: 1) how the individual decides whether to express his/her emotions or not to other people around him/her, 2) regret and ambivalence over emotional expressiveness, 3) adult attachment in close relationships, and 4) how information is shared and relayed within triads and how that affects the individual who receives the second-hand information.

Fen-Fang had a beautiful baby girl a few weeks ago and is currently on maternity leave so she couldn't update us on her recent research activity – please contact Fen-Fang directly if you would like an update! *Congratulations Fen-Fang!*

Research Spotlight

Nicolas Escoffier & Annett Schirmer

Music can compel us to dance or tap to it, but its influence on our brain extends beyond these noticeable effects. As we listen to the rhythm in music, our attention does not stay constant over time but tends to synchronize to the rhythm. We then have more attention for events that occur in synchrony and our brain will analyze those events faster than out-of-synchrony events.

In a recent study, we explored how far reaching this influence of rhythm actually is. We asked whether apart from influencing auditory attention, it would influence our visual attention. During the study participants were seated in front of a screen where photographs appeared one after the other. Half of the images were presented upside-down and we measured how fast participants detected whether an image was upside-down or upright. Crucially, a musical rhythm was playing in the background during the experiment, and we presented the images either synchronized or not synchronized with it.

The results revealed that, even though participants were asked to ignore the rhythm and to focus solely on the images, the rhythm influenced their reaction to the images. They responded faster to images presented in synchrony as compared to out-of-synchrony or silence. This shows that, far from being distracting, a musical rhythm can improve visual processing. This cross-modal improvement could explain why music has long been so important in human societies. By synchronizing and enhancing our brain's performance, music allows a group of individuals to feel, think, and act as one.

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Research Overview: *Developmental Psychology*

Elliott, John Michael

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John's research this year has mainly involved oversight of a study on recollections of bullying in young adults, via a systematic survey of 600 young Singapore Adults. The investigation assessed their recollections of bullying or victimization experiences in school and related these to measures of well being. This study was funded by the Singapore Children's Society. The Society has also funded for some time an ongoing longitudinal study of attachment security, temperament, language competence and child rearing arrangements in three cohorts recruited at birth in successive years, totaling 319 participants including the pilot cohort. This continues under his supervision.

In addition, there has been a study of public attitudes to child abuse, in an effort to assess change over a period of 14 years since a similar study done in 1996.

Singh, Leher

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Leher's research focuses on the issue of how infants overcome natural variability in speech to develop stable lexical representations. In this program of research, she has examined the role of talker variability (in affect, pitch, and amplitude), word familiarity, task complexity and age on infants' emergent capacities to cope with variability in speech.

These studies have revealed significant influences of talker variation on early word learning. These effects have been shown to be both beneficial and disruptive depending on task demands and have been shown to be highly age-dependent. This program of research has also revealed that not all sources of variability are treated equally by infants, with some sources, such as affect and pitch being highly disruptive, and others such as amplitude exerting no significant effect on word recognition.

As talker variability is often language-specific (i.e. an acoustic dimension can vary phonemically in one language but non-phonemically in another), she is extending her research on this issue to bilingual infants learning one tonal and one non-tonal language (Mandarin Chinese/English) for whom the dimension of pitch varies both phonemically and non-phonemically.

Sim Tick Ngee

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Tick Ngee has two main streams of ongoing projects. One stream involves looking at predicting schooling outcomes such as achievement, school-related beliefs, and school engagement. The other stream continues the work he has been doing on attachment to God and how it plays out in the lives of believers of different faiths.

So Wing Chee, Catherine

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Catherine's research examines the roles of gesture in language development and cognitive processes. When we talk, we gesture. These gestures are spontaneous hand movements that co-occur with speech. Her studies have shown that gesture and speech are tightly integrated during the process of speech production.

However, the way speakers produce gesture is influenced by their language proficiency, type of gesture produced, discourse context and visibility of listener. Her research has also shown that speakers from different cultures gesture in different rates. For example, Chinese speakers in mainland China tend to gesture less often than English speakers in America. Bilinguals who speak in these two languages seem to transfer gestures from one language to another.

Her findings also revealed that gesture and words are integrated during speech comprehension. Using a cross-modal priming paradigm, she and her collaborators found that listeners who are presented with gestures activate the semantically-related words in their mental representation. And young children comprehend their caregivers' speech better when the caregivers produce gestures than when they do not. Currently, she is extending her research to look at how producing and comprehending gesture facilitates cognitive process such as memory recall. And she is interested in comparing simulated actions and co-speech gestures.

Tan Seok-Hui

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Seok-Hui's research interests are in cognitive and language development in infancy and early childhood. She is interested in speech perception and language processing in adults and young children, as well as early language development in infants and toddlers particularly in the context of languages spoken in Singapore.

Tay Su-Mien, Lynette

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Lynette's research contributes to the understanding of psychological and neurocognitive aspects of child health and coping with chronic illness. Based on the biopsychosocial model of conceptualizing response to stress, her research efforts are focused on the investigation of variables that impact upon coping, quality of life and long-term outcome in relation to chronic illness in children. Developmentally and ecologically speaking, the functioning of parents and other family members (e.g., siblings) of children with chronic medical conditions have been found to mediate key outcomes, including treatment adherence and psychological wellbeing in various pediatric populations. As such, the understanding of parent functioning and its impact on medical and psychosocial outcomes are of interest as well.

Current projects are aimed towards systematic examination of potential variables that would comprise a common model in order to account for the influence of psychosocial and cognitive factors on outcome and general well-being in various pediatric populations, including cancer, transplant, liver & renal disease, asthma and recurrent abdominal pain. In addition, investigation of long-term impact of chronic medical stress on children and their families allows for understanding of the impact of recurrent stress across developmental phases.

The formulation of a unifying model to account for long-term adaptation and functioning of children coping with illness across disease conditions would facilitate development of evidence-based intervention approaches in order to improve adjustment and alleviate stress across patient groups. Development and evaluation of theory-based intervention programs would be the second arm of her research program in this area. With funding and willing clinical collaborators secured, she will be embarking on a pilot project investigating the feasibility and clinical utility of a parenting intervention for enhancing parent-child attachments among women with high-risk pregnancies, as part of an effort to examine the potential clinical outcomes associated with providing intervention to alleviate stress in parents of children with chronic illness.

Research Spotlight

Catherine So

In order to produce a coherent narrative or engage in a conversation, speakers must identify the referents so that listeners can figure out *who* is doing what to *whom*. My research examines whether speakers use gesture, as well as speech, for this purpose. Speakers use gestures to identify referents by either pointing to the entities that are perceptually accessible to both speakers and listeners (i.e., concrete deictic gestures) or representing entities in abstract locations and using those locations consistently (i.e., image-driven gestures). According to Cross-modal Compensation Hypothesis, gesture compensates speech in referential identification and steps in when speech is ambiguous. Alternatively, Interface Hypothesis suggests that gesture reflects mental imagery of speakers during the process of speech production, and thus, gesture and speech should go hand-in-hand.

Catherine has conducted three different studies with her collaborators testing these two hypotheses in three groups of participants who are speaking in English: English-speaking monolingual adults, English-speaking monolingual children, and English-Chinese bilingual adults. The findings indicate that the way speakers identify referents in gestures depends on their language proficiency *and* types of gestures produced. The English-speaking monolingual and English-dominant bilingual adults use image-driven gesture most often to identify referents that are also uniquely specified in speech. However, English dominant bilingual adults use concrete deictic gesture to identify referents that are not specified in speech. Likewise, English-speaking monolingual children who have not yet mastered language skills also use concrete deictic gestures to disambiguate referents in speech.

Thus, concrete deictic gesture and image-driven gesture bear different kinds of relationship with accompanying speech in monolinguals and English-dominant bilingual adults. Yet, Chinese-dominant bilingual adults do not show those patterns in their image-driven and concrete deictic gestures when speaking in English (i.e., less dominant language), suggesting that language proficiency affects the relationship between speech and gesture.

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Research Overview: *Cognition & Neuroscience*

Chua Fook Kee

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My recent research concerns the limits of top-down attentional control. I look at how attention may be captured, the types of stimuli that are capable of capturing attention, and the conditions under which attentional capture occurs. More recently, I have looked at whether one may inoculate the visual system from attentional capture. Related to the topic of attentional control, I have been investigating how the visual system implicitly encodes the external world, and how visual memory is updated with the advent of new entities to the visual field. Additionally, I have also been investigating the limitations of attentional shifting across time and space.

Ebstein, Richard

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Richard Ebstein's research revolves around human behavior genetics, with the overarching goal of providing molecular insights into the role of genes as a partial contributor to all facets of human behavior. His work is highly interdisciplinary and combines personality, social, cognitive, and neuropsychology with techniques of molecular genetics. Major research areas include neuroeconomics, and molecular genetic studies of normal personality, altruism, schizophrenia, ADHD, and autism.

Richard's recent work investigates the effects of two neuropeptides, oxytocin (OT) and arginine vasopressin (AVP), on affiliative behaviors between parents and offsprings across a variety of species. In humans, both oxytocin and vasopressin have been shown to modulate social perception and social behavior, and facilitate important facets of normal and abnormal human social behavior. This research also addresses the therapeutic potential of these neuropeptides in treating diseases of social deficits and decision-making.

Goh Choon Peng, Winston

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My research currently looks at various aspects of human memory and spoken language processing. Some of my studies explore the interplay between long-term memory and working or short-term memory, specifically how the organisation of words in long-term memory can affect short-term memory processes. Another question is whether certain types of memory traces are more dominant than others, and how they may interfere with each

other in the course of remembering. Related to the question of what type of information get stored in memory, I examine how people make use of non-linguistic information to recognise and remember words and sentences. I am specifically exploring the extent to which people remember the non-linguistic properties of spoken language and how voice information may be used in word recognition and memory processes.

Graham, Steven

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My long-term aim is to understand how interacting brain systems give rise to the decisions we make, and to design more effective interventions to enhance decision-making and overall mental health. To this end we are using functional and structural neuroimaging (e.g., fMRI, MRS, perfusion, DTI), neuropsychological tests, clinical outcome measures, and physiological assessments of cardiorespiratory performance, cardiovascular reactivity/recovery and anthropometry in a variety of populations: young or old, healthy or clinical.

When I joined NUS, I took advantage of scientific approaches to understand decision-making behavior. Using a neuroimaging technique called functional magnetic resonance imaging (fMRI), I began to investigate how different brain regions involved during complex decision-making (e.g., "executive functioning" tasks) interact to guide our behavior and decisions. My group has also explored how an individual's level of intelligence (and hence response strategy) impacts on brain function. This work has proved useful when interpreting our neuroimaging work in patients with schizophrenia, in which we have disentangled the effects of intellectual decline from the disorder itself. Currently, we are extending these studies to understand changes in the brain to better understand how physical activity (e.g., cardiovascular exercise) interventions enhance brain function, decision-making and mental health, in healthy volunteers (both young and old) and also ameliorate symptoms in patients with schizophrenia and depression.

Hon Hsueh Hsien, Nicholas

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Two of the most important mental abilities we have are the ability to selectively focus on the relevant stimuli in our environment and the ability to control our mental activities such that our overall behavior is consistent with our goals and desires. These are known as attention and cognitive control respectively. My current research focuses on understanding how the brain supports these two important mental activities. We utilize a combination of behavioural and biological approaches in order to study this issue.

Kozhevnikov, Maria

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I investigate the neural mechanisms of visual/ spatial imagery, as well as individual differences in basic information processing capacities (e.g. the ability to generate, inspect, or transform visual/ spatial images). In addition, the lab research focuses on examining how these individual differences affect more complex activities, such as spatial navigation, learning and problem solving in mathematics and science, as well as in exploring ways to train visual/spatial imagery skills and design learning technologies that can accommodate individual differences and learning styles. Our approach integrates qualitative and quantitative behavioral research methods, as well as neuroimaging techniques (EEG, fMRI). We also develop and validate assessment and training paradigms for visualization ability, using 3D immersive virtual reality.

Currently I am involved in exploring neural correlates of 3D visual perception in 3D immersive virtual reality. Recently, more realistic 3D displays have been designed as new, more ecologically valid alternatives to conventional 2D visual displays. However, research has thus far provided inconsistent evidence regarding their contribution to visual -spatial image encoding and transformation. The majority of experimental studies on 3D visual-spatial processing have been conducted using traditional 2D displays. Our research suggests that immersivity is a critical feature of 3D virtual environments for facilitating visual processing and the training of visual ability.

I am interested in understanding how immersion contributes to spatial processing and also compare subjects' performance in non-immersive and immersive 2D vs. 3D environments.

Lim Wee Hun, Stephen

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Most of us might have, at some point in our lives, asked: Why is music so pleasurable, with some genres more so than others? For over a century since the time of Helmholtz, auditory roughness (how "rough" a sound is, much like how a surface feels to be bumpy or smooth when we run our fingers over it) seemed to explain musical dissonance and whether we like a particular musical experience. Yet recently, we discovered that auditory roughness, while it can predict consonance of and our preferences for musical dyads (a combination of two musical tones such as doh plus soh), fails to do so for triads (three tones) and tetrads (four tones). We offer an alternative biological framework to suggest that our musical preferences are fundamentally determined by the extent to which the musical episode mimics human voiced speech. In addition, there is a possibility that we prefer music with rhythmic structures that correspond to basic human motion (much as the way we walk, or dance).

A second question concerns how musical structures modulate semantic priming in vocal music. While some work had been done to suggest that musical harmony interferes with the linguistic computation of lyrics exactly as prosodic cues do in voiced speech, my goal is to foreclose how musical rhythmicity can influence the implicit processing of words in songs. Other questions of interest include whether

musical rhythm and meter are fundamentally different even though they have not traditionally been treated separately, and how each independent property might permit or prevent the rubato effect (a piece of music to be expressed freely in time).

Penney, Trevor Bruce

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One focus of research in my laboratory is the cognitive and brain basis of how humans, and other animals, learn about and remember the characteristics of environmental stimuli and the temporal relationships between those stimuli. In some instances the subject actively attends to the environmental stimuli whereas in other cases the stimuli are processed in background. For example, when a person is actively attending to a foreground activity, such as sending an SMS while walking down a quiet street, the brain also processes and interprets otherwise irrelevant background information, such as the sound of passing cars.

Although we may not be consciously aware of it, the brain builds up expectations about what events "fit" within the context of the street noise. If those expectations are violated, say by the screech of car tires, then attention is directed toward this new, unexpected, and potentially threatening stimulus, with the result that an appropriate response can be made (e.g. jumping out of the way). Here, the critical information is the identity (i.e. what) of the new stimulus, however, information about when in time events occur and how long they last is also important. Moreover, as with identity information, information about when and how long can also be processed within or outside of conscious awareness. To continue with the texting example, if the delay between pressing the send key and the SMS being sent is too long, then the user will suspect a network or phone malfunction. This tells us that the phone user learned the typical delay for a message to be sent.

These everyday examples raise the question of how the brain establishes expectations about *what* should occur *when* in a given context and how these expectations influence the ability to detect and interpret events. To address these issues in a laboratory setting, we use a mixture of techniques including behavioral measures in simple tasks that establish expectancies, electroencephalography (EEG), and optical brain imaging in both human and non-human animals. For example, we are currently using EEG to ask whether and how the context provided by a visual task influences the interpretation of potentially ambiguous background sounds.

In other work with colleagues at Biopolis, we are examining the role of various brain structures in learning that a particular stimulus predicts an unpleasant outcome (i.e. fear conditioning) at a particular place and time.

Rickard Liow, Susan Jane

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My main research interest is language processing, especially the reading and spelling skills of Malay-English and Mandarin-English speaking bilingual children and adults.

I hold a split-post as Director for the M.Sc. (Speech and Language Pathology) Programme in the YLL School of Medicine (http://www.med.nus.edu.sg/dgms/SLP.shtml), where I supervise clinical research and evidence-based practice with people who have acquired language impairments as a result of head injury, stroke or dementia. I am also working with kindergarten teachers and speech-language pathologists to develop assessment and intervention tools that are culturally and linguistically appropriate for the local population.

Tjokro, Travellia

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The projects that I have been conducting during my PhD training involved the training of participants in acquiring new words and meanings (e.g., "VESDEL is a pajama worn by a baby dwarf"), using the divided visual field paradigm (either in lateralized lexical decision or semantic relatedness judgment task) to gauge the possible role(s) of the right hemisphere in the process of acquiring novel words and meanings.

The dissertation project also involved the measurement of the participants' baseline reading skills (utilizing the Nelson Denny Reading Test, both vocabulary and reading comprehension test) to investigate possible individual differences in hemispheric processing of novel words and meanings. The findings showed that greater amount of experience with words benefited skilled readers more than less-skilled readers, and skill differences were obtained only in the right hemisphere.

A follow-up study utilized a slightly different group division method, instead of the median split used previously. Now the groups were separated into the top 25% readers (superior readers) and the bottom 25% readers (poor readers). Using this group division method, it was found that superior comprehenders showed similar performance level between the left and right hemispheres, while poor comprehenders showed significantly better left hemisphere performance.

Yap Ju-Min, Melvin

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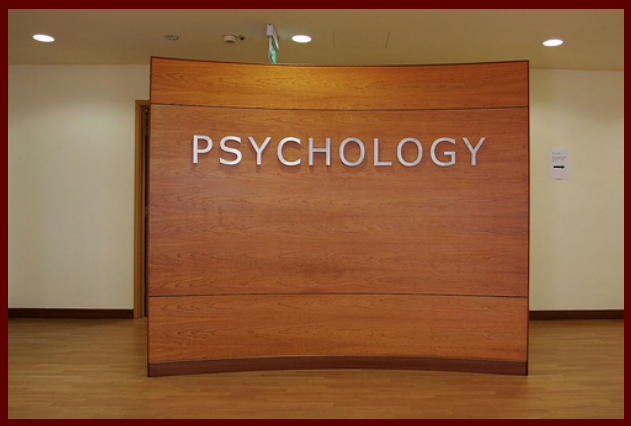
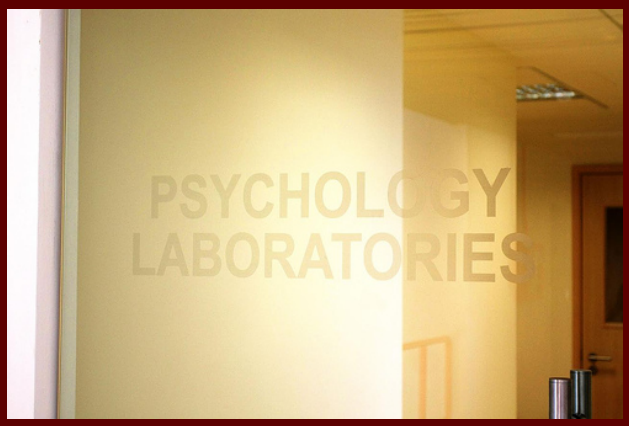
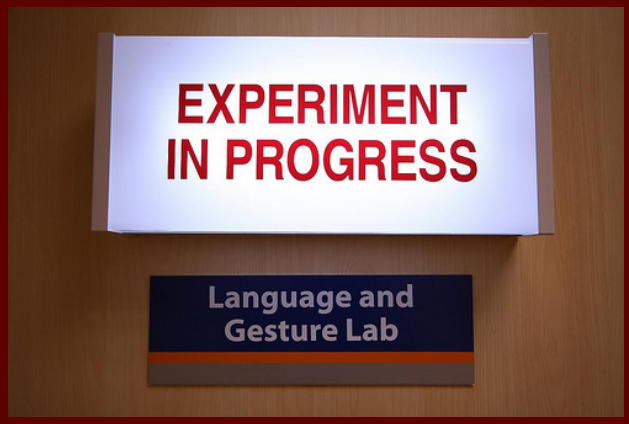
I'm primarily interested in studying the mechanisms and processes that underlie people's ability to recognize visually presented words. Specifically, how do the different properties of a word (e.g., number of letters, distinctiveness, frequency of occurrence) influence how quickly and accurately a person can recognize a word? To address these questions, I make use of both large-scale study data as well as response time distributional analyses. Large-scale studies refer to archival databases containing word recognition performance data for a large set of participants responding to a large set of words, and it is possible to use these databases to explore a variety of interrelated questions.

Response time distributional analyses extend traditional analyses, which focus on comparing mean response times across different conditions. Here, we are able to quantify the effects of different variables on the shape of RT distributions, which allows us to resolve RT data at a finer-grained level.

My recent work has focused on individual differences in visual word recognition, modality effects in word recognition, and the effect of task context on word recognition. Together with a number of collaborators, I have also recently developed a database containing lexical and behavioral characteristics for Malay, the first such database for an orthography with relatively regular mappings between spelling and sound.







This Newsletter is brought to you by the NUS Psychology Department Publicity Committee:

Stephen Lim, Iliana Magiati, Catherine So, & Melvin Yap

To update yourself on departmental events, happenings, and talks, go to http://blog.nus.edu.sg/psychology/.

Melvin Yap & Susan Rickard Liow

Although Malay is a language spoken by 250 million people in Indonesia, Brunei, and Singapore, there is remarkably little work exploring the cognitive processes involved in Malay reading and spelling. Written Malay has a relatively shallow alphabetic orthography, simple syllabic structures, and transparent affixation. The relationship between the spelling and pronunciation of Malay words is very clear and regular. This contrasts with English, where the mapping between spelling and sounds sometimes seems quite arbitrary (e.g., *yacht, pint, draught*). Cross-linguistic work has examined how word recognition processes can be influenced by the properties of a language, showing that reliance on distinct reading mechanisms is modulated by the depth of a language, where English is considered deeper while Malay is considered shallower. The assumption is that 2 types of mechanisms mediate reading, a rule-based mechanism (non-lexical) that assembles pronunciations using spelling-sound rules, and a parallel (lexical) mechanism that retrieves pronunciations directly from the lexicon. The general finding is that deeper languages show more involvement of the lexical mechanism while shallower languages show more involvement of the non-lexical mechanism.

Most word recognition research has focused on alphabetic writing systems with relatively deep orthographies (e.g., English and French). To help develop a better understanding of word recognition mechanisms and processes in shallow writing systems, we developed a large-scale database of Malay. Specifically, we obtained the following characteristics (letter length, syllable length, phoneme length, morpheme length, word frequency, orthographic and phonological neighborhood sizes, orthographic and phonological Levenshtein Distance) for 9,592 Malay words. We also obtained word recognition (lexical decision and speeded pronunciation) performance for 1,500 of these words.

Using regression analyses to examine the effects of the same variables on English and Malay word recognition, we found that the frequency of a word (i.e., how often it occurs in the language) has much stronger effects on English, compared to Malay, word recognition. Conversely, the length of a word influences Malay, compared to English, word recognition much more strongly. This is consistent with the idea that Malay, unlike English, readers rely very heavily on a serial, non-lexical mechanism that assembles that sound of a word unit-by-unit. The present database, which contains lexical characteristics and behavioral performance for a large set of Malay words, is the first such resource. This database, which will be made freely available on http://brm.psychonomic-journals.org/content/supplemental will be useful not only for researchers studying Malay lexical and memory processing, but other researchers who are interested in making systematic cross-linguistic comparisons that allow us to better separate language-specific versus language-general processes in visual word recognition.

References

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