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PsychoShorts 2023

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PSYCHOSHORTS 2023

Panel: Working in Industry as a Linguistics Graduate
Panel: *Travailler dans l'industrie en tant que diplômé.e en linguistique*

Cindy Berger, PhD (she/her)

Dr. Berger obtained her Ph.D. in Applied Linguistics at Georgia State University in 2018. She currently works as a Lead Learning Scientist at Duolingo, and is based in Pittsburgh, Pennsylvania. / ***Dre Berger a obtenu son doctorat en linguistique appliquée à Georgia State University en 2018. Elle travaille actuellement en tant que scientifique principale en apprentissage chez Duolingo et est basée à Pittsburgh, en Pennsylvanie.***

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Félix Desmeules-Trudel, PhD (il/lui, he/him)

Dr. Desmeules-Trudel obtained his Ph.D. in Linguistics at the University of Ottawa in 2018. He worked as a postdoctoral fellow at Western University and the University of Toronto Mississauga before taking on a position as a Bilingual Knowledge Mobilization Specialist at Research Impact Canada. He now works at Egale Canada as a Senior Research Officer. / ***Félix Desmeules-Trudel a obtenu son doctorat en linguistique à l'Université d'Ottawa en 2018. Il a travaillé comme chercheur postdoctoral à l'Université Western et à l'Université de Toronto Mississauga avant d'accepter un emploi comme Spécialiste bilingue en mobilisation des connaissances au Réseau Impact Recherche Canada. Il travaille maintenant à Egale Canada en tant qu'agent de recherche principal***.

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Lisa Levesque, M.H.Sc., S-LP (C), Reg. CASLPO (elle, she/her)

Lisa Levesque obtained her M.H.Sc in Speech-Language Pathology at the University of Ottawa in 2020. Lisa has experience working with individuals who have cognitive-communication disorders (e.g.: following an acquired brain injury) and other speech, language and communication disorders. Lisa currently works at Bright Spot Therapy Services where she serves her community in Northern Ontario. / ***Lisa Levesque a obtenu sa maîtrise en sciences de la santé en orthophonie à l'Université d'Ottawa en 2020. Lisa travaille avec des individus qui ont des troubles cognitivo-linguistiques (e.g.: suite à une lésion cérébrale) et une gamme d'autres troubles de langage, de parole ou de la communication. Elle travaille actuellement chez Bright Spot Therapy Services où elle dessert sa communauté dans le nord de l'Ontario.***

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Richard Mah, PhD (he/him)

Dr. Mah obtained his Ph.D. in the Cognitive Science of Language at McMaster University in 2018. He has worked as a Data Scientist and Data Engineer, and currently works as a DevOps/MLOps Engineer at MosaicML in San Francisco, California. / ***Dr Mah a obtenu son doctorat en Sciences cognitives du langage à l'Université McMaster en 2018. Il a travaillé comme scientifique des données et ingénieur des données, et travaille actuellement en tant qu'ingénieur DevOps/MLOps chez MosaicML à San Francisco, en Californie.***

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PSYCHOSHORTS 2023

Keynote Lectures / *Discours liminaires*

Student Keynote / *Conférencière étudiante invitée*

Mahsa Morid (she/her)

Mahsa Morid is a fifth year Ph.D. Candidate in Linguistics at the University of Ottawa. She completed an M.A. in Teaching English as a Second Language and a B.Sc. in Computer Engineering at Islamic Azad University. Mahsa's dissertation, under the supervision of Prof. Laura Sabourin, examines the processing of figurative language by monolingual and bilingual speakers. She has utilized descriptive, behavioural and online techniques.

Mahsa Morid est doctorante en cinquième année en linguistique à l'Université d'Ottawa. Elle a complété une maîtrise en enseignement de l'anglais comme langue seconde et un baccalauréat ès sciences en génie informatique à l'Université islamique d'Azad. La thèse de Mahsa, sous la direction de la professeure Laura Sabourin, examine le traitement du langage figuratif par des locuteurs monolingues et bilingues. Elle se sert des techniques descriptives, comportementales et électrophysiologiques.

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From the neurophysiology of idioms to their embodiment: Behind the scenes of a PhD dissertation

ABSTRACT: In this talk, I will present the results of three main studies that compose my PhD dissertation, entitled "Bridging From Multi-dimensionality of Idioms to Their Embodiment". Idioms, such as ***walk on sunshine*** or ***raise the devil*** are multi-word expressions possessing an interpretation that is typically unrelated to the meaning of their constituents. In my dissertation, I investigated the processing of such expressions from two angles. Using the Event-Related Potentials (ERP) technique, I examined the underlying processes involved during the comprehension of idioms possessing a range of lexical characteristics. I also studied idioms from an embodied account of language processing, wherein emotion and sensory-motor factors are considered to be vital for the processing of figurative language. Besides presenting my findings, I will tell the story behind my dissertation. Previous studies (conducted by other scholars and I) that have been influential in shaping this dissertation will also be discussed briefly.

De la neurophysiologie des idiomes jusqu'à leur incarnation : les coulisses d'une thèse de doctorat

RÉSUMÉ: Dans cet exposé, je présenterai les résultats de trois études principales qui composent ma thèse de doctorat, intitulée « Bridging From Multi-dimensionality of Idioms to Their Embodiment ». Les idiomes (p.ex., ***être dans son assiette***) sont des expressions possédant une interprétation qui n'est généralement pas liée à la signification de leurs constituants. Dans ma thèse, j'ai étudié le traitement de telles expressions sous deux angles. En utilisant la technique des potentiels évoqués (PÉ), j'ai examiné les processus sous-jacents impliqués lors de la compréhension d'idiomes possédant une gamme de caractéristiques lexicales. J'ai également étudié les idiomes à partir de la perspective de cognition incarnée, dans lequel l'émotion et les facteurs sensori-moteurs sont considérés comme vitaux pour le traitement du langage. En plus de présenter mes découvertes, je raconterai l'histoire derrière ma thèse. Des études antérieures (menées par d'autres chercheurs et moi-même) qui ont eu une influence sur l'élaboration de cette thèse seront également discutées.

Primary Keynote / *Conférencière d'honneure*

Prof. Shanna Kousaie

Prof. Kousaie is an Assistant Professor in the School of Psychology at the University of Ottawa. She obtained her Ph.D. in Psychology at Concordia University in 2011. Prof. Kousaie completed postdoctoral fellowships at the Bruyère Research Institute in Ottawa and the Montréal Neurological Institute (Cognitive Neuroscience Unit). Her primary research interests concern the interactions between cognition and language, notably those relating to bilingualism, executive functioning, and aging. She utilizes behavioural, electrophysiological, and brain imaging techniques.

La Prof. Kousaie est professeure adjointe à l'École de psychologie de l'Université d'Ottawa. Elle a obtenu son doctorat en psychologie à l'Université Concordia en 2011. Prof. Kousaie a complété des stages postdoctoraux à l'Institut de recherche Bruyère à Ottawa et à l'Institut neurologique de Montréal (Unité de neurosciences cognitives). Ses principaux intérêts de recherche portent sur les interactions entre la cognition et le langage, notamment celles relatives au bilinguisme, aux fonctions exécutives et au vieillissement. Elle utilise des techniques comportementales, électrophysiologiques et d'imagerie cérébrale.

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The impact of language experience on cognition and the brain

ABSTRACT: An influential (and controversial) topic in the bilingualism literature is the bilingual advantage hypothesis, which proposes that the constant management of two languages in bilinguals results in superior cognitive/executive function compared to monolinguals. However, findings in the literature are inconsistent and it remains unclear what aspects of the bilingual experience underlie potential language group differences in cognition. To overcome some of the methodological issues that may play a role in the equivocal findings to date (e.g., dichotomizing language experience, experimental task design, the nature of the dependent measures), my research program uses a multimethod cognitive neuroscience approach to examine the relation between individual differences in language experience, cognition, and brain structure and function. I will discuss the use of behavioural, electrophysiological, and neuroimaging methods in my lab, and how they are harnessed to examine the potential mechanism(s) underlying the effects of different language experiences on cognition and the brain.

L'impact de l'expérience langagière sur la cognition et le cerveau

RÉSUMÉ: Un sujet influent (et controversé) dans la littérature sur le bilinguisme est l'hypothèse de l'avantage bilingue, qui propose que la gestion constante de deux langues entraîne une fonction cognitive/exécutive supérieure à celle des monolingues. Cependant, les résultats de la littérature sont incohérents et il reste difficile de savoir quels aspects de l'expérience bilingue sous-tendent les différences cognitives potentielles. Pour surmonter les problèmes méthodologiques qui peuvent jouer un rôle dans les résultats équivoques (p.ex., la dichotomie de l'expérience langagière, la conception de tâches expérimentales, la nature des mesures dépendantes), mon programme de recherche utilise une approche multiméthode afin d'examiner la relation entre les différences individuelles langagières, la cognition, ainsi que la structure et les fonctions du cerveau. Je discuterai de méthodes comportementales, électrophysiologiques et de neuroimagerie utilisées dans mon laboratoire, et de la façon dont elles sont employées pour examiner le(s) mécanisme(s) qui semblent former la base des différentes langagières, cognitives et cérébrales.

ORAL PRESENTATIONS / PRÉSENTATIONS ORALES

Which factors drive meaning selection during L1 and L2 idiom processing following a prior context: Direct retrieval or compositional assembly?

Marco S.G. Senaldi[1], Debra Titone[1];
[1] McGill University

Past work suggests that L1 readers retrieve idioms (spill the tea) directly compared to matched literal controls (drink the tea), whereas L2 readers process idioms more compositionally. However, it is unclear whether this occurs when idioms follow figuratively or literally biased contexts. We tested this in an eye-tracking study where 40 English-L1 and 35 English-L2 adults read English sentences containing idioms having figurative, literal, or neutral prior contexts. Linear mixed- effects models revealed an overall preference to interpret idioms literally for early measures, with L1 readers exhibiting a stronger literal bias. At the disambiguation region, however, L1 readers appeared to interpret idioms figuratively as familiarity increased, suggesting an L1 reliance on direct retrieval. In contrast, idioms' figurative interpretation in L2 readers was facilitated by verb- decomposability, suggesting an L2 reliance on compositional assembly. These data suggest that L1 and L2 idiom interpretation strategies are comparable whether idioms precede or follow biased contexts.

Maturation of French grammar in adolescence: ERP evidence for delayed adjectival agreement consolidation

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[2] Centre for Research on Brain, Language and Music (CRBLM);
[3] Dalhousie University Department of Psychology & Neuroscience;
[4] McGill School of Communication Sciences and Disorders;
[5] École d'orthophonie et d'audiologie de l'Université de Montréal

We investigated agreement mismatch effects for noun-adjective and noun-determiner gender in French-speaking adolescents using an audio-visual event related potential (ERP) paradigm. In spoken French, feminine gender on determiners is marked by a predictable vowel alternation (e.g., ***le/la*** [lœ]/[la] 'the$_{M/F}$') and on adjectives by an unpredictable consonant (e.g., ***gris/e*** [gʁi/z] 'grey$_{M/F}$'). Previous audio-visual studies found that determiner gender errors elicited AN-P600s, while adjectives gender errors elicited LAN-P600s in adults (Gascon et al., 2011; Royle et al., 2013). Differences were also found in young children: gender errors on determiners elicited late P300-like positivities, and adjective errors elicited N400-like negativities (Courteau et al., 2015). Language-acquisition research generally focuses on children up to age 10. After this age, some studies find similar ERP patterns in adults and adolescents (e.g., Atchley et al., 2006; Clahsen, 2007) and others do not (Meier, 2008). By using French regular determiners and irregular postnominal adjectives, this study will test whether gender agreement processing is mature in adolescence.

21 French-speaking adolescents (aged 10-16 years) and 29 adults (19-39 years) viewed images of colored objects followed by auditory sentences describing them, and made grammaticality judgements on these picture-sentence pairs. Sentences contained determiner phrases that a) were grammatically correct (***Je vois la clef grise sur la table*** 'I see the$_F$ grey$_F$ key on the table'), b) carried a gender error on the determiner (...****le clef grise ...*** ' the$_M$ grey$_F$ key'), or c) contained a

gender error on the adjective (***... la clef *gris ...*** 'the$_F$ grey$_M$ key'). We used ERPscope (Herbay, 2021) to average ERPs on determiners or adjectives and compared these to correct conditions.

We present preliminary analyses of amplitude differences using t-tests. Determiner errors elicited LAN-P600s in both adults and teens. In adults, adjective errors elicited broad fronto-temporal and temporo-posterior negativities followed by P600s, possibly superimposed LAN and N400 effects, while adolescents exhibited biphasic N400-P600s. These results point towards different underlying agreement mechanisms for French adjectives between adults and adolescents, while determiners appear to be processed similarly. Adolescents' N400 response to adjective errors could reflect lexicalization of irregular forms, and the adults' LAN + N400 pattern suggests additional feature checking as reflected by LAN-like responses. This data supports the idea that grammar is not yet fully consolidated in adolescence, and that regularity might play a role in maturation patterns.

Processing of filler-gap dependencies in native and second language speakers: Evidence from a self-paced reading task

Shuzhen Wang[1], **Laura Sabourin**[1]
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Natural language is full of filler-gap dependencies. For example, in a simple ***wh***-question ***which book did John read*** ___, the ***wh***-phrase "which book" appears at the beginning of the question, but it is interpreted as the direct object commanded by the verb ***read,*** which appears at the end of the question. Interestingly, in ***which book did Bill say that Mary thought John read*** ____, the displaced element (a filler) can be indefinitely far away from the syntactic position at which it is interpreted (its gap). Research concerning filler-gap dependency has been extensively studied with monolinguals (Stowe, 1986; Traxler & Pickering, 1996; Chow & Zhou, 2019; Wagers & Phillips, 2009). However, this syntactic pattern has rarely been investigated in bilinguals.

The understanding of how parsers encode and retrieve information from the filler to complete the gap will shed light on the underlying processing mechanism of syntactic complexity. Previous research using different techniques has commonly suggested that filler-gap dependencies are computed predictively, without waiting for unambiguous evidence about the actual location of the gap (Active Filler Strategy) (Wagers & Phillips, 2014; Chow & Zhou, 2019; Garnsey et al., 1989; Dallas et al., 2013; Frazier & Clifton, 1989; Stowe, 1986). However, this generalization has been challenged by Wagers and Phillips's (2014) experiment, which shows that parsers fail to predictively compute filler-gap dependencies when the dependency spans a long distance. The present study aims to investigate active gap-filling in sentences with the manipulation of filler plausibility and dependency length at the same time in L1 and L2 speakers. The main research questions investigated are the following:

1) Can native English speakers show a plausibility effect?
2) Is the effect modulated by the distance between the filler and the gap?
3) Can L2 speakers of high proficiency show the same effect and how is this effect modulated by dependency lengths?

We have completed the investigation of the processing of filler-gap dependency constructions in native English speakers by conducting an online self-paced reading experiment. We found visibly longer reading times (these did not however reach significance) for implausible filler-verb combinations than for plausible ones in the long dependency conditions. Interestingly, there were no RT differences found on the verbs between plausible and implausible conditions in short dependency conditions. This observation cannot be reconciled with the lack of the effect in the long conditions in the study of Wagers and Phillips (2014). Although the t-test results failed to demonstrate the statistical significance of the mean reading times, the numerical difference indicated that potential plausibility effect may be detected with better-controlled experimental materials. After modifying the stimuli, we will continue the study by investigating how these effects might be different if highly proficient L2 English speakers are investigated.

Refined Chaos Raffiné: When bilingual adults learn novel words in a multilingual iterated learning task

Vegas Hodgins[1], Pauline Palma[1], Sarah Lee[1], Debra Titone[1]
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Studies of language evolution in the lab have used the iterated learning paradigm to show how linguistic structure emerges through cultural transmission—repeated cycles of learning and use across generations of speakers. Agent-based simulations of iterated learning suggest that prior biases crucially impact the outcome of cultural transmission. In our studies, we explored the impact of bilingual cognitive biases on the evolution of artificial languages. We created two initially random artificial languages, each respectively resembling English or French at the phono-orthographic level. Participants learned each artificial language in their respective "language mode" and then were tested on their production. The output of their testing was used as learning input stimuli for the next participant, creating a "chain" of language transmission across generations. This process was repeated over ten generations per diffusion chain, with language structure and learnability measured at each generation. In study 1, our participants were bilinguals who speak English and French, but varied in first language (L1; overwhelmingly English). In study 2, each diffusion chain consisted solely of L1 French or L1 English bilingual speakers, respectively, with no strong third language. We hypothesized that artificial languages would increase in learnability and structure when they were aligned with participants' real-world daily language usage, or as a function of practice. In study 1, we found that English-like languages became more structured over generations, but only when they were learned first. In contrast, French-like languages in study 1 became more structured regardless of the order of learning, suggesting an asymmetric switch cost during artificial language learning in this English-dominant bilingual population. These data suggest that bilingual experience impacts how novel languages are learned at an individual level, which can then scale up to cultural transmission of novel language at a group level. Data collection for study 2 is still ongoing, and seeks to clarify the asymmetric findings in study 1 by examining whether the observed effects also occur in exclusively L1 French bilingual diffusion chains.

How listeners combine and integrate multiple linguistic cues during spoken language comprehension a focus on semantics and coarticulation

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When comprehending and recognizing a word within a discourse, listeners actively interpret incoming information by coordinating different linguistic cues. Previous research on the processing of single cues has shown that adults use low-level cues (e.g., coarticulatory) and higher-level cues (e.g., morphosyntactic and semantic information) to predict upcoming words (Altmann & Kamide, 1999; Beddor et al., 2013; Dahan et al., 2001; Desmeules-Trudel & Zamuner, 2019; Huettig & Janse, 2016; Yee & Sedivy, 2001). Other lines of research have been concerned with how multiple cues are processed during speech processing. Evidence from behavioral studies showing that listeners can dynamically combine and integrate some of the lower-level and higher-level cues during spoken language comprehension (Falandays et al., 2020; Kaufeld et al., 2020; Ronai et al., 2019; Zellou & Dahan 2019). However, it is still not well understood how the mechanism of cue combination and integration work; moreover, it is still unclear whether listeners can combine and integrate all types of cues across levels of linguistic representations.

The current study investigated how adults (n = 52) process coarticulation (a lower-level cue) in the presence of preceding semantic information (a higher-level cue) during spoken language comprehension using an eye-tracking paradigm. Participants were tested on sentences with where there was a prime (semantically related or semantically unrelated to the target) and a target which had varying coarticulation cues (matching vs. mismatching splicing cues). For example, ***The man sees the river*** $_{Semantically\ related}$***/cartoon*** $_{Semantically\ unrelated}$ ***(Prime) and looks for the boa*** $_{t}$***t*** $_{Matching\ splicing}$ ***/boa*** $_{n}$***t*** $_{Mismatching\ splicing}$ ***(Target).*** Participants were presented two pictures (target and competitor) on a screen. Proportional looking to target for prime and target windows, and mouseclick responses were collected.

Results indicate that adults used both semantic and coarticulatory cues once the cues were available. For the prime window, adults fixated to target significantly more in semantic- related compared to semantic-unrelated condition (***p*** <

.001). For the target window, adults have significantly greater proportional looking to target in match-splicing than in mismatching- splicing condition ($p < .001$). Results also showed the pattern of greater looking to target in both semantic conditions when participants listened to the match-splicing cues, while the mean proportional looking in semantic-related condition is slightly higher but statistically not significant, compared to semantic-unrelated condition, when participants heard the mismatch- splicing cues ($p = 0.46$). Our findings suggest that adults were sensitive to both preceding higher- level and later lower-level cues, and that the processing of low-level coarticulatory cues may vary depending on the semantic context.

POSTER PRESENTATIONS / PRÉSENTATIONS D'AFFICHE

1. L'effet d'accent sur la reconnaissance du locuteur : étude du français québécois et hexagonal

Paméla Bautista Boivin[1]
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Le présent projet porte sur la capacité de perception humaine servant à reconnaitre les voix et à distinguer entre elles. Plus précisément, il s'agit d'étudier l'effet de l'accent géographique en contexte de parade vocale pour les locuteurs du français québécois montréalais et du français hexagonal. La parade vocale est une méthode parajuridique dont le but est de présenter plusieurs voix acoustiquement similaires à un identificateur afin qu'il tente de reconnaitre et d'identifier la voix d'un suspect (« voix-cible ») parmi plusieurs individus (Hollien et al., 2012; Nolan, 2003; Plante-Hébert, 2014; Atkinson, 2015). L'objectif principal de la présente étude est donc de déterminer si, tel que l'indique la définition de l'effet de l'accent différent, un identificateur aurait une plus grande difficulté à distinguer parmi un ensemble de voix non dialectales (accent différent) qu'à distinguer entre des voix qui ont le même accent que le sien. Bien que plusieurs études aient porté sur ce phénomène, celle-ci est la première à s'intéresser précisément aux différentes variétés de français (Atkinson, 2015; Philippon et al., 2007b; Stevenage et al., 2012; Goldstein, 1981; Yu et al., 2021). Des identificateurs ($n = 24$) natifs de chacun des accents ont donc été testés sur les deux variétés de français à partir de deux parades vocales contenant chacune 6 voix de femmes. Les trois paramètres suivants ont été observés : l'exactitude de leur identification pour chacun des contextes, l'asymétrie potentielle de l'effet de l'accent ainsi que le niveau de confiance autoévalué des participants.

Les résultats révèlent qu'il n'y a pas d'impact significatif de l'accent sur la reconnaissance du locuteur pour les variétés de français étudiées, quoique la performance des Français illustre une tendance qui ait du potentiel. Pour leur part, seulement 45% des Québécois sont parvenus à identifier correctement la voix montréalaise, ce qui constitue un résultat surprenant. Malgré une performance légèrement plus élevée des Québécois en contexte de reconnaissance de la voix appartenant à l'autre l'accent, l'asymétrie de l'effet de l'accent en leur faveur n'a pas pu être significativement confirmée. Finalement, les participants des deux variétés de français étudiées ont obtenu un score moyen de certitude autoévaluée plus élevé en contexte d'identification du même accent que le leur. À la lumière des résultats obtenus et malgré le fait que certaines hypothèses n'aient pas été avérées, il semble clair que pour le moment, une identification faite lors d'une parade vocale ne soit pas suffisamment fiable pour être considérée comme une preuve de culpabilité en contexte judiciaire.

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2. Validity of corpus-based measures of idiom processing in English and Mandarin Chinese

Michelle Yang[1], **Marco S.G Senaldi**[1], **Junyan Wei**[1], **Brendan Johns**[1], **Debra Titone**[1]
[1] McGill University

Idioms are expressions whose meanings differ from that of their component words (e.g., kick the bucket, pay through the nose). According to recent psycholinguistic findings, idioms are processed both holistically and compositionally over different time courses (e.g., Senaldi et al., in revision). In this work, we aimed to understand how

previously underexplored corpus-based indices of lexical strength and semantic compositionality can model cognitive measures of idiom processing in English and Mandarin Chinese. Thus, we propose the use of frequency- based corpus measures (word and phrase frequency, contextual diversity) and meaning-based measures (semantic similarity, neighbourhood overlap) to predict subjects' judgements of idioms. The meaning-based measures are derived from word2vec models trained on English and Mandarin Chinese corpora. We predict that greater frequency and contextual diversity of an idiomatic expression will positively correlate with subjective familiarity judgements. Similarly, greater semantic similarity and neighbourhood overlap between component words of an idiomatic expression should positively correlate with decomposability. This work will shed light on the cognitive reliability of corpus-based measures and the interplay of formal and semantic factors on idiom processing. Also, this will reveal whether current models of idiom processing hold across languages.

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3. Accessing verbal humour: An investigation of the time-course of joke processing

Aymée Bray Le Métayer[1], Laura Pissani[1], Christopher Genovesi[1], Roberto G. de Almeida[1]
[1] Department of Psychology, Concordia University

Humour has been the subject of much discussion among researchers, with various theories emerging on how humour is processed in the brain. It is widely accepted that humour often violates our expectations and requires us to reinterpret the meaning of a joke sentence to appreciate it. However, there is an ongoing debate over whether humour is accessed directly from the sentence or indirectly through a re-analysis of the sentence's meaning. One theory suggests that humour is processed directly, with the joke being immediately understood after it is heard. On the other hand, another theory proposes that humour is understood through a slower process of re-analysis, requiring the reinterpretation of the sentence's meaning. These theories emphasize the speed at which a re-analysis of meaning occurs, yet they do not adequately address the processing time of verbal jokes. Our study aims to use a more rigorous technique of measuring the time-course differences between joke and non-joke sentence processing and determining the role of re-analysis in verbal joke comprehension. In this study (currently in progress), we employ a cross-modal masked priming with lexical decision task, with sentences presented aurally and words presented visually with forward and backward masks. Our sentences include either a literal/cloze ending (e.g., ***It's sad that a family can be torn apart by something as simple as disease***) or a joke ending (e.g., ***It's sad that a family can be torn apart by something as simple as coyotes***). Experimental targets are either related (e.g.***, ANIMAL / INFECTION***) or unrelated (e.g., ***LEAGUE / BLIZZARD***) to the final word of the sentence. Targets are presented at two probe points: either at the onset of the final word of the sentence (considered an early probe point) or at its offset (considered a late probe point). We expect related targets to yield greater priming effects than unrelated targets for joke sentences compared to non-joke sentences, but only at the late probe point, thus providing evidence for the indirect access of verbal humour. This study will contribute to our understanding of the processing time of verbal jokes and provide valuable insights into the nature of humour processing. Finally, given that accessing verbal humour is a time-sensitive process, our use of a more refined measurement technique will help establish more robust methodologies for future studies.

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4. The status of propositions in memory: How concepts combine to represent meaning

Paul Emanuel Stan[1], Christopher Genovesi[1], Roberto G. de Almeida[1]
[1] Psycholinguistics and Cognition Lab, Department of Psychology, Concordia University

The nature of propositional content, that is, the way concepts combine in the mind to represent knowledge, has been a key concern in philosophy of language and cognitive science. Much of the emphasis on linguistic analysis is enrooted in the analytic tradition, most notably going back to Russell and Wittgenstein's ***logical atomism***— the theory that meaningful statements consist of indivisible ("atomic") propositions that combine according to a fixed set of logical rules. But is there any evidence that our memory stores and manipulates propositional units as such?

Kintsch (1974) investigated propositions in a series of psychological experiments on memory, where he defined them as units of meaning with truth-value functions. According to his definition, "the girl ate apples" only conveys one proposition because it expresses a single, indivisible truth-value statement. "The thick snow melted", however, conveys two propositions: (a) the snow was thick and (b) the snow melted. Crucially, Kintsch found that similar sentences, though having the same number of content words, are not recalled with similar accuracy. The more propositions a sentence had, independent on its surface length, the harder it was to remember it.

Given the lack of detail in his methods, direct replications of this effect have not been done. The present study aims to conceptually replicate Kintsch's findings, with more refined materials gathered from up-to-date corpora (e.g., Corpus of Contemporary American English). In an auditory experiment on sentence processing, we will be assessing recall accuracy with four different types of sentences: sentences containing three content words and conveying one proposition (3w1p; e.g., "The trick fooled the dog"), three content words and two propositions (3w2p; e.g., "The wild roses fell"), four content words and two propositions (4w2p; e.g., "The farmer harvested organic corn"), and four content words and three propositions (4w3p; "The red paint dried evenly"). Assuming, like Kintsch, that memory for "gist" is sensitive to propositional complexity, we expect the following results: (1) poorer recall for 3w2p than for 3w1p; (2) poorer recall for 4w3p than for 4w2p; and (3) equal recall between 3w2p and 4w2p.

Grounding the functions of memory in a propositional, combinatorial syntax has both theoretical and practical implications. On the one hand, it supports the existence of a context-independent language of thought that provides meaning from abstract, relational representations. On the other, it informs models of reading comprehension and writing.

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5. Context effect in indeterminate sentence comprehension: Evidence from eye tracking

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Indeterminate sentences such as ***Lisa began the book*** can appear infinitely ambiguous when isolated from context. This is so because the phrase ***begin NP*** can be interpreted as referring to a wide range of events (***reading, writing, eating...***). This contrasts with determinate sentences such as ***Lisa read the book*** which refers to a semantically determined event. The present study uses eye-tracking to investigate how naturalistic contexts influence the interpretation of indeterminate sentences. Investigating the role of context in indeterminacy bears on the nature of compositionality whether enriched or "classical" compositionality. Enriched compositionality involves forcing the interpolation of an event into the verb phrase, while classical compositionality considers the meaning of the whole to depend on the meaning of its components and structural combination. To distinguish between the two theories, the experiment will rely on the naturalistic context passages of Antal & de Almeida (2021). The sample of approximately 30 participants will be presented with 24 passages, each involving a different narrative. Those passages will be broken down and presented sentence by sentence. The critical sentence of each passage contains one of three conditions: (a) an indeterminate sentence (***Lisa began the book***); (b) a preferred-verb sentence (***Lisa read the book***), which is compatible with the context; or (c) a non-preferred-verb sentence (***Lisa wrote the book***), which is incompatible with the context. We predict that there will be no effect in reading time when participants first encounter the target sentence at the verb region in indeterminate verb sentences compared to preferred verb sentences, but with potential increase in reading time at the post-noun regions. An increase in reading time when participants begin re-reading portions of the target sentence is expected at the verb and noun regions in indeterminate verb sentences. It is also suggested that non-preferred verb sentences will have longer reading times than indeterminate sentences due to the role of pragmatic knowledge (viz., contextual content). If the predicted effects are obtained, the results will support the idea of late, pragmatic resolution of indeterminacy, rather than early default interpolation. In addition to eye movements we will rely on pupillometry, on the assumption that an increase in pupil dilation, should suggest an increase in processing difficulty when reading indeterminate sentences. Overall, the results of this study on indeterminacy should help distinguish between types of semantic composition and the role that the context of a sentence plays in its ultimate interpretation over time.

6. The time course of conceptual access: Evidence from a dichotic presentation paradigm

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What conceptual information about an object do we attain at a glance? And how are concepts accessed via object referents and words? Addressing these questions requires investigation into the earliest moments of conceptual access - that is, when meaning is assigned to incoming visual and linguistic information. Research on conceptual access has mainly focused on the questions of what kind of information is being accessed and on the timing in which the concept is being accessed. However, various inquiries into these questions have yielded conflicting results as to what is accessed during conceptual tokening (e.g., semantic features, category information). Further, it is important to note that the validity of the findings derived from most of the research conducted on conceptual access is limited by key methodological issues (e.g., slow stimulus presentation, limited set of category information). The present study aims to address these issues by investigating two main questions: (1) ***what*** kind of information is accessed when objects are recognized - namely, are the whole objects being accessed (i.e., at the superordinate level or at the basic level), or are the objects being accessed through their constituent features (i.e., through their high-salient features, or through their low-salient features)? And (2) ***When*** is that information accessed (i.e., at what time-point is that information accessed)? To investigate these questions, we will deploy a picture word-masked congruency (PWMC) task - a task designed to capture the crucial moment in which the visual properties of an object are tagged with its corresponding conceptual representation. The PWMC task will display simultaneous object and word items for either 30-40 ms, 50-60 ms, 190-200 ms or 390-400 ms. Participants will judge the relation between a presented object (e.g., DOG) and one of four abstract category labels: (a) superordinate-level label (e.g., "animal"), (b) basic-level label (e.g., "dog"), (c) high-salient label (e.g., "bark"), or (4) low-salient label (e.g., tail). Through this task, which involves determining the kind, in addition to the time-point of conceptual access (i.e., when the concept of an object is accessed), we aim to gain insight into the time-course of conceptual access and the nature of the information attained in the early moments of conceptual encoding. This work is in progress and preliminary results will be presented at the conference.

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7. The impact of learning background in bilingual writing

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Language experience is characterized by high variability in a range of factors related to language exposure. One of the most important is the nature of the input received during learning, which has important consequences for language processing. The quantity, and, even more important, the quality of the input are strong predictors of language development in multilinguals. In this context, it is fundamental to consider differences between naturalistic and classroom settings where the input modality is completely different. It is well known that L2 learners in a classroom setting receive considerably more visual/written input than in a naturalistic setting which provides more verbal/auditory input. The learning background may be especially relevant to the acquisition of writing, as it requires conscious effort and time to master. This study explored the influence of learning background on bilingual writing production.

To address this critical question, we included two groups of English-Spanish bilinguals with different learning backgrounds: late bilinguals with formal education in English and Spanish, and heritage speakers with formal education in English, but informal education in Spanish. They carried out a writing to dictation task that included 104 words in English and Spanish in two independent blocks. The stimuli were presented in the auditory modality and their orthographic and phonological similarities between languages were manipulated orthogonally: O+P+ (hospital-HOSPITAL), O+P- (horrible-HORRIBLE), O-P+ (panic-PÁNICO), O-P- (oxygen-OXÍGENO). The reaction times of the typing responses were collected in two different stages to track the time course of the processing: from the offset of the stimulus to the first keypress (early stage), and from the first keypress to the end of the word (late stage).

From a psycholinguistic perspective, writing to dictation consists of the conversion of phonology into orthography. For this reason, we expected more differences between high and low phonological similarity (phonological

effects) in the early stage, and more differences between high and low orthographic similarity (orthographic effects) in the late stage, following the time course of the dictation subprocesses. Late bilinguals showed general phonological effects in the early stage, and only orthographic effects in the L2 (Spanish). Heritage speakers showed a similar pattern in the early stage. However, In the late stage, they continued to show phonological effects in the heritage language (Spanish). Since native speakers learned their minority language in a natural environment, they received mainly oral/phonological information, resulting in a phonological bias during writing processing.

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8. Using Bayesian Hierarchical Multinomial Models to characterize language- unique words, cognates, and interlingual homographs in the linguistic landscape of four Canadian cities

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Throughout their lives people have to make sense and interact with an incommensurable amount of linguistic information that has to be filtered efficiently (Vingron et al., 2017). However, how people process and interpret this input can be thought as dynamic and interactive process, jointly determined by their linguistic background, the sociolinguistic context, and the policies regulating how signs should be displayed. The linguistic landscape is "the language of public road signs, advertising billboards, street names, place names, commercial shop signs, and public signs on government buildings" (Shohamy, 2006). Here, we investigated the proportion of French and English words in the linguistic landscape of four Canadian cities whose residents had comparable bilingual knowledge of French and English but varied in whether French or English was the language of the home (Statistics Canada, 2017). Fredericton, NB and Ottawa, ON are highly English-speaking at home, though Ottawa is more French. Montréal and Québec City are highly French-speaking at home, though Montréal is more English. We exhaustively photographed signage of one street from each city (except Montréal where we photographed four streets). ~2,500 public signs were coded for the number of French and English words, and the number of words that had the same meaning in French and English (COGNATES) or different meanings (INTERLINGUAL HOMOGRAPHS). As expected, the proportion of French was low in Fredericton and Ottawa, but high in Montréal and Québec City; though French was consistently high for governmental signs. More interestingly, the proportion of cognates was higher than interlingual homographs, and the size of this cognate effect varied with both city and sign type: It was maximal for government signs in Fredericton, Ottawa, and Montréal, but smaller in highly French Québec City; It was minimal for ad-hoc signs, especially in highly English Fredericton and Ottawa; It was intermediate for commercial signs across all cities consistently. This cognate effect is interesting given copious psycholinguistic research demonstrating that cognates are easier for bilinguals to read than interlingual homographs (Palma & Titone, 2020). Using a Bayesian hierarchical multinomial models, we are currently exploring whether these trends arose from deliberate intent of sign creators, unconscious psycholinguistic processes of sign creators, or simply because governmental signs contain more Latinate words.

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9. Language Coactivation for Interlingual Homographs During Bilingual Reading: The Impact of Semantic Bias and Individual Differences in Language Entropy

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Bilingual adult readers fixate longer on words that straddle two languages (interlingual homographs, ILHs; e.g., CHAT in French/English) indicating language coactivation (Libben & Titone, 2009; Pivneva et al., 2014). Interestingly coactivation decreases when contexts biases target-language ILH meanings (English sentence about conversations). Unclear is whether contexts biasing other-language meanings (English sentence about cats) increase coactivation, and whether reading habits play a role. Across two studies, bilinguals read ILHs in English sentences. In Study 1, 87 bilinguals read ILHs when contexts biased target language meanings (CHAT=talking). Here, global ILH interference (i.e.,

coactivation) emerged across contexts for late-, but not early-stage measures, irrespective of reading habits (language entropy). In Study 2, 80 bilinguals read ILHs when contexts biased non-target language meanings (CHAT=cat). Here, language entropy increased ILH interference globally for early but not late measures, only for L2-readers. These results suggest that language coactivation is multidetermined by text- and person-related factors.

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10. Beefed up bilinguals or a different beast? Investigating whether plurilinguals differ from bilinguals in their cognitive control

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Though bilingualism has come to be the focus of an important body of research, whether it translates into differences in speakers' brains—and if so, which of its facets matter most and what differences they may correlate with—is still the subject of (at times acrimonious) debate (e.g., Paap, 2019). Whether a plurilingual brain could be something different from both a bilingual and a monolingual brain is a question less often asked, but that can play a role in how we define and investigate bilingualism: currently, it is not unusual for studies to collapse plurilinguals in with bilingual participants, while others exclude them from their bilingual samples. Does plurilingualism warrant separate assessments or can we broaden our view of bilingualism to include the trilinguals, quadrilinguals and other polyglots? Asymmetries in how bilingual vs. plurilingual speakers appear to manage their different languages had been observed in a previous pilot study of French-English bilinguals vs. speakers of French-English and at least one other language (Senecal, Gosselin & Sabourin, 2023). The current research further explores this issue by comparing the cognitive control abilities of Spanish-English bilingual and Spanish-English- French trilingual adults. 62 participants completed an online study including an extensive Language Background Questionnaire (Sabourin et al., 2016), English and French cloze tests, and Flanker and Stroop tasks. The latter included both single-language Spanish and English blocks as well as a more demanding mixed Spanish-English block, to assess whether a more challenging task may reveal differences hidden in the simpler task (Vinerte & Sabourin, 2015). Participant cognitive control abilities were computed as global (i.e., overall reaction times), facilitation (i.e., the difference in averaged reaction times for congruent and neutral trials), and inhibition (i.e., the difference in averaged reaction times for incongruent and neutral trials) effects. Ongoing statistical analysis using linear mixed effects models seeks to evaluate the effect of factors related to participants' linguistic environment and behaviour, including the number of languages they use on a regular basis, on their performance in the two tasks. Furthermore, language entropy (Gullifer & Titone, 2020) was calculated for each participant and is also being tested as a predictor, to try and account for the high variability of the different multilingual contexts of plurilinguals speakers.

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11. The continuous effects of language experience on the shared-syntax systems of bilinguals

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The shared-syntax account of language representation is highly elaborated in the bilingualism literature. Language acquisition and bilingual attainment are affected by a huge cluster of variables, among which the maturational factor and manner of acquisition (MoA) are prominent. The purpose of this study is to investigate how age of immersion (AoI) and MoA modulate the shared syntactic representation of (balanced) bilinguals as continuums.

Specifically, the current study continues this line of research by testing the grammatical co- activation of relatively balanced English-French bilinguals while processing adverb placement in a self-regulated reading paradigm. Studies with grammaticality judgment tasks have shown controversial results of adverb placement competence in bilingual. This could be due to the various language backgrounds of the participants in these studies. In some particular environments where two languages are spoken at a similar dominant level, such as the Ottawa-Gatineau area in Canada, AoI and MoA have been suggested as crucial for the organization of the mental lexicon of bilingual speakers. To investigate these issues, two

research questions are asked: 1) Is there an integration effect during adverb placement processing for balanced English-French bilinguals? 2) Do age and manner of acquisition continuously correlate with the co-activation effect?

An online grammatical maze task was conducted to compare the processing patterns between two counterbalanced conditions (i.e., English vs. French word order of adverb placement) in English, across a group of English-French bilingual with various AoI and MoA. A group of English monolinguals was also tested as control. Predictions from mixed models indicate that the RT difference of early bilinguals is found to be 17ms smaller than that of monolingual speakers. As AoI increases, the effect size is also increasing. However, the trend of the MoA effect is the opposite. One specific reason is the collinearity between AoI and MoA. In summary, an early AoI is more likely to predict the co-activation of two grammars in one head, and this is also the case for a large amount of exposure in a community setting environment (i.e., a more naturalistic manner of acquisition).

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12. Assessing the impact of frequent code-switching on the mental lexicon

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Contemporary research related to the bilingual lexicon has focused on analyzing the effects of language proficiency on lexical integration. However, the field has seen a more recent shift towards the study of code-switching as a reflection of language co-activation (Kootstra et al. 2020). In their 2017 study, Smith et al. found that while unbalanced bilinguals demonstrated similar within-language priming effects, cross-linguistic priming effects were asymmetric, with stronger effects from L1-L2 than from L2-L1. Additionally, this study evaluated the role of L2 targets with regards to this asymmetric priming effect. While previous research has focused on the strength of L1 primes, this study demonstrated the complementary strength of L2 targets, and their joint influence on this asymmetry. These results demonstrate that language proficiency has a significant impact on cross-linguistic priming effects, and that language use may play an important role in modulating these effects. In their 2020 study, Kootstra, et al. examined the contexts in which code-switching took place. Their results indicate that words that are similar cross-linguistically can prompt bilinguals into code-switching behaviour.

Varying levels of co-activation have been observed in relation to language proficiency, and manner of acquisition (Kootstra et al. 2020). This study will be an attempt to evaluate the effect of frequent code-switching on the integration of the bilingual lexicon, if these effects are noticeable with regards to the cross-linguistic semantic priming effect, and if they demonstrate a significantly lessened language switching costs. We anticipate that habitual code-switchers will present higher accuracy rates and faster reaction times than bilinguals who do not habitually code-switch. These hypothesized results would demonstrate that habitual code-switchers present with reduced cost related to language shifting, an indication that when compared to non-habitual code switchers, they present with a more integrated lexicon. Highly proficient French-English bilinguals will be asked to complete a lexical decision task. This lexical decision task will include both between and within-language priming in repetition and semantic conditions. During these tasks, participants will be presented with masked primes, followed by their chosen targets, and asked to decide if the targets are proper words in either their L1 or L2. Reaction times and accuracy of responses will be collected for each participant, and correlated with self-reported measures related to frequency and intensity of code-switching. The majority of the participants come from the student body of the University of Ottawa.