Interpreting intentions: evidence for cross-language influences in bilinguals

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Abstract

In Malay, accidental actions are marked with the prefix -ter. Malay speakers typically assume a deliberate intent when the prefix is absent. I investigated whether Malay-English bilinguals are more likely than English monolinguals to interpret actions in English sentences as deliberate when they are not clearly indicated as being accidental. In Experiment 1, Malay speakers completed a recognition memory task. The results showed that Malay speakers remembered unintentionality accurately. This accuracy in remembering unintentionality suggests that Malay speakers encode the intentions of others. In Experiment 2, participants completed a cross-modal priming task. They first heard scenarios in which a character’s action was either accidental or was ambiguous as to intent, and then they saw either a word that was consistent with an unintended-action interpretation, an unrelated word, or a nonword and made a lexical decision. The grammatical intention marker in Malay influenced speakers’ perception of intentions even when listening to English. Bilinguals showed a smaller priming effect than monolinguals only in the ambiguous condition, suggesting that they were more likely to have interpreted intention-ambiguous actions as deliberate. These findings inform our understanding of cross-cultural communication differences.
Keywords

Cross-linguistic, cross-language influences, linguistic relativity, cross-cultural communication, lexical decision, causation
Summary for Lay Audience

“Users of markedly different grammars are pointed by their grammars towards different types of observations and . . . hence are not equivalent as observers but must arrive at somewhat different views of the world” (Whorf, 1956). Research has shown that the grammar of a language may influence the way we think. In Malay, accidental actions are clearly indicated as they are grammatically marked with the prefix -ter such as in terlanggar (langgar – “hit”). Malay speakers typically assume a deliberate intent when accidental actions are not clearly indicated such as when the prefix is absent. In English, however, accidental actions are not grammatically marked. I investigated whether the habitual way of interpreting intentions in Malay was carried over to the interpretation of intentions in English for Malay-English bilinguals. More specifically, the present study examines whether Malay-English bilinguals are more likely than English monolinguals to interpret actions in English sentences as deliberate when they are not clearly indicated as being accidental. In Experiment 1, Malay speakers completed a recognition memory task. The results showed that Malay speakers remembered unintentionality accurately. This finding suggests that Malay speakers encode the intentions of others. In Experiment 2, participants completed a cross-modal priming task. They first heard scenarios in which a character’s action was either accidental (unambiguous condition) or was ambiguous as to intent (ambiguous condition). They then saw a word presented visually that was either consistent with an unintended-action interpretation, an unrelated word, or a non-word. Participants had to decide as quickly as possible if the word was a real English word or a non-word. The results showed that the way of interpreting intentions in Malay, as indicated by the grammatical intention marker, influenced speakers’ perception of intentions even when listening to English. More specifically, Malay-English bilinguals showed less facilitation for unintended action words
compared to unrelated words in the ambiguous condition than in the unambiguous condition. In contrast, English monolinguals showed comparable facilitation effects for unintended action words compared to unrelated words in both conditions. This result suggests that the unintended action word in “ambiguous” scenarios was more incongruent to the expectations of Malay-English bilinguals than for English monolinguals. Malay-English bilinguals were more likely to interpret the actions as deliberate, as they habitually would in Malay when accidental actions are not clearly specified. These findings inform our understanding of cross-cultural communication differences.
Co-Authorship Statement

This thesis and the projects that were conducted were performed under the close supervision of Dr. Debra Jared.
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Chapter 1

1  A Relationship Between Language and Thought

Our ability to express our ideas through language is a fundamental characteristic to being human that differentiates us from other species. There are as many as 7111 languages spoken in the world today (Eberhard, Simons, & Fennig, 2019) that are differentiated by their own unique features. To illustrate, some languages require its speakers to distinguish between various periods of time, space, or grammatical genders when speaking, to name a few. People have been interested in understanding how the habitual use of certain features in the language that we speak influences habitual behavior and the way we think ever since the time of Plato. Over the years, the exploration of the relationship between language and thought has evolved, with more recent bilingual studies focusing on cross-linguistic influences between languages that are driven by these linguistic features. The present study examines the cross-language influence of a Malay grammatical feature in Malay-English bilinguals. Before describing the study, I first discuss the linguistic relativity hypothesis and the monolingual literature that has addressed this hypothesis. I then review some studies of bilinguals that have explored the influence of the grammatical features of one language on comprehension of the other language.
1.1 A Kerfuffle: The Linguistic Relativity Hypothesis.

Whorf (1956) wrote that “Users of markedly different grammars are pointed by their grammars towards different types of observations and different evaluations of externally similar acts of observation, and hence are not equivalent as observers but must arrive at somewhat different views of the world”. When it was proposed that the language we speak may influence the way we think, many language researchers were quick to question the notion. Whorf’s (1940) linguistic relativity hypothesis was initially misinterpreted, primarily by Brown and Lenneberg (1954), as claiming that the language we speak determined our thoughts. Brown and Lenneberg (1954) discussed and tested Whorf’s argument empirically in non-linguistic tasks such as color perception, even though Whorf elaborated his views only in the realms of linguistic habits that usually go unnoticed in our everyday speech (Pavlenko, 2016). Many language researchers miscredited Whorf and instead developed their studies based on the notion of linguistic determinism formulated by Brown and Lenneberg (1954). For instance, a popular yet misinformed illustration representing Whorf’s ideas is how the large vocabulary for different types of snow in Inuit and Yupik speakers allows them to perceive the world differently from English speakers. This version of Whorf’s ideas is what is known to many and published in textbooks (Martin, 1986), resulting in skepticism among many language researchers. For example, Pullum (1991) argued that the many variations of the word “snow” are simply derivations of a single root word and not actual distinct words. Even if Pullum’s (1991) argument is valid, Whorf’s focus was less on vocabulary and more on the habitual way of thinking developed by certain features present in one’s grammar.
More recently, however, language researchers have re-examined Whorf’s ideas on the relationship between language and thought. It is now widely accepted among neo-Whorfian researchers that Whorf’s linguistic relativity hypothesis posits that language merely influences one’s thoughts. This idea has gathered extensive empirical support from a multitude of studies concerned with concepts of grammatical gender, motion, and spatial cognition. Current researchers of the hypothesis primarily emphasize Whorf’s idea of the “habitual ways of speaking” (Hill, 1999). Thus, it is believed that a language may encourage its speakers to think more about some concepts than others because they are called to attention by certain linguistic features. (Wolff & Holmes, 2012).

1.2 Language and Thought in Monolinguals

Empirical evidence for the relationship between language and thought was first obtained with monolingual speakers (see Pavlenko, 2014). Grammatical features involving grammatical gender, motion and spatial frames of references have been examined to determine if these features influence the way speakers perceive and understand these concepts. This literature is briefly reviewed to illustrate the methodology used in this line of research. Some of the tasks employed in these studies were later adapted in bilingual studies that tested the same phenomena.

1.2.1 Grammatical gender.

Speakers of languages that have grammatical gender, such as French, assign masculine or feminine pronouns to objects and animals. In contrast, other languages, such as English, do not require its speakers to assign gender to non-human entities.
Vigliocco, Paganelli, and Dworzynski (2005) examined the effects of grammatical gender on thought in native Italian speakers. Native Italian and native English speakers were recruited for their study. Participants were presented with triplets of words referring to either animals or objects. Their task was to judge which two of the three words in each set were most similar in meaning. They found that Italian speakers were more likely, than English speakers, to choose word pairs that shared the same gender. However, this grammatical gender effect during a similarity judgment task was only evident in words referring to animals. These effects of grammatical gender on thoughts are further supported by other studies as well (see Imai, Schalk, Saalbach, & Okada, 2014; Saalbach et al., 2012).

Moreover, these effects of grammatical gender on one’s thoughts have also spurred an interest in understanding its consequences. Prewitt-Freilino, Caswell, and Laakso (2012) categorized countries according to those with gendered, natural gender and genderless languages. Their findings highlighted that countries with languages that use grammatical gender scored lower on the World Economic Forum’s Global Gender Gap report (Hausmann, Tyson, & Zahidi, 2009) as compared to countries with languages that use natural gender or are genderless.

Despite several studies supporting these findings, some studies have failed to show any grammatical gender effect on thought (Mickan, Schiefke, & Stefannowitsch, 2014; Ramos & Roberson, 2011). Due to the conflicting results in the literature of grammatical gender, its effects have been characterized as task-dependent (Bassetti & Nicoladis, 2016). For instance, effects of grammatical gender are evident in linguistic tasks but not when the tasks are non-linguistic (Ramos & Roberson, 2011; see also
Vigliocco et al., 2005). Additionally, it is argued that some studies showing grammatical gender effects used primarily overt judgment tasks that are considered more offline than online language processing tasks.

If effects of grammatical gender are present even in online tasks, such as in eye-tracking studies, then such findings would show that grammatical gender indeed actively influences one’s thought processes on gender. For example, Esaulova, Reali, and von Stockhausen (2014) investigated the influences of grammatical gender and stereotypical gender on reading comprehension in German speakers. They found that when the grammatical gender of a role noun (e.g., *Elektriker* – “electrician”, masculine) was congruent with the pronoun (e.g., *er* – “he”) or with the stereotypicality of the role noun, fixations were shorter and probabilities of regression were lower than when it was incongruent. This interaction between the grammatical gender of the role noun and of the pronoun also appeared during first-pass reading times which reflected early processing of grammatical gender. Additionally, the incongruency between stereotypicality and role noun gender did not influence the processing of role nouns until the last stage as reflected in the total fixation times. This effect was not seen in earlier stages, suggesting that stereotypical gender information was only activated much later. Their findings suggest that grammatical gender influences thought much earlier compared to stereotypical gender. Therefore, using a more sensitive measure to examine the effects of grammatical gender provide a more temporal insight to how early these effects occur during language processing.
1.2.2 Motion.

Other studies examined the grammatical structure in which motion is encoded in a language and its effect on memory. Languages differ in how motion is regularly encoded. For example, the “manner” of motion is often coded in English like in the sentence “…after ten minutes of nearly being smothered or crushed to death, we finally fought our way to the exit” but in Spanish, the “manner” of motion is often not paid attention to, such as in “…luego de diez minutos de asfixia y empujones, llegamos al pasillo de la entrada” which translates to “…after ten minutes of asphyxiation and pushes, we arrived at the entry-way”. (Slobin, 2003). This difference in encoding motion seems to have an impact on what people remember (see also Choi & Bowerman, 1991). Slobin (2003) had English and Spanish speakers read a passage from a novel and asked them to describe the character’s manner of movement. It was found that English speakers recalled how the action was performed by using descriptive verbs (e.g., stagger, stumble) whereas most Spanish speakers did not describe how the action was performed and instead, focused on the surrounding space (e.g., muddy). Thus, Slobin (2003) suggested that English speakers had better recall for the manner of movement because English encoded motion more economically using more specific descriptions of motion.

However, some studies show that the differential encoding of motion in some languages influences one’s perception of motion only to a certain extent. Athanasopoulos and Bylund (2013) showed that these cross-linguistic differences in encoding motion were only present in linguistic tasks or offline memory tasks but not in online tasks. In their study, native speakers of English and Swedish were recruited. Swedish speakers encode ongoing aspects of motion less than English speakers and even when they do, the
lexical means to do so in the Swedish grammatical system is limited. Thus, Swedish speakers are more likely to focus on end-points rather than intermediate or ongoing aspects. In a verbal description task, participants were shown a series of goal-oriented videos and were asked to describe each video in their respective languages. Their results showed that Swedish speakers were more likely to describe event endpoints (e.g., two persons walk to a house) than English speakers (e.g., two people are walking).

In an offline similarity judgment task, participants were first shown two types of videos, one with a high level of goal orientation where the endpoint of the motion was overtly shown (e.g., a person walking and entering a building) and one with a low level of goal orientation (e.g., a person walking along the pavement) before they were shown target scenes with an intermediate goal orientation (e.g., a person walking towards a café). Participants were asked to choose which of the initial video clips was more similar to the target video clip. Swedish speakers chose the video with the high goal orientation significantly more often than English speakers. However, in an online version of the task in which the initial videos were instead presented in a loop simultaneously at the bottom left and right of the screen with the target video, there was no difference between the groups in their similarity judgments. The authors concluded that grammatical aspects influence memory in event cognition such that one’s language fine tunes rather than shapes one’s perceptual processes that may be universal. Thus, their findings highlighted the extent of influence of language on one’s perception of motion where these language effects are confined to linguistic tasks or offline-memory tasks.
1.2.3 Spatial navigation.

Whorf (1956) hypothesized that our representation of space varies with the language we speak. Initially, the concept of space was thought as universally egocentric to the individual, where it was always interpreted as relative to one’s position in space (Levinson, 2003), but recent studies have shown empirical support for Whorf’s claim. For instance, speakers of Pormpuraawan languages, Guugu Yimithirr and Tzeltal, use absolute cardinal directions as obligatory grammatical features in their daily speech, as space is an important concept in the language and is not expressed in an egocentric representation (Boroditsky & Gaby, 2010; Haviland 1998; Levinson, 2003). In these languages, orientation and location of the interlocuters are fundamental to speaking and comprehending the language. For example, Pormpuraawans indicate cardinal directions depending on where the individual they are speaking to is positioned (e.g., move your cup over to the north-northwest a little bit). Thus, speakers of these languages are often required to consider cardinal directions to communicate in the language eloquently (Boroditsky & Gaby, 2010). Boroditsky and Gaby illustrated how the habitual use of grammatical spatial representation influenced how Pormpuraawans think about other abstract concepts such as time. Pormpuraawans and English speakers participated in card arrangement and dot-drawing non-linguistic tasks. Each set of cards depicted a man at different ages. Participants were positioned at different cardinal directions and were asked to arrange the cards in order from youngest to oldest. The dot-drawing task followed a similar design but participants were instead asked where “yesterday” was if the dot represented “today”. It was found that English speakers arranged left to right regardless of which cardinal direction they were facing but Pormpuraawans arranged the
cards and dots differently based on which cardinal direction they were facing. More specifically, time was thought as progressing from left to right when they were facing South and right to left when they were facing North. Thus, the way in which spatial representation is expressed and structured in the grammar of a language influences how its speakers interpret the space around them.

1.2.4 Causation.

One way that causation is explored in monolinguals is through linguistic framing. Linguistic framing is known to affect how one perceives causation events in their surroundings. This area of study is particularly important given that most real-life situations involve linguistic accounts (e.g., news). Depending on the language that we speak, its linguistic structures may shape our perception, the type of information encoded in our memories and our resulting interpretation or decisions of a given scenario. Fausey and Boroditsky (2010) showed participants videos depicting actions, and they found that when the videos were accompanied by agentive language (e.g., she ignited the napkin), participants attributed more blame and consequently, greater punishment to actors than when the same videos were accompanied by non-agentive language (e.g., the napkin was ignited).

Some studies (Fausey & Boroditsky, 2011; Filipovic, 2013a) have examined differences in habitual linguistic expressions concerning causation produced by English and Spanish speakers when describing past events. English and Spanish speakers were equally likely to use agentive language (e.g., he broke the glass) when the action was intentional. When the action was accidental, however, Spanish speakers were more likely to use non-agentive descriptions (e.g., the glass was broken) than English speakers.
Moreover, in Spanish, there are two common expressions that clearly specify that the act was accidental (e.g., *Se me rompió un vaso*, *se rompió un vaso* which translate to “to me it happened that the glass broke”). In English, however, there are no equivalent expressions that require its speakers to identify that the act was accidental (Filipovic, 2013a).

Due to this difference in habitual expressions towards accidental events, the type of information that is encoded has also been found to differ between English and Spanish speakers. For example, Fausey and Boroditsky (2011) investigated whether the type of language used (agentive or non-agentive) played a role in memory for English and Spanish monolinguals. Participants took part in an object-orientation memory task and an agent memory task. In the agent memory task, both groups of speakers watched 16 videos followed by a brief distractor task where they counted to 10. Each video depicted a different event where eight videos showed intentional events and eight showed accidental events, with each having four videos consisting of one actor in blue shirt and the other four videos consisting of another actor in yellow shirt. The purpose of the different colored shirts was to determine if participants recalled the individual involved accurately. Each video that depicted an intentional event had the actor express satisfaction when an event (e.g., breaking a pencil) occurred, whereas the actor expressed a surprised reaction when the same event occurred unintentionally for accidental events. Participants were then shown a probe video of each event that they had previously watched enacted by a third actor, followed by two still images of both actors from the encoding phase. Participants were asked which actor appeared in the original video for each event and responded by choosing one of the two still images. As a control task, participants took
part in an object orientation memory task where they were shown pictures of objects in
different orientations followed by a brief distractor task. They were then asked to indicate
which orientation, among three different options, was the one they had seen before.

Their results showed that Spanish speakers were less accurate than English
speakers in recalling the individual involved in accidental events but not for intentional
events, despite similar performance in an object orientation memory task. This difference
in memory performance in Spanish speakers for accidental events can be explained by
the habitual use of non-agentive descriptions that do not focus on the individuals
involved. Some extended findings further supported the effects found in the above-
mentioned study. Japanese speakers habitually describe accidental events similarly to
Spanish speakers. Thus, in a direct replication study comparing English monolinguals
and Japanese monolinguals, comparable results were obtained (Fausey, Long, Inamori, &
Boroditsky, 2010). These studies, thus, showed that the habitual linguistic framing of
Spanish for accidental events resulted in a poorer recall for the individual involved than
English speakers.

In response to the above-mentioned study, Filipovic (2013a), however, argued
that the same habitual linguistic framing of Spanish speakers for accidental events
resulted in a better recall for the intentions as compared to English speakers. More
specifically, Spanish speakers remembered the intentions of accidental acts better than
English speakers, as Spanish speakers were more likely to specify that the act was
accidental given the two common expressions in Spanish that requires its speakers to
indicate that the action was accidental. For instance, when asked to describe a past event
that was accidental, Spanish speakers were more likely to accurately recall that the intent
was accidental (e.g. *Se le cayó la botella* which translates to “to her the bottle fell”) than
English speakers. English speakers were more likely to describe accidental past events as
more ambiguous in its intent (e.g. the woman knocked the bottle off the table). Hence,
these findings altogether suggest that the habitual expressions of a language that direct its
speakers to focus on different types of information have consequences on memory.

1.2.5 Summary.

All in all, there is ample evidence showing that the habitual grammatical structure in a
language drives a speaker’s attention to the concepts associated to said features, be it
gender, motion, spatial navigation or causation. These findings as discussed, however, are
limited to monolinguals. Given that a considerable number of speakers in the world are
bilinguals, a further examination of such language effects needs to be extended to
bilinguals. Of particular interest is whether features of one language influence
comprehension of the other language. There has been a considerable body of research
that has investigated cross-language interactions at the word level, but considerably less
concerning cross-language interactions in higher-level processes such as in
comprehending meaning and intentions (Jarvis, 2011). Below, I briefly review findings
regarding the former, and then focus on what is known about the latter.

1.3 Language and Thought in Bilinguals

1.3.1 Language interaction in bilinguals.

Much work on language interactions in bilinguals has focused on the representation and
processing of words (Jared, 2015). This interaction between two language systems is
captured in computational models such as the Bilingual Interactive Activation Model (BIA+) (Dijkstra et al., 2019; Dijkstra & van Heuven, 2002) by assuming that words from both languages are stored in shared orthographic and phonological lexical stores. The BIA+ model proposed that, upon a visual presentation of a word in one language, similar words from a bilingual’s other language are simultaneously activated. Activation then spreads to a shared conceptual store. The BIA+ model, thus, posits that knowledge of one language influences another in bilinguals (see De Groot, 1991, Dong, Gui, & MacWhinney, 2005, and Kroll & Stewart, 1994, for other models that assume shared conceptual representations). The BIA+ model is supported by studies showing cross-language semantic priming effects (Chen & Ng, 1989; de Groot & Nas, 1991; Friesen & Haigh, 2018; Singh, 2014, Van Hell & Tanner, 2012) and facilitation effects in reading cognates in a passage in one language after reading the cognates in a passage in another language (Friesen & Jared, 2007; Raney, 2003). The presence of such cross-language effects showed that language comprehension often involves the activation of knowledge of words in both languages in bilinguals. There have been some studies showing cross-language influences of grammatical structures (e.g., Dussias & Sagarra, 2007; Frenck-Mestre, 2002, 2005; Tokowicz & MacWhinney, 2005; for reviews see Clahsen & Felser, 2006; Tolentini & Tokowicz, 2011; Van Hell & Tokowicz, 2010). For example, Frenck-Mestre observed that when English-French bilinguals read French sentences with relative clauses (e.g., Someone shot the son of the actress who was on the balcony) they showed a preference to interpret the subject of the clause (i.e., Who was on the balcony?) as they did in English (e.g., the actress) rather than as done in French (e.g., the son), showing cross-linguistic transfer of parsing preferences. Of interest in the present study was
whether the grammatical features reviewed in the section on monolinguals that appear to influence conceptual processing transfer from one language to another. That is, my research question examined whether a grammatical feature in one language influences one’s interpretation of the other language for bilinguals.

1.3.2 Grammatical gender.

As noted previously, one such topic that garnered much attention is the influence of grammatical gender on one’s thoughts (Bassetti & Nicoladis, 2016). A question of further interest is whether the two grammatical gender systems of a bilingual have an influence on each other. For instance, the assignment of opposing grammatical genders for the words “key” (male in German; female in Spanish) and “bridge” (female in German; male in Spanish) may reduce the effects of grammatical gender on its speakers’ perceptions of gender (Bassetti & Nicoladis, 2016; Whorf, 1956). Thus, these cross-language influences that are unique in bilinguals, as they are produced by the presence of two grammatical systems, further extend our knowledge of how language influences the way one thinks.

In exploring cross-linguistic effects, Paolieri et al. (2010) found that the grammatical gender of both languages in Italian-Spanish bilinguals was activated even though the participants were only tested in one of the languages. More specifically, Italian-Spanish bilinguals responded faster in a naming task to L2 nouns that shared the same grammatical gender as in their L1 than when the grammatical genders of the nouns in their L1 and L2 were not congruent. Sato, Gygax, and Gabriel (2016) found similar grammatical gender effects with German-French bilinguals. Thus, the grammatical gender of a noun can be activated in both languages concurrently.
Boroditsky and Schmidt (2003) investigated whether grammatical gender knowledge, such as in German and Spanish, would interfere with the participant’s abilities to perform a memory task correctly. Native Spanish and German speakers were recruited. Participants were shown object–name pairs (e.g., apple–Patrick). The object names (e.g., apple) were carefully chosen such that if it was grammatically feminine in Spanish, it was grammatically masculine in German, and vice versa. Participants then took part in a short distractor task before engaging in a recall task where they were asked to indicate the gender of the proper name that was associated with the object name. The study was conducted in English. They found that Spanish and German speakers were more accurate in their responses when the proper name that was associated with the object name was congruent with the object’s grammatical gender in their respective languages than when it was incongruent. For the same object that was grammatically feminine in Spanish and grammatically masculine in German, Spanish speakers were more likely to recall a female name whereas German speakers were more likely to recall a male name. This language-specific bias suggests that grammatical gender not only influences memory recall but is also evidence for cross-language influences.

Other studies examined the extent of the influence of grammatical gender on one’s representation of gender. Kousta, Vinson, and Vigliocco (2008) claimed that grammatical gender influences perceived semantic similarity at the word level but does not impact non-linguistic and conceptual representation of gender. In their study, Italian-English bilinguals were asked to name pictures of animals quickly and were expected to produce errors that were semantically related. If there is a cross-linguistic effect of grammatical gender on thought, then when performing the task in English, Italian-
English bilinguals would be expected to produce more errors that share the same gender as the target noun in Italian as compared to English monolinguals (e.g., more likely to mistakenly call a leopard, which is masculine, a lion, which is also masculine, than a tiger, which is feminine). Additionally, to examine whether the effects of grammatical gender extend to conceptual gender, Italian-English bilinguals were expected to perform more similarly to Italian monolinguals even when the experiment was conducted in English. However, although they found that Italian monolinguals indeed made more gender preservation errors than English monolinguals, Italian-English bilinguals performed similarly to their monolingual counterparts when the task was tested in each language (Kousta et al., 2008). The lack of a cross-language effect of Italian gender on the performance of bilinguals when they did the task in English fails to provide support for the influence of grammatical gender on conceptual gender.

On the other hand, Boutonnet, Athanasopoulos, and Thierry (2012) found effects of grammatical gender on one’s conceptual representation of gender. They examined whether grammatical gender in Spanish influences performance on a semantic categorization task conducted in English. Spanish-English bilinguals and English monolinguals saw triplets of pictures and had to decide whether the third was semantically related to the first two. For half of the pictures, the third object had the same gender as the first two in Spanish, and for the other half the third object had a different gender in Spanish. The behavioural results showed no effect of gender consistency for either group. However, the ERP data showed effects of gender consistency on object categorization in Spanish-English bilinguals but not in English monolinguals, such that LAN amplitudes were more negative in the gender inconsistent condition than in the
gender consistent condition. Thus, the ERP data provided evidence that grammatical genders were retrieved automatically even though that information was irrelevant to the task. The authors concluded that the grammars of both languages of a bilingual are not only activated simultaneously and automatically but also are used to shape their conceptualization of a given object.

Overall, there has been some mixed evidence concerning the effects of grammatical gender on thought in the form of cross-linguistic influences in bilinguals. These grammatical gender effects in bilinguals as seen in the above-mentioned studies showed that the knowledge of grammatical gender in one language influences a bilingual’s thoughts even when the task was conducted in the other language. However, perhaps an especially sensitive dependent measure is required to uncover the influence of grammatical gender on one’s conceptualization of gender as evident in the study conducted by Boutonnet et al. (2012).

1.3.3 Motion and space.
Another potential area in the examination of cross-linguistic influences in bilinguals is the notion of motion. There are, however, not many studies exploring this phenomenon within bilinguals (Pavlenko, 2014).

Filipovic (2011) examined cross-linguistic influences on remembering complex motion events in Spanish-English bilinguals. As discussed previously in the monolingual literature above, the “manner” of motion in Spanish, when expressed, is often optional. Although a Spanish speaker can say Salió de la casa brincando, which translates to “she exited the house skipping”, it is usually sufficient for speakers to express only the “path”
of motion such as in “Salió de la casa” which translates to “she exited the house”.

English speakers, however, encode and express both “path” and “manner” of motion in the preposition. The study was conducted in English for native English monolinguals, in Spanish for native Spanish monolinguals and in both Spanish and English for Spanish-English bilinguals. Participants watched videos in two blocks and engaged in a distractor task in between blocks. Each video depicted a series of motion events (e.g., jumping over a wall, speed-walking along a path, and skipping across a road). Upon completion of the second block of videos, participants were asked to describe the videos and to indicate if each video in the second block was identical to a video shown in the first block. The video shown in the second block was only considered identical if all three motions (e.g., jumping, speed-walking, and skipping) were the same motions that were previously enacted in a video shown in the first block.

The results showed that Spanish monolinguals and Spanish-English bilinguals made more recognition errors than English monolinguals, even when the task was conducted in English for the Spanish-English bilinguals. This finding can be explained by the lack of encoding for “manner” in motion events in Spanish as previously discussed. This finding supports the presence of cross-linguistic influences because Spanish-English bilinguals remembered motion events the way they are habitually expressed in Spanish. The “manner” of motion is often not paid attention to, even when the task is conducted in English.

In a study with ASL-English bilinguals, Emmorey et al. (2005) provided evidence that the mode of language production influences a bilingual’s thoughts when speaking in another language. It has been widely established that the parietal regions in both
hemispheres are involved in the attention and perception of spatial representation (Posner & Peterson, 1990; Ungerleider & Mishkin, 1982) as well as the production and comprehension of spatial representation in signed language (Emmorey et al., 2005). In American Signed Language (ASL), signers use classifier constructions to describe the spatial relation between objects and to represent each relevant object in detail in the surrounding space. In English, however, these details of visual-motoric integration are not necessarily required as prepositions and locative affixes can be used to depict the same spatial scene without describing the details of the target object. Thus, the right parietal cortex was hypothesized to be more involved for ASL signers than for English speakers (Emmorey et al., 2005). In their study, ASL-English bilinguals were shown line drawings and a red object. Participants were asked to describe the spatial scene between objects using a classifier construction in one task and English prepositions in another task. Their results showed that there is not only an activation in the left parietal cortex when describing spatial scenes using English prepositions, replicating previous findings with English monolingual speakers (Damasio et al., 2001), but also a simultaneous activation in the right parietal cortex for ASL-English bilinguals even they were completing the task using only English prepositions. Activation of the right parietal cortex, however, is not evident in monolingual English speakers taking part in the same tasks (Damasio et al., 2001). Therefore, this bilateral activation of the parietal cortex in ASL-English bilinguals when using only English prepositions to describe the spatial scenes provides evidence that ASL-English bilinguals are using the spatial knowledge from both languages in their interpretation of their surrounding space even when speaking in English. Thus, these findings strengthened previous behavioural evidence
that showed support for the influence of one’s spatial knowledge in one language on another.

1.3.4 Causation.

An area of research interest that is addressed in the present study is the topic of causation in bilinguals. There have been few attempts in examining the consequences of linguistic framing in bilinguals. As discussed previously, monolingual studies have shown that the habitual expressions of our language influence our interpretation of causation events and how we remember them. Given the complexities of a shared conceptual representation in bilinguals (Dijkstra & van Heuven, 2002), a question of further interest is to understand how these consequences of linguistic framing differ in bilinguals in comparison to monolinguals as a function of the interaction between two languages.

Filipovic (2018) showed an L1 to L2 transfer with English and Spanish bilinguals. Filipovic (2018) extended the findings of Fausey and Boroditsky (2011) by examining how language impacts memory in both English and Spanish monolinguals and bilinguals. As previously discussed, the linguistic construction of Spanish that demands its speakers differentiate between intentional or accidental causation events has been shown to influence what Spanish speakers remember (Fausey & Boroditsky, 2011; Filipovic, 2013a). In English, however, intentionality is not consistently addressed and even when it is discussed, an adverb is used to clarify one’s intentions (e.g., Bill pushed George by accident).

English and Spanish monolinguals were recruited as a control group. Participants watched 10 target videos that were either intentional (e.g., girl popping a balloon) or
accidental (e.g., girl playing with a balloon and was surprised when it popped) followed by a distractor task where they were asked to count the number of letters they saw appearing on the screen. Participants then responded with either “yes” or “no” to unbiased questions that were asked with regards to intentionality (e.g. Did you see a girl with a blue balloon? Was the event that occurred intentional or accidental?). The questions asked in the study and the participants’ responses were in the participants’ respective L1 for the monolinguals and L2 for the bilinguals. Both Spanish-English and English-Spanish bilinguals were comparable in their recall accuracy for intentional events. However, Spanish-English bilinguals recalled intentions more accurately than English-Spanish bilinguals and English monolinguals for accidental events. Furthermore, participants were also asked to recall and verbally describe the events that occurred in the videos. When describing the events in English, the Spanish-English bilinguals constructed their sentences in a way that identified the intentionality of the act (whether it was intentional or accidental) even though English does not require its speakers to make such a distinction. Conversely, when describing the events in Spanish, the English-Spanish bilinguals described the events without consistently identifying the intentionality of the act even though in Spanish, it is required to make such a distinction. These results suggest that both bilingual groups continue to think in their respective L1 even when speaking in their L2.

On the other hand, Wolff and Ventura (2009) found an L2 to L1 transfer when comparing Russian and English monolinguals with Russian-English and English-Russian bilinguals concerning their perception of the causation of events. Due to the way that causation events are expressed, Russian speakers are more likely to focus on internal
forces (e.g., deliberate intent) within the causee whereas English speakers focus on both internal and external forces (e.g., gravity). In their study, participants watched animations that clearly imply internal forces (e.g., man on the dolly pushes himself toward the line), external forces (e.g., man resisting by pushing dolly backwards) or ambiguous in its association with internal or external forces (e.g., man on the dolly is simply sitting and facing the line). Participants were then asked to choose one of two sentences that described the animation. The sentences either involved an “enable” verb (e.g., let, help, allow) that is associated with internal forces or a “cause” verb (e.g., make, force) that is associated with external forces. Bilinguals were tested in their first language. Their results showed that Russian speakers were more likely to associate internal forces with the individual when the intent was ambiguous. More specifically, when the intention was unclear, Russian speakers were more likely to associate more control with the individual (e.g., the man in green) by choosing sentences with “enable” verbs (e.g., the man in red let the man in green cross the line) whereas English speakers were more likely to associate less control with the individual by using “cause” verbs (e.g., the man in red made the man in green cross the line). Russian-English and English-Russian bilinguals behaved more similarly to monolinguals of their L2 than monolinguals of their L1, providing evidence of L2 to L1 transfer. Thus, their findings suggest that the habitual way of expressing causation events linguistically in Russian, for example, influences English-Russian bilinguals in their interpretation of causation events by focusing on internal forces only, even when they were tested in English.
Therefore, both above-mentioned studies showed support for cross-linguistic influences within bilingual speakers in interpreting causation events, albeit in different directions for its influences.

1.4 Present Study: Rationale and Hypothesis

The present study examines cross-linguistic influences in Malay-English bilinguals in their interpretation of intentions. More specifically, the study investigated whether Malay-English bilinguals are more likely than English monolinguals to interpret actions in English sentences as deliberate when they are not clearly indicated as accidental. Based on the importance of using online tasks as previously noted, the present study serves as an extension to prior studies on causation. Previous bilingual studies investigated cross-linguistic influences on the interpretation of causation events using offline-based memory tasks where participants were asked to describe the videos they had seen after some time (see Filipovic, 2018; Wolff & Ventura, 2009). In contrast, the present study investigated the immediate interpretation of intentions in an online-based reaction time task.

There are two main theories that influenced the research questions in the present study: Whorf’s (1940) linguistic relativity hypothesis and the shared conceptual representation view of bilinguals (Dijkstra et al., 2019; Dijkstra & van Heuven, 2002, Dong et al., 2005). The linguistic relativity hypothesis proposed that there is a relationship between language and thought such that the language that one speaks influences the way one thinks (Whorf, 1940). The shared conceptual representation in bilinguals view posits that bilinguals have a single conceptual system that is accessed by L1 and L2. The current study tested both theories by investigating whether Malay-
English bilinguals are influenced by the Malay grammatical system when interpreting intentions in English.

In Malay, affixes are commonly used to create a variety of words due to the agglutinative nature of the language. Some of these affixes have clear semantic functions (e.g., ter–), whereas others (e.g., me-) serve only a syntactic purpose. The prefix ter– has two functions: when it is attached to a verb it indicates unintentionality, and when it is attached to an adjective it functions as a superlative. An action is distinguished as either intentional or accidental with the absence or presence of the prefix ter– respectively. More specifically, accidental actions are marked with the prefix ter– in Malay. Thus, an accidental action is commonly stated clearly as unintentional with the prefix. Less often, unintentionality is conveyed using the phrase dengan tidak sengaja. On the other hand, if actions are not marked with the prefix ter–, Malay speakers are likely to assume a deliberate intent. Given the unique marker for unintentionality in Malay, I predicted that Malay speakers typically encode and remember the accidental actions of others. Furthermore, I expected that Malay-English bilinguals would be more likely than English monolinguals to interpret intentions as deliberate when they are not explicitly stated as accidental.

Experiment 1 examined the importance of intentions in Malay by assessing the accuracy of Malay speakers in encoding and remembering intentions of others. The study was conducted in Malay using a memory recognition task. Given the presence of a grammatical prefix that marks for unintentionality, it was predicted that Malay speakers would encode and remember the intentions of others accurately. The purpose of Experiment 1 was to test the assumption that intention is indeed an important concept in
the language. Experiment 2 investigated whether Malay-English bilinguals interpret intentions in English the way in which intentions are habitually interpreted in Malay. This hypothesis was tested using English sentences and words in an auditory and visual cross-modal priming paradigm with a lexical decision task where reaction times of Malay-English bilinguals and English monolinguals were measured. Participants first heard scenarios in which a character’s action was either accidental or was ambiguous as to intent, and then they saw either a word that was consistent with an unintended-action interpretation, an unrelated word, or a nonword and made a lexical decision.

If the habitual use of the unintentionality marker in Malay facilitates encoding the intentions of others, and if Malay-English bilinguals are influenced by how intentions are habitually interpreted in Malay even when comprehending English, we should expect Malay English bilinguals, more than English monolinguals, to interpret intentions as deliberate when actions are not clearly described as accidental.
Chapter 2

2 Experiment 1

The aim of this experiment was to determine whether Malay speakers accurately encode the intentions of the actors in sentences when the prefix *ter-* is used. If understanding the intent of others is indeed important to Malay speakers, then they should encode and remember the intent of others accurately. Participants read Malay sentences and made a judgment about each one. After a short distractor task, they then completed a recognition memory task in which four alternatives were given for each of the sentences they were shown in the first task, and they had to indicate which had the same wording as a sentence they had seen.

2.1 Method

2.1.1 Participants.
Forty Malay speakers (mean age = 22.9 years, $SD = 2.6$ years) participated. Participants were tested at the National University of Singapore and were compensated. Participants were bilingual in both Malay and English. Exposure to English is mandatory in Singapore as English is the mode of instruction in schools. Malay speakers who had received formal education in standard Malay at least up to the secondary school level were selected.

2.1.2 Materials.
All instructions, questions and sentences were presented in Malay. The Malay text was verified by a Singaporean native Malay speaker. There were 65 sentences (22 critical
sentences, 43 filler sentences) in the first task. Critical sentences were all intention-related and included the prefix *ter*– on the verb to indicate accidental intent (e.g., *Ali terlanggar orang itu*/*Ali accidentally hit that person*). For each critical sentence, four response options were created for the recognition (third) task. Critical (or correct) sentence options were simply the sentences from the first task. Paraphrased sentences preserved the semantics of the sentences in the first task but used different wording (e.g., *Ali melanggar orang itu dengan tidak sengaja*/*Ali hit that person unintentionally*). Sentences with different objects largely preserved the semantics of the sentences in the first task but differed in the object that was acted upon (e.g., *Ali terlanggar meja itu*/*Ali accidentally hit that table*). Sentences with a deliberate intent omitted the *ter*– from the verb in critical sentences (e.g., *Ali melanggar orang itu*/*Ali hit that person*).

The critical stimuli all referred to an unintended action with the prefix *ter*–, and only two of the four response options contained the prefix *ter*–. If only these critical stimuli were included in the experiment, participants might learn to ignore the response options that did not contain *ter*–. Therefore, filler stimuli were added to conceal the true purpose of the experiment. There were five types of filler sentences. One type (7 sentences) were intention-related sentences that did not use the prefix *ter*–, that is, they were like the paraphrased response options used for the critical sentences (e.g., *Rohaya mengilap notis penting itu di papan tulis bapanya dengan tidak sengaja*/*Rohaya did not erase the important notice on her father’s whiteboard on purpose*). The response options for filler sentences follow a similar format to that of critical sentences: *Rohaya terlap notis penting itu di papan tulis bapanya*/*Rohaya accidentally erased the important notice on her father’s whiteboard*, *Rohaya mengilap notis penting itu di papan tulis bapanya*/*Rohaya did not erase the important notice on her father’s whiteboard*. 
"dengan tidak sengaja / Rohaya erased the important notice on her father’s whiteboard unintentionally, Rohaya terlap nombor penting itu di papan tulis bapanya / Rohaya accidentally erased the important number on her father’s whiteboard, Rohaya mengilap notis penting itu di papan tulis bapanya / Rohaya erased the important notice on her father’s whiteboard. These were included so that a response option that expressed accidental actions without using ter– was sometimes the correct response in the study. Note that an incorrect response option for these sentences used ter–.

A second type of filler sentence (5 sentences) used ter– as a superlative. The other three filler types each had a different focus that informed the creation of the response options; plurals (11 sentences), active-passive voice (12 sentences), and adjectives (8 sentences). For example, a sentence with a focus on plurals was Mira memelihara burung-burungnya di belakang rumahnya / Mira takes care of her birds in her backyard. The response options were: Mira memelihara burung-burungnya di belakang rumahnya / Mira takes care of her birds in her backyard, Mira memelihara beberapa burungnya di belakang rumahnya / Mira takes care of some of her birds in her backyard, Mira memelihara arnab-arnabnya di belakang rumahnya / Mira takes care of her rabbits in her backyard, Mira memelihara burungnya di belakang rumahnya / Mira takes care of her bird in her backyard. The response options described so far all had one option with a different object than the other three (e.g., three mentioned birds and one mentioned rabbits). In order to reduce response bias, for 16 out of 43 filler sentences, the correct response option was the one that had a different object than the other three. See Appendix A for a complete list of the stimuli.
A language background questionnaire was used to collect information about participants’ language exposure (see Appendix B).

2.1.3 Procedure.

Participants were told that they would be reading Malay sentences and responding to some questions. Participants were not told about the memory task. Participants were given three tasks that were presented using the Qualtrics platform.

In the first task, participants were required to read 65 sentences and rate them individually on a 10-point scale based on how interesting they thought the sentences were where 0 indicates “not interesting at all” and 10 indicates “very interesting”. The rating task was included to ensure that participants read every sentence that was presented to them and to prevent participants from speculating as to the purpose of the study. Sentences were presented five at a time on a computer screen and the order of sentences presented was randomized. Participants completed the task at their own pace without feedback.

The second task was a filler task that was used to minimize the possibility that participants completed the subsequent recognition task based on a short-term memory recall. Participants were given five minutes to recall and type in as many of the 66 neighbourhoods in Singapore as they could. The third task was a four-alternative forced-choice recognition task (4-AFC). For each sentence that was presented in the first task, a set of four alternative sentences was presented to the participants. Each set of four sentences was presented one at a time on a computer screen. Participants were asked to choose the sentence that was the same as the sentence that they had read previously. The questions and the order of choices were randomized. Participants completed the task at
their own pace without feedback. Participants then completed the language background questionnaire. The entire experiment took no longer than 45 minutes.

2.2 Results

There were 22 critical sentences for each of 40 participants, giving 880 total responses on the memory task. These responses were distributed across four alternatives: Critical (e.g., *Ali terlanggar orang itu* / Ali accidentally hit that person), Paraphrased (e.g., *Ali melanggar orang itu dengan tidak sengaja* / Ali did not hit that person on purpose), Different object (e.g., *Ali terlanggar kereta itu* / Ali accidentally hit that car), and Deliberate (e.g., *Ali melanggar orang itu* / Ali hit that person). See Figure 1 for the proportion of responses for each alternative.

![Figure 1](image.png)

*Figure 1.* Proportion of responses for each alternative.
2.2.1 Test of significance.

A chi-square goodness-of-fit test of proportions was conducted to determine if any of the alternatives was chosen significantly more or less often than chance (25%). The chi-square was highly significant, $\chi^2(3) = 716.77, p < .001$. Participants chose the critical sentence significantly more often than chance, 95% CI [.594, .659]. The paraphrased, different object and deliberate alternatives were chosen significantly less often than chance, 95% CI [.177, .232], 95% CI [.0260, .0523] and, 95% CI [.110 to .156], respectively.

2.2.2 Post-hoc.

A post-hoc binomial test between observed and expected proportions was further conducted to determine if each of the three incorrect alternatives was significantly different from chance at 12%. Given that the probability of correctly choosing the critical sentence is approximately .64, the total probability of success for three incorrect alternatives is .36. The alternatives that were paraphrased were chosen significantly above chance (20.3%), $p < .001$ and those that consisted of different objects were significantly below chance (3.8%), $p < .001$. The alternative that omitted the ter– and thus conveyed deliberate intent was not chosen significantly more often than chance (13.2%). Next, one-sided z-tests of proportions were conducted to determine if there was a significant difference between the correct alternative and each of the three incorrect alternatives for each critical sentence. Given that there were 22 critical sentences and three pairwise comparisons for each one, there were 66 pairwise comparisons in all. Of these 66 pairwise comparisons, 60 comparisons between critical sentences and the alternatives were significant, $ps < .05$. These findings indicate that the critical sentences
were chosen more often than the alternatives across most of the items. Moreover, for the intention-related fillers (paraphrased sentences without the prefix ter–), participants chose the correct alternative most often (59.3%). When the correct alternative was not chosen, participants frequently chose the sentence with the prefix ter– (24.6%). They chose the sentence with no ter- (i.e., deliberate) only 11.8% of the time.

2.3 Discussion

The purpose of Experiment 1 was to determine if Malay speakers encoded the intentions of others and remembered them accurately given the common use of the grammatical prefix, ter–, that marks for unintended actions in Malay sentences. I tested this hypothesis using a four-alternative forced-choice recognition task where Malay speakers were asked to choose the sentence that they had seen previously.

The main results of Experiment 1 showed that Malay speakers accurately remembered the intent of the actions that had the prefix ter–, as the critical (correct) sentence was chosen 64% of the time. The results of the posthoc binomial test for the other three (error) alternatives also provided important additional evidence that Malay speakers encoded intention accurately. The alternative sentences that preserved the meaning of the action as unintended using paraphrasing instead of ter– were chosen more often than would be expected by chance for an error, and those options that described intended actions were not chosen significantly more often than chance. These findings support the hypothesis that unintentionality is particularly memorable to Malay speakers. The encoding of unintended actions may have been facilitated by the common use of the grammatical prefix, ter–, that marks for unintentionality.
However, the results of Experiment 1 do not fully explain the extent of the importance of unintentionality as a concept in the Malay language and how it influences the way Malay speakers think. If an explicit grammatical intention marker helps Malay speakers develop a habit of thinking about the intentions of others, then I expect that this habit may carry over to their reading in English. Thus, Experiment 2 was conducted to examine for any cross-linguistic effects of interpreting intentions that may be present in Malay-English bilinguals.
Chapter 3

3 Experiment 2

As the results in Experiment 1 showed that Malay speakers encode unintended actions when reading Malay sentences, a question of further interest is to examine if the grammatical intention marker in Malay influences Malay speakers in their interpretation of intentions even when reading English sentences. Specifically, the grammatical marker signals when an action is unintended. If the habitual way of interpreting intentions in Malay is also practiced in English for Malay-English bilinguals, then I would expect Malay-English bilinguals to interpret an action as unintended only if it is clearly stated just like in Malay sentences as marked by the prefix. Otherwise, if the intention of an action is not clearly indicated, Malay-English bilinguals should interpret the action as deliberate.

In Experiment 2, I tested my hypothesis using a cross-modal priming paradigm with a lexical decision task. The auditory stimuli were vignettes that described actions that either were clearly indicated as unintended (unambiguous condition) or that did not have the intent specified (ambiguous condition). The vignettes were presented in the auditory modality to help ensure that participants fully processed the stimuli. The visual stimuli consisted of either a real English word that implied the action was unintended, an unrelated word that does not involve intentions, or a nonword. Of interest was the difference in response latencies between the two types of words. If participants interpret the action in the vignette as unintended, then they should have faster decision latencies
for related words that are consistent with an unintended interpretation than for unrelated words. In contrast, if participants interpret the action as intended, as might be the case for Malay-English bilinguals in the ambiguous condition, then the difference in decision latencies between the unintended-related and unrelated words should be smaller.

3.1 Method

3.1.1 Participants.

Fifty-six Malay-English bilinguals (mean age = 21.5 years, $SD = 2.0$ years) were paid for their participation. Fifty-six English monolingual speakers (University of Western Ontario, mean age = 19.0 years, $SD = 3.0$ years) received course credit for their participation. Malay-English bilinguals were tested at the National University of Singapore and English monolinguals were tested at the University of Western Ontario. Exposure to English is mandatory in Singapore with English being the mode of instruction in schools. Of the 56 Malay-English bilinguals that were recruited, all Malay-English bilinguals had studied Malay formally at the basic and standard levels, 38 had studied Malay at an advanced level, and 23 had studied Malay literature. See Table 3.1.1 for the language background of Malay-English bilinguals. English monolingual speakers were native English speakers with minimal or no exposure at all to other languages. Two Malay bilinguals and seven native English speakers were excluded from the analysis as they had an accuracy rate that was lower than 70 percent.
### Table 3.1.1

*Language Fluency of Malay-English Bilinguals*

<table>
<thead>
<tr>
<th>Exposure to languages (%)</th>
<th>Understanding</th>
<th>Speaking</th>
<th>Reading</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>English</td>
<td>59.9</td>
<td>32.2</td>
<td>8.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Malay</td>
<td>15.0</td>
<td>15.0</td>
<td>8.1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Note.* Language skills are self-reported measures on a 10-point scale (1 = not fluent, 10 = very fluent).

#### 3.1.2 Materials.

All stimuli were in English. The first part of each stimulus consisted of two spoken sentences (minus the final word of the second sentence) and the second part was a single word. The first sentence described the action of a character and the second sentence described a consequence that follows the action that was carried out. The stimuli were developed in pairs. For critical stimuli, the first sentence of each pair was either unambiguous, clearly indicating that the action of the character was unintended (e.g., Jackie left the salon and had forgotten to tip her hairdresser), or it was ambiguous, that is, it did not specify whether the action of the character was intended or not (e.g., Jackie left the salon without tipping her hairdresser). The second sentence of each pair was the same
(e.g., The next time she had a haircut, she . . .). Two English words were selected for each pair of sentences; one of these words was intention-related and consistent with an unintended interpretation (e.g., apologized) and the other was intention-unrelated (e.g., walked). English words for related and unrelated conditions were matched on number of syllables, length, word frequency, number of phonemes and orthographic neighbourhood size (N) based on the English Lexicon Project (Balota et al., 2007) database, as well as on accuracy and mean lexical decision latency from that source. See Table 3.2 for the means of these characteristics.

A further 24 pairs of English sentences were included as filler sentences for the purposes of the lexical decision task. Like the critical stimuli, the first sentence in one member of the pair was unambiguous (e.g., Billy was reprimanded by his mother) and the other was ambiguous (e.g., Billy had a talk with his mother), and both were followed by the same second sentence (e.g., He retreated to his room and . . .). Two pseudowords were selected for each pair of filler sentences (e.g., drified and krappe).

All sentence stimuli were read aloud and recorded by a native English speaker using Audacity v.2.2.2. The sentences were recorded at a steady speaking rate with no emphasis on the last word of the recording. The stimuli were distributed onto four lists. Each list had six items from each of the four conditions; ambiguous-related, ambiguous-unrelated, unambiguous-related, and unambiguous-unrelated.

The same language background questionnaire was used as in Experiment 1.
Table 3.1.2

*Means of lexical characteristics*

<table>
<thead>
<tr>
<th></th>
<th>Related word</th>
<th>Unrelated word</th>
</tr>
</thead>
<tbody>
<tr>
<td>(unintended-action)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of syllables</td>
<td>2.04</td>
<td>1.96</td>
</tr>
<tr>
<td>Word length</td>
<td>7.83</td>
<td>7.29</td>
</tr>
<tr>
<td>Word frequency</td>
<td>2.64</td>
<td>2.32</td>
</tr>
<tr>
<td>Number of phonemes</td>
<td>6.08</td>
<td>5.96</td>
</tr>
<tr>
<td>Orthographic neighbourhood size (N)</td>
<td>.96</td>
<td>1.5</td>
</tr>
<tr>
<td>Accuracy</td>
<td>.96</td>
<td>.95</td>
</tr>
<tr>
<td>Lexical decision latency</td>
<td>670</td>
<td>676</td>
</tr>
</tbody>
</table>

3.1.3 Procedure.

The study was set up using E-Prime v. 2.0 as a cross-modal auditory and visual priming paradigm with a lexical decision task. Participants first saw a fixation cross at the centre of the computer screen while listening to a two-sentence stimulus read aloud over headphones. As soon as the auditory stimulus ended, a letter string in 18 pt Courier font
appeared in the centre of the screen, and participants were asked to decide as quickly and accurately as possible if it was a real English word or a made-up word by pressing “1” or “0” on the computer keyboard respectively. Immediately after participants made a lexical decision, the fixation cross was displayed at the centre of the screen and the next audio stimulus was played. Participants completed four practice trials and then were given one of the four lists of 48 experimental stimuli. Stimuli within a list were randomized for each participant. Presenting both sentences as auditory stimuli ensures that the rate at which information is revealed to each participant is the same. Moreover, requiring only one word to be read reduces variability caused by differences in participants’ reading rates. The study took approximately 30 minutes to complete.

3.2 Results

Response times exceeding 2.5 SDs from each participants’ mean (2.9%) and incorrect responses (6.8%) were excluded from the analyses. See Figure 2 for mean response times in each experimental condition. For nonword stimuli, both groups had similar mean response times (Malay-English 1090 ms, English monolinguals 1060 ms) and similar
accuracy rates (Malay-English 89.5%, English monolinguals 86.4%).

![Response time data for Malay-English bilinguals and English monolinguals in unambiguous and ambiguous conditions.](image)

*Figure 2.* Response time data for Malay-English bilinguals and English monolinguals in unambiguous and ambiguous conditions.

Generalized linear mixed effects models were fitted on the reaction time data in the R software (R Core Team, 2013) using the lme4 package (Bates, Maechler, Bolker, & Walker, 2015). Mixed effects models account for by-subject and by-item variation concurrently, making them a more sensitive test than a traditional ANOVA analysis which conducts a by-subject and by-item analysis separately (Barr, Levi, Scheepers, & Tily, 2013; Carson & Beeson, 2013). Generalized mixed effects models have an advantage over linear mixed effects models when analyzing reaction time data. Reaction time data are typically skewed. Generalized mixed effects models do not assume a normal distribution, unlike linear mixed effects models. Instead they allow the user to specify a frequency distribution that fits skewed data (here the gamma distribution was
used). Lo and Andrews (2015) argue that this method is more appropriate for interpreting interaction terms than using linear mixed effects models with a data transformation. Generalized linear mixed models are more complex and often fail to converge; here the bobyqa optimizer was used and the number of evaluations was increased to minimize chance of convergence failure. Furthermore, the initial random structure included random slopes and random intercepts for participants and items but the model failed to converge. Thus, the final random structure of the model used only random intercepts for participants and items. Separate models were run on data from the Unambiguous and Ambiguous conditions. Each model included Language Group (Malay bilinguals vs English monolinguals) and Word Type (related vs unrelated) and List as fixed factors. Normalized sum contrasts were used for these factors. In addition, Word Frequency was included as a control variable. Specifically, the syntax for each model was: glmer(DV ~ LanguageGroup * WordType * List + Word Frequency + (1|Participant) + (1|Item), dataset, family = Gamma(link="identity"), control= glmerControl (optimizer = "bobyqa",optCtrl = list (maxfun=1e6))). Model outputs are reported in Table 3.3. The function Anova in the car package version 2.1-2 (Fox & Weisberg, 2011) was used to obtain estimates and probability values for the fixed effects.

In the unambiguous condition, when the sentence context clearly conveyed an unintended action, participants responded significantly faster to related (unintended action) words than unrelated words, $\chi^2 (1) = 12.67, p < .001$. Response times for Malay-English bilinguals and English monolinguals did not differ, $\chi^2 (1) = 1.36, ns$. There was no significant interaction between participant group and word type, $\chi^2 (1) = 0.23, ns$, that
is, priming effects were similar for Malay-English bilinguals (117 ms) and English monolinguals (107 ms).

In the critical ambiguous condition, when the context did not convey the intention of the action, there was also a significant priming effect, $\chi^2 (1) = 15.74, p < .001$, and no effect of participant group, $\chi^2 (1) = 0.09$. However, here there was a significant interaction between participant group and word type, $\chi^2 (1) = 4.56, p < .05$. The priming effect was smaller for Malay-English bilinguals (82 ms) than for English monolinguals (127 ms), that is, Malay-English bilinguals showed less facilitation from the ambiguous context for words that conveyed a related unintended action than did English monolinguals.

Table 3.2

*Summary of Model Outputs for Experiment 2*

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Estimate ($b$)</th>
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<th>t</th>
<th>p</th>
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<td>19.19</td>
<td>.001***</td>
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<td>Word Type</td>
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<td>-3.02</td>
<td>.003**</td>
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<td>.684</td>
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<tr>
<td>LgSUBTWF</td>
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<td>17.75</td>
<td>-2.79</td>
<td>.005**</td>
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<td>----------</td>
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**Random Effects**

<table>
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</thead>
<tbody>
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<tr>
<td>Item (Intercept)</td>
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</tbody>
</table>

**Ambiguous Condition**

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<th>p</th>
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</thead>
<tbody>
<tr>
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<td></td>
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</tr>
<tr>
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<td>Word Type x Group x List</td>
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<td>5.02</td>
<td>2.04</td>
</tr>
</tbody>
</table>

| LgSUBTWF | 51.23 | 8.83  | -5.80 | .001*** |

**Random Effects**

<table>
<thead>
<tr>
<th>Variance</th>
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</thead>
<tbody>
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<td>Item (Intercept)</td>
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</table>

Note. *p < .05, **p < .01, ***p < .001
3.3 Discussion

The purpose of Experiment 2 was to determine whether there were cross-linguistic influences in interpreting intentions among Malay-English bilinguals such that they would be more likely than English monolinguals to interpret actions as deliberate if the action was not clearly indicated as accidental. I tested this hypothesis using an auditory and visual cross modal priming paradigm with a lexical decision task. Participants heard scenarios in which a character’s action was either accidental or ambiguous as to intent, and then they saw either a word that was consistent with an unintended-action interpretation, an unrelated word, or a nonword and made a lexical decision.

As expected, the results showed that in the unambiguous condition where intent was clearly indicated as being accidental, Malay-English bilinguals and English monolinguals showed a similar size of priming effects for unintended-action related words compared to unrelated words. This finding suggests that both groups equally interpreted the action as unintentional, as they were expecting an unintended-action related word more than an unrelated word.

In the ambiguous condition, however, where unintentionality was not clearly indicated, Malay-English bilinguals showed a smaller priming effect than English monolinguals for unintended-action related words compared to unrelated words. This finding suggests that Malay-English bilinguals were surprised by the unintended-action related words and as a result, interpreted unintended-action related words more like an unrelated word than English monolinguals. A possible explanation could be that Malay-English bilinguals were influenced by the Malay grammatical system even when
interpreting intentions in English, such that they were more likely than English monolinguals to interpret actions as deliberate when accidental actions were not clearly stated.
Chapter 4

4 General Discussion

The goal of the current study was to examine cross-linguistic effects of intention interpretation in Malay-English bilinguals. More specifically, the objective was to determine whether the habitual way of thinking about intentions in Malay is also practised even when Malay-English bilinguals are comprehending in English. Whorf (1956) argued that specific grammatical features of a given language point its speakers to subconsciously think about certain concepts more than others. The hypothesis for the current studies stemmed from the common use in Malay of the grammatical feature, *ter–*, that marks for unintended actions. Recall that for Malay speakers, actions are interpreted as unintended when the unintentionality is clearly described by using the grammatical intention marker, *ter–*. In contrast, when the grammatical intention marker is absent, Malay speakers are more likely to interpret the action as deliberate.

Two experiments were conducted to investigate the hypothesis. The purpose of Experiment 1 was to test the assumption that the grammatical intention marker, *ter–*, directed Malay speakers to habitually encode intentions of others. As predicted, the results of Experiment 1 showed that Malay speakers encoded intentions of others accurately. Specifically, when critical sentences in the first phase of the experiment contained the prefix *ter–*, in the recall phase of the experiment Malay speakers correctly selected the critical sentence 64% of the time and selected a paraphrase that indicated an unintended action on another 20% of trials. On only 13% of trials did participants
incorrectly indicate that the action was deliberate. This finding not only supports prior
studies and Whorf’s (1956) argument on the influential role of grammar on thought, but
also paved the way to investigate the presence of cross-language influences in Malay-
English bilinguals.

Bilinguals are assumed to have a shared conceptual store for their two languages
(Dijkstra & van Heuven, 2002) and prior studies (Chen & Ng, 1989; de Groot & Nas, 1991; Kousta et al., 2008; Paolieri et al., 2010; Sato et al., 2016) have supported this
model at the word level. Previous findings have highlighted the lexical activation of
similar words in both languages even though the task was tested in only one of the
languages (Chen & Ng, 1989; de Groot & Nas, 1991). The purpose of Experiment 2 was
to examine whether there are cross-language influences in a discourse-level process, that
of making inferences about the intention of characters. More specifically, Experiment 2
investigated whether the habitual way of interpreting intentions in Malay because of the
common marking of unintended actions with ter- is transferred over to the interpretation
of intention in English. As expected, the results of Experiment 2 provided evidence that
Malay-English bilinguals interpreted intentions in English as they would in Malay.

If intentions of others were interpreted similarly by Malay-English bilinguals and
English monolinguals, then we should expect the size of the priming effects (unintended
action word vs unrelated word) for both groups of speakers to be comparable in both
“ambiguous” and “unambiguous” conditions. However, similar facilitatory priming
effects were observed for both groups of speakers only in “unambiguous” scenarios
where the action of the character was clearly unintended. This finding showed that both
Malay-English bilinguals and English monolinguals were equally likely to interpret the
intention as accidental. In “ambiguous” scenarios, however, where the intention of the character was not clearly specified, Malay-English bilinguals had a smaller priming effect than English monolinguals, that is, they showed less facilitation for unintended action words compared to unrelated words. This result suggests that the unintended action word in “ambiguous” scenarios was more incongruent to the expectations of Malay-English bilinguals than for English monolinguals. This finding supports the notion that Malay-English bilinguals were more likely to interpret the intentions as deliberate, like Malay speakers habitually would when unintentionality was not clearly specified. Malay-English bilinguals were influenced by the habitual thinking of interpreting intentions in Malay even when they were reading and listening in English. There have been few attempts to investigate cross-language effects beyond the word or sentence level and thus, the results of Experiment 2 represent a novel contribution to the current literature.

Generally, the findings of the present study showed support for Whorf’s (1956) argument concerning the role of grammar on discourse interpretation. The common use of the prefix ter– in Malay to indicate whether or not an action is intentional may focus the attention of Malay speakers on the actor’s intention. The habit of interpreting actions as unintended only when clearly marked appears to carry over to their interpretation of English.

The findings of the present study were aligned with the broader ideas of previous work in the bilingual literature as discussed above, altogether lending support to the influential impact of the grammar of a language on the way information is encoded and interpreted in that language and also when comprehending other languages. As previously discussed, these cross-language influences are evident in studies exploring the
topics of grammatical gender, motion, space, and most relevant to the present study, causation.

Although previous bilingual studies on causation also provided evidence for cross-language effects, the effects observed by Wolff and Ventura (2009) and Filipovic (2018) stemmed primarily from linguistic framing. Due to the way causation events are expressed in Russian, participants appear to be restricted to entities that are self-energetic. This characteristic of the language may lead Russian speakers to focus on internal forces from within the individual, thus, associating more control with the individuals. In English, however, there is no such restriction in expressing causation events. This allows English speakers to consider both internal and external forces (Wolff & Ventura, 2009). Wolff and Ventura (2009) showed that Russian monolinguals preferred to describe a scenario with ambiguous intent using “enable” verbs (e.g., let, allow) more than English monolinguals. English-Russian bilinguals showed a similar preference as Russian monolinguals to use “enable” verbs when describing a scenario with ambiguous intent in English, implying an influence of Russian on their assumptions about individuals’ control of their actions. Additionally, Filipovic (2018) showed that Spanish-English bilinguals carried over to English the Spanish habit of indicating only accidental intentions. These findings provide some evidence of a cross-language influence on interpreting intentions. The present study, however, investigated these cross-language influences through a more concrete grammatical aspect of the Malay language where accidental intent is marked by a prefix, whereas the above-mentioned studies examined these influences that were driven by linguistic framing which is an aspect of grammar that is still subjected to one’s preference.
Although the findings of the present study provided converging evidence of an effect of language on the interpretation of causation, there were some methodological differences between the tasks used in present study and other studies that investigated how accidental actions are encoded in various languages. Much of previous work that focused on causation employed primarily offline tasks only (Fausey & Boroditsky, 2011; Filipovic, 2013a, 2018; Wolff & Ventura, 2009). In offline tasks, participants may employ strategies to complete the task that might not be used in natural language processing. For example, in the study conducted by Filipovic (2018) that was discussed above, Spanish-English bilinguals were given ample time to verbally describe the videos that they had seen. In that case, Spanish-English bilinguals may have silently thought about what had happened in the videos in their L1 (Spanish) before translating and verbalizing it out in English. On the other hand, introducing an online task, such as in the speeded response task in the present study, helps to obtain an immediate interpretation of intent as participants were expected to respond as quickly as possible. This requirement reduces the possibility that participants were contemplating about the scenarios and the character’s intent in Malay. Although the task was conducted in English, the findings have shown that the immediate interpretation of intent for Malay-English bilinguals reflected the habitual way of interpreting intentions in Malay. Thus, the carrying over of the way intentions are interpreted in Malay to English in a short span of time is evidence for these cross-language influences as automatic and habitual in nature.

Other than the differences in methodologies between the present study and previous studies, the findings of the present study extend existing findings of bilingual research by examining cross-language influences at a discourse processing level. Previous studies
examining cross-language effects are mostly concerned with lexical concepts and meanings of isolated words or individual words even at the sentence level. In addition to providing a more informed perspective on cross-language effects when interpreting intentions, these findings that were present at the discourse level allow for practical implications in everyday communication when conversing with speakers of different language and cultural backgrounds.

4.1 Limitations of Present Study

There are, however, some limitations to the present study that must be acknowledged. Firstly, the priming effects observed within the Malay-English bilinguals are small effects that most likely underestimate cross-language effects that would occur if bilinguals were more exposed to the Malay language and culture. The group of Malay-English bilinguals who were recruited for the present study was fluent in both Malay and English as the typical language of instruction used in the National University of Singapore is English. On top of that, these bilinguals are not always exposed to other Malay speakers as they are a minority population in Singapore. Thus, the effects observed in the present study are likely smaller than they would be for individuals who have greater exposure to Malay.

Secondly, the present study did not include an experiment to tease apart possible language and cultural factors that may be influencing the results as one’s knowledge of language and culture are often intertwined. Apart from the differing linguistic knowledge between the bilingual and monolingual speakers in the present study, an alternative explanation to the results may be due to some cultural differences that may be driving the different sizes of priming effects between the groups in the “ambiguous” condition. For
example, in the Malay culture, one’s actions and words towards others are expected to be gentle and respectful. Evidently, this cultural practice is expressed through common phrases such as “sopan santun” and “lemah lembut”. To be “sopan santun” is used to describe the idea that one is expected to be polite and respectful in their actions and speech towards others. Moreover, to be “lemah lembut” is a habit that is encouraged in the Malay culture where one should be gentle and soft-spoken in speaking to others. The lack of a complete translation equivalent in English for these behaviors does not mean that English speakers undervalue the concept of politeness and respect towards other individuals but rather that Malay speakers are more likely to be hypersensitive with regards to the politeness of their actions and speech towards others. Thus, it may be possible that the prefix ter– that marks for accidental actions stem from cultural practices such that Malay speakers feel the need to indicate an action as accidental as clearly as possible if the action otherwise might be interpreted as deviating from the cultural norms. Moreover, the present study did not test for the accuracy of the participants’ memory recall for deliberate actions. If it is indeed the grammar of the Malay language that guides Malay speakers to focus on intentions, then Malay speakers should recall deliberate actions equally as well as unintended actions. However, if Malay speakers are not as accurate in recalling deliberate actions as with unintended actions, then the results of the present study might be explained by cultural biases with a focus on unintentionality as described above.

In retrospect, the present study also lacks a pilot rating study of the experimental stimuli as to the ambiguity of the intent in each scenario. It is important to consider because the scenarios may vary in the extent of the ambiguity of intent. More
specifically, some scenarios may have the character’s intent implied more ambiguously than other scenarios even within the “ambiguous” condition. Ambiguity ratings could be collected for the stimuli and included as a variable in the analyses. An alternative method to account for the variability in the intent implied among the scenarios would have been to include random slopes in the linear mixed model analysis. Including random slopes for both items and participants accounts for the possibility that the effect of ambiguity in the scenarios may be different for each item and for each participant. However, the model failed to converge with both random intercepts and random slopes for both items and participants, likely because there were a small number of items. Thus, random slopes were not included in the analysis of the present study.

Considering the mixed evidence of the literature on the relationship between language and thought with grammatical gender (Bassetti & Nicoladis, 2016), the present study attempted at employing a more online task by examining reaction times. However, the speeded lexical decision task is somewhat distant from the true purpose of understanding the scenarios. The lexical decision task in Experiment 2 was an indirect measure of comprehension where the longer reaction times within Malay-English bilinguals in “ambiguous” conditions, compared to English monolinguals, was interpreted as an incongruency in their expectations and the outcome. The accuracy data derived from the lexical decision task were merely to ensure that the participants’ data that were included in the analysis had at least a 70% accuracy rate. Although a lexical decision task is sufficient and appropriate for language processing studies at the word level, examining higher-level processes such as in a discourse text processing study may require a more sensitive measure. This measure will be discussed in more detail below.
4.2 Suggestions for Future Research

A direction for future research would be replicate the present study but compare both groups of speakers in the present study and Malay-English bilinguals who are situated in Malaysia where speakers are more consistently exposed to Malay more than English. The rationale in comparing among these groups is to further strengthen the interpretation of the current findings by eliminating possible cultural factors as the two groups of Malay bilinguals would share a similar cultural knowledge. Thus, any differences observed among the groups would not be attributed to cultural factors. The notion that one’s habitual thinking may be shaped by the grammar of one’s language could possibly be moderated by the frequency of language use. In this regard, we should expect that the more one speaks and is exposed to Malay, the more likely that the habitual thinking of interpreting intentions in English the way it is interpreted in Malay is reinforced. Thus, the expected sizes of the priming effects in ascending order among the groups would be: English monolinguals, Malay-English bilinguals (in Singapore), Malay-English bilinguals (in Malaysia). Observing these differences in priming effects among the groups would provide a more compelling argument towards the notion that one’s grammar, not culture, is the primary driving force of these observed priming effects and consequently, one’s interpretation of intentions.

On top of that, the present study could be extended with an additional study to distinguish between language and cultural factors that may be influencing the results. The additional study may involve a priming manipulation beforehand where a separate group
of English monolinguals are shown the same sentences, each accompanied by an image depicting the outcome. Participants would then take part in Experiment 2. During the priming manipulation, participants would listen to sentences read aloud as in Experiment 2 where the unintended action may be clearly or not clearly stated. When the unintended action is clearly stated, the image displayed immediately after would depict an unintended outcome. When the unintended action is not clearly stated, however, the image would depict a deliberate outcome. If the structure of a language is the driving force towards shaping one’s habitual ways of interpreting intentions, then we would expect this group of English monolinguals to perform similarly to the Malay-English bilinguals in the present study.

Future research could also include an online experimental design that involves a more natural experimental task. A possible solution is to conduct an eye-tracking experiment. Using an eye-tracker may serve as a better tool to examine more online processes such as fixation duration and sequences that may not be captured in a reaction time task. With eye-tracking data, it would be possible to analyze what participants fixated on for prolonged periods of time, how their gaze changed from one word to another and whether specific words were revisited more than others. For instance, instead of listening to the sentences and responding to the unintended action word in a lexical decision task such as in Experiment 2, participants may read these sentences on the screen in an eye-tracking experiment. If the unintended action word that completes the sentence violates the expectations of the participants, then participants will show more regressions to earlier parts of the text and a greater total reading time. These types of data would help provide a better insight towards the intermediary processes that occur between the time of stimulus
onset and button-pressing. An eye-tracking procedure was not carried out in the present study due to logistical constraints. More specifically, the present study would require an eye-tracker to be at both locations (Western University and National University of Singapore) and a portable eye-tracker was not available at the time of data collection.

### 4.3 Conclusion

In conclusion, the primary purpose of the present study is to examine cross-linguistic influences in intention interpretation within Malay-English bilinguals. The results revealed that Malay-English bilinguals interpreted intentions the way that intentions are habitually interpreted in Malay even when they are reading in English. The findings of the present study not only supported previous theories and the findings of previous work with bilinguals but also extended the effects of the shared conceptual representation in bilinguals beyond the word-level. Moreover, the findings of the present study have practical implications for cross-cultural communication. It is especially important in more diverse societies that host various nationalities with differing language and cultural norms. Understanding that one may perceive intentions differently minimizes the risks for miscommunication across speakers of various language and cultural backgrounds.
References


Appendices

Appendix A

Complete List of Stimuli for Experiment 1.

Target Sentences

Set 1

1. Ali terlanggar orang itu (*Ali accidentally hit that person*)
2. Ali melanggar orang itu dengan tidak sengaja (*Ali hit that person unintentionally*)
3. Ali terlanggar meja itu (*Ali accidentally hit that table*)
4. Ali melanggar orang itu (*Ali hit that person*)

Set 2

1. Lisa tertendang kerusi itu (*Lisa accidentally kicked that chair*)
2. Lisa menendang kerusi itu dengan tidak sengaja (*Lisa kick that chair unintentionally*)
3. Lisa tertendang rakannya itu (*Lisa accidentally kicked her classmate*)
4. Lisa menendang kerusi itu (*Lisa kicked that chair*)

Set 3

1. John terambil tuala Sally (*John accidentally took Sally’s towel*)
2. John mengambil tuala Sally dengan tidak sengaja (*John took Sally’s towel intentionally*)
3. John terambil majalah Sally (*John accidentally took Sally’s magazine*)
4. John mengambil tuala Sally (John took Sally’s towel)

Set 4

1. Tariq tercium kucingnya (Tariq accidentally kissed his cat)
2. Tariq mencium kucingnya dengan tidak sengaja (Tariq kissed his cat unintentionally)
3. Tariq tercium tikusnya (Tariq accidentally kissed his mouse)
4. Tariq mencium kucingnya (Tariq kissed his cat)

Set 5

1. Shafiq tertolak rakan sepasukannya (Shafiq accidentally pushed his teammate)
2. Shafiq menolak rakan sepasukannya dengan tidak sengaja (Shafiq pushed his teammate unintentionally)
3. Shafiq tertolak guru kegemarannya (Shafiq accidentally pushed his favourite teacher)
4. Shafiq menolak rakan sepasukannya (Shafiq pushed his teammate)

Set 6

1. Sam terlihat jawapan rakannya semasa peperiksaan Kimia (Sam accidentally saw his friend’s answers during the Chemistry exam)
2. Sam melihat jawapan rakannya semasa peperiksaan Kimia dengan tidak sengaja (Sam saw his friend’s answers during the Chemistry exam unintentionally)
3. Sam terlihat mesej teks rakannya semasa peperiksaan Kimia (Sam accidentally saw his friend’s text message during the Chemistry exam)
4. Sam melihat jawapan rakannya semasa peperiksaan Kimia *(Sam saw his friend's answers during the Chemistry exam)*

**Set 7**

1. Hamad tertulis nama gelaran di kertas kerjanya *(Hamad accidentally wrote his nickname on his school assignment)*

2. Hamad menulis nama gelaran di kertas kerjanya dengan tidak sengaja *(Hamad wrote his nickname on his school assignment unintentionally)*

3. Hamad tertulis tarikh yang salah di kertas kerjanya *(Hamad accidentally wrote the wrong date on his school assignment)*

4. Hamad menulis nama gelaran di kertas kerjanya *(Hamad wrote his nickname on his school assignment)*

**Set 8**

1. Guru Matematik terberi markah lebih kepada Ahmad *(The Mathematics teacher accidentally gave more marks to Ahmad)*

2. Guru Matematik memberi markah lebih kepada Ahmad dengan tidak sengaja *(The Mathematics teacher gave more marks to Ahmad unintentionally)*

3. Guru Matematik terberi buku Lisa kepada Ahmad *(The Mathematics teacher accidentally gave Lisa’s book to Ahmad)*

4. Guru Matematik memberi markah lebih kepada Ahmad *(The Mathematics teacher gave more marks to Ahmad)*

**Set 9**

1. Ibu Johari terbuang kasutnya *(Johari’s mother accidentally threw his shoes)*
2. Ibu Johari membuang kasutnya dengan tidak sengaja (*Johari’s mother threw his shoes unintentionally*)

3. Ibu Johari terbuang mainannya (*Johari’s mother accidentally threw his toys*)

4. Ibu Johari membuang kasutnya (*Johari’s mother threw his shoes*)

**Set 10**

1. Tommy terpijak semut api (*Tom accidentally stepped on a fire ant*)

2. Tommy memijak semut api dengan tidak sengaja (*Tom stepped on a fire ant unintentionally*)

3. Tommy terpijak pakar karat (*Tom accidentally stepped on a rusted nail*)

4. Tommy memijak semut api (*Tom stepped on a fire ant*)

**Set 11**

1. Samad terpegang anjing Lin (*Samad accidentally touched Lin’s dog*)

2. Samad memegang anjing Lin dengan tidak sengaja (*Samad touched Lin’s dog unintentionally*)

3. Samad terpegang tangan Lin (*Samad accidentally touched Lin’s hand*)

4. Samad memegang anjing Lin (*Samad touched Lin’s dog*)

**Set 12**

1. Ben terpotong jari manisnya (*Ben accidentally cut his pinkie finger*)

2. Ben memotong jari manisnya dengan tidak sengaja (*Ben cut his pinkie finger unintentionally*)

3. Ben terpotong rambut misainya (*Ben accidentally cut his moustache*)

4. Ben memotong jari manisnya (*Ben cut his pinkie finger*)
Set 13

1. Jimmy terbuka sampul surat jirannya (Jimmy accidentally opened his neighbour’s envelope)
2. Jimmy membuka sampul surat jirannya dengan tidak sengaja (Jimmy opened his neighbour’s envelope unintentionally)
3. Jimmy terbuka pintu pagar jirannya (Jimmy accidentally opened his neighbour’s gate)
4. Jimmy membuka sampul surat jirannya (Jimmy opened his neighbour’s envelope)

Set 14

1. Salim tertinggalkan komputer ribanya di pejabat (Salim accidentally left his laptop in the office)
2. Salim meninggalkan komputer ribanya di pejabat dengan tidak sengaja (Salim left his laptop in the office unintentionally)
3. Salim tertinggalkan cermin matanya di pejabat (Salim accidentally left his glasses in the office)
4. Salim meninggalkan komputer ribanya di pejabat (Salim left his laptop in his office)

Set 15

1. Jane tertelan gula kelapa (Jane accidentally swallowed the coconut candy – solid/liquid)
2. Jane menelan gula kelapa dengan tidak sengaja (Jane swallowed the coconut candy unintentionally)
3. Jane tertelan ubat gigi (Jane accidentally swallowed toothpaste)
4. Jane menelan gula kelapa (*Jane swallowed the coconut candy*)

**Set 16**

1. Alexis tergiggit bibirnya (*Alexis accidentally bit her lips*)

2. Alexis menggigit bibirnya dengan tidak sengaja (*Alexis bit her lips unintentionally*)

3. Alexis tergiggit benih oren (*Alexis accidentally bit her orange seeds*)

4. Alexis menggigit bibirnya (*Alexis bit her lips*)

**Set 17**

1. Halimah tertumpah adunan cair itu (*Halimah accidentally poured/spilled the liquid mix*)

2. Halimah menumpah adunan cair itu dengan tidak sengaja (*Halimah poured/spilled the liquid mix unintentionally*)

3. Halimah tertumpah gelas air itu (*Halimah accidentally poured/spilled the glass of water*)

4. Halimah menumpah adunan cair itu (*Halimah poured the liquid mix*)

**Set 18**

1. Fitri tergunting bajunya (*Fitri accidentally cut (with scissors) his shirt*)

2. Fitri menggunting bajunya dengan tidak sengaja (*Fitri cut (with scissors) his shirt unintentionally*)

3. Fitri tergunting alas katilnya (*Fitri accidentally cut (with scissors) his bedsheets*)

4. Fitri menggunting bajunya (*Fitri cut (with scissors) his shirt*)

**Set 19**
1. Khalis terbakar gambar keluarganya (Khalis accidentally burnt his family’s photo)

2. Khalis membakar gambar keluarganya dengan tidak sengaja (Khalis burnt his family’s photo unintentionally)

3. Khalis terbakar roti jala yang dimasakkannya (Khalis accidentally burnt the ‘roti jala’ that was cooked)

4. Khalis membakar gambar keluarganya (Khalis burnt his family’s photo)

Set 20

1. Ketika meneroka sekolah, murid itu terjumpa bilik kelasnya (As he was exploring the school, the student accidentally found his classroom)

2. Ketika meneroka sekolah, murid itu menjumpa bilik kelasnya dengan tidak sengaja (As he was exploring the school, the student found his classroom unintentionally)

3. Ketika meneroka sekolah, murid itu terjumpa dompet coklat (As he was exploring the school, the student accidentally found a brown wallet)

4. Ketika meneroka sekolah, murid itu menjumpa bilik kelasnya (As he was exploring the school, the student found his classroom)

Set 21

1. Gina terpakai baju sekolah kakaknya (Gina accidentally wore her sister’s school uniform)

2. Gina memakai baju sekolah kakaknya dengan tidak sengaja (Gina wore her sister’s school uniform unintentionally)

3. Gina terpakai sarung kaki kakaknya (Gina accidentally wore her sister’s socks)
4. Gina memakai baju sekolah kakaknya (Gina wore her sister’s school uniform)

Set 22

1. Haza tertelefon teman lelakinya di kerja (Haza accidentally called her boyfriend at work)
2. Haza menelefon teman lelakinya di kerja dengan tidak sengaja (Haza called her boyfriend at work unintentionally)
3. Haza tertelefon adik bungsunya di kerja (Haza called her youngest sibling at work)
4. Haza menelefon teman lelakinya di kerja (Haza called her boyfriend at work)

Filler Sentences

Set 1

1. Lin membeli botol-botol air mineral yang dijual di kedai runcit (Lin bought those bottles of mineral water that were sold in the provision store)
2. Lin membeli beberapa botol air mineral yang dijual di kedai runcit (Lin bought several of those bottles of mineral water that were sold in the provision store)
3. Lin membeli perkakas-perkakas dapur dijual di kedai runcit (Lin bought kitchen utensils that were sold in the provision store)
4. Lin membeli botol air mineral yang dijual di kedai runcit (Lin bought that bottle of mineral water that was sold in the provision store)

Set 2

1. Jamal sedang membersihkan buah-buahan sitrus yang diletak di atas meja (Jamal is cleaning those citrus fruits that are placed on the table)
2. Jamal sedang membersihkan beberapa buah sitrus yang diletak di atas meja
   *(Jamal is cleaning several of those citrus fruits that are placed on the table)*

3. Jamal sedang membersihkan pinggan-pinggan yang diletak di atas meja *(Jamal is cleaning those plates that are placed on the table)*

4. Jamal sedang membersihkan buah sitrus yang diletak di atas meja *(Jamal is cleaning that citrus fruit that is placed on the table)*

**Set 3**

1. Cikgu Imbran mengajar Bahasa Melayu kepada pelajar-pelajar di Sekolah Orchid
   *(The Malay Language teacher teaches students at Orchid School)*

2. Cikgu Imbran mengajar Bahasa Melayu kepada beberapa pelajar di Sekolah Orchid *(That Malay language teacher teaches some students at Orchid School)*

3. Cikgu Imbran mengajar Bahasa Melayu kepada orang-orang dewasa di Sekolah Orchid *(That Malay language teacher teaches adults at Orchid School)*

4. Cikgu Imbran mengajar Bahasa Melayu kepada pelajar Sekolah Orchid *(That Malay language teacher teaches that student from Orchid School)*

**Set 4**

1. Johari membawa makanan-makanan ringan ke pantai East Coast *(Johari brought snacks to East Coast beach)*

2. Johari membawa beberapa makanan ringan ke pantai East Coast *(Johari brought some snacks to East Coast beach)*

3. Johari membawa minuman-minuman sejuk ke pantai East Coast *(Johari brought chilled drinks to East Coast beach)*
4. Johari membawa makanan ringan ke pantai East Coast (*Johari brought snacks to East Coast beach*)

Set 5

1. April mencuci cawan-cawan porselin sebelum ketibaan tetamuanya (*April washed her porcelain cups before the arrival of her guest(s)*)
2. April mencuci beberapa cawan porselin sebelum ketibaan tetamuanya (*April washed several porcelain cups before the arrival of her guest(s)*)
3. April mencuci jeket-jeket sebelum ketibaan tetamuanya (*April washed her jackets before the arrival of her guest(s)*)
4. April mencuci cawan porselin sebelum ketibaan tetamuanya (*April washed her porcelain cup before the arrival of her guest(s)*)

Set 6

1. Naim mengilap cincin-cincin emas yang pudar (*Naim polished dull gold rings*)
2. Naim mengilap beberapa cincin emas yang pudar (*Naim polished several dull gold rings*)
3. Naim mengilap sofa-sofa kulit yang pudar (*Naim polished dull leather couches*)
4. Naim mengilap cincin emas yang pudar (*Naim polished a dull gold ring*)

Set 7

1. Ibu Salih menjual kuih-muihnya di pasar malam Geylang Serai (*Salih’s mother sold her traditional goodies at Geylang Serai night market*)
2. Ibu Salih menjual beberapa kuih-muihnya di pasar malam Geylang Serai (*Salih’s mother sold some of her traditional goodies at Geylang Serai night market*)
3. Ibu Salih menjual biskut-biskutnya di pasar malam Geylang Serai (Salih’s mother sold her biscuits at Geylang Serai night market)

4. Ibu Salih menjual kuihnya di pasar malam Geylang Serai (Salih’s mother sold her traditional goodies at Geylang Serai night market)

Set 8

1. Kamil memberi makanan kepada ayam-ayam di ladang ternakkannya (Kamil fed those chickens in his breeding farm)

2. Kamil memberi makanan kepada beberapa ayam di ladang ternakkannya (Kamil fed some of those chickens in his breeding farm)

3. Kamil memberi makanan kepada ikan-ikan di ladang ternakkannya (Kamil fed those fishes in his breeding farm)

4. Kamil memberi makanan kepada ayam di ladang ternakkanya (Kamil fed that chicken in his breeding farm)

Set 9

1. Mira memelihara burung-burungnya di belakang rumahnya (Mira takes care of her birds in her backyard)

2. Mira memelihara beberapa burungnya di belakang rumahnya (Mira takes care of some of her birds in her backyard)

3. Mira memelihara arnab-arnabnya di belakang rumahnya (Mira takes care of her rabbits in her backyard)

4. Mira memelihara burungnya di belakang rumahnya (Mira takes care of her bird in her backyard)
Set 10

1. Barang peribadi Haizam disimpan dalam kotak-kotak sebelum berpindah ke rumah baru (*Haizam’s personal belongings are placed in boxes before he moves to a new house*)

2. Barang peribadi Haizam disimpan dalam beberapa kotak sebelum berpindah ke rumah baru (*Haizam’s personal belongings are placed in several boxes before he moves to a new house*)

3. Barang peribadi Haizam disimpan dalam kontena-plastik sebelum berpindah ke rumah baru (*Haizam’s personal belongings are placed in plastic containers before he moves to a new house*)

4. Barang peribadi Haizam disimpan dalam kotak sebelum berpindah ke rumah baru (*Haizam’s personal belongings are placed in a box before he moves to a new house*)

Set 11

1. Giri merosakkan kereta-kereta yang berada di tempat letak kereta (*Ali vandalized cars at a carpark*)

2. Giri merosakkan beberapa kereta yang berada di tempat letak kereta (*Ali vandalized several cars at a carpark*)

3. Giri merosakkan papan-papan tanda jalanraya yang berada di tempat letak kereta (*Ali vandalized the signs at a carpark*)

4. Giri merosakkan kereta itu yang berada di tempat letak kereta (*Ali vandalized that car that at a carpark*)

Set 1
1. Sarah memasak lauk ayam kicap (Sarah cooked ‘ayam kicap’ dish)

2. Lauk ayam kicap dimasak oleh Sarah (The ‘ayam kicap’ dish was cooked by Sarah)

3. Sarah memasak gula merah (Sarah cooked palm sugar)

4. Sarah tidak memasak lauk ayam kicap (Sarah did not cook the ‘ayam kicap’ dish)

Set 2

1. Salim menggosok seluar biru itu (Salim ironed that blue pants)

2. Seluar biru itu digosok oleh Salim (That blue pants was ironed by Salim)

3. Salim menggosok kain biru itu (Salim ironed that blue cloth)

4. Salim meronyok seluar biru itu (Salim wrinkled that blue pants)

Set 3

1. Melissa menulis lirik lagu rock itu (Melissa wrote the lyrics of that rock song)

2. Lirik lagu rock itu ditulis oleh Melissa (The lyrics of that rock song was written by Melissa)

3. Melissa menulis karangan itu (Melissa wrote that essay)

4. Melissa tidak menulis lirik lagu rock itu (Melissa did not write the lyrics of that rock song)

Set 4

1. Fitri melukis potret bunga yang dipamerkan di galeri itu (Fitri drew a portrait of a flower that was exhibited in that gallery)

2. Potret bunga yang dipamerkan di galeri itu dilukis oleh Fitri (That portrait of a flower that was exhibited was drawn by Fitri)
3. Fitri melukis batik yang dipamerkan di galeri itu (Fitri drew “batik” that is exhibited in that gallery)

4. Fitri tidak melukis potret bunga yang dipamerkan di galeri itu (Fitri did not draw a portrait of a flower that was exhibited in that gallery)

Set 5

1. Haikal memecahkan cermin kakaknya (Haikal broke his sister’s mirror)

2. Cermin kakaknya itu dipecahkan oleh Haikal (His sister’s mirror was broken by Haikal)

3. Haikal memecahkan pasu bunga kakaknya (Haikal broke his sister’s flower vase)

4. Haikal membaiki cermin kakaknya (Haikal repaired his sister’s mirror)

Set 6

1. Peter membina bangunan tertinggi di Singapura (Peter built the tallest building in Singapore)

2. Bangunan tertinggi di Singapura dibina oleh Peter (The tallest building in Singapore was built by Peter)

3. Peter membina rumah tertinggi di Singapura (Peter built the tallest house in Singapore)

4. Peter merobohkan bangunan tertinggi di Singapura (Peter demolished the tallest building in Singapore)

Set 7

1. Steve Jobs mencipta alat teknologi yang terkenal di dunia (Steve Jobs invented the most popular technological tool in the world)
2. Alat teknologi yang terkenal di dunia dicipta oleh Steve Jobs (The most popular technological tools in the world are invented by Steve Jobs)

3. Steve Jobs mencipta doktrin pekerjaan yang terkenal di dunia (Steve Jobs invented the most popular (work) doctrine in the world)

4. Steve Jobs tidak mencipta alat teknologi yang terkenal di dunia (Steve Jobs did not invent the most popular technological tool in the world)

Set 8

1. Greg mencuci teksi Salim (Greg washed Salim’s taxi)

2. Teksi Salim dicuci oleh Greg (Salim’s taxi was washed by Greg)

3. Greg mencuci topi Salim (Greg washed Salim’s hat)

4. Greg kotorkan teksi Salim (Greg dirtied Salim’s taxi)

Set 9

1. Aviva memelihara ular kesayangannya di rumah (Aviva takes care of her beloved snake at home)

2. Ular kesayangannya dipelihara oleh Aviva di rumah (Her beloved snake is taken care of by Aviva at home)

3. Aviva memelihara penyu kesayangannya di rumah (Aviva takes care of her beloved turtle at home)

4. Aviva mengabaikan ular kesayangannya di rumah (Aviva abandoned her beloved snake at home)

Set 10

1. Andrew menggunting daging itu (Andrew had cut that meat)
2. Daging itu digunting oleh Andrew (That meat was cut by Andrew)
3. Andrew menggunting rumput itu (Andrew had cut that grass)
4. Andrew tidak menggunting daging itu (Andrew did not cut that meat)

Set 11
1. Bahrain membeli anting-anting baru (Bahrain bought new earrings)
2. Anting-anting baru itu dibeli oleh Bahrain (That new earrings are bought by Bahrain)
3. Bahrain membeli sarung tangan baru (Bahrain bought new gloves)
4. Bahrain menjual anting-anting baru (Bahrain sold new earrings)

Set 12
1. Atok menjaga cucu-cucunya (Grandfather takes care of his grandchildren)
2. Cucu-cucu dijaga Atok (The grandchildren are taken care by the grandfather)
3. Atok menjaga kanak-kanak (Atok takes care of children)
4. Atok tida menjaga cucu-cucunya (Grandfather does not take care of his grandchildren)

Set 13
1. Farah adalah anak perumpuan Encik Kamil yang tercantik (Farah is Kamil’s most beautiful daughter)
2. Anak perumpuan Encik Kamil yang tercantik adalah Farah (Kamil’s most beautiful daughter is Farah)
3. Farah adalah teman perempuan Encik Kamil yang tercantik (Farah is Kamil’s most beautiful girlfriend)
4. Farah bukan anak perempuan Encik Kamil yang tercantik (Farah is not Kamil’s most beautiful daughter)

Set 14

1. Ibu membeli televisyen Samsung yang terbaru (Mother bought the newest Samsung television)

2. Televisyen Samsung yang terbaru dibeli oleh ibu (The newest Samsung television was bought by my mother)

3. Ibu membeli alat telinga Samsung yang terbaru (Mother bought the newest Samsung headphones)

4. Ibu tidak membeli televisyen Samsung yang terbaru (Mother did not buy the newest Samsung television)

Set 15

1. Keluarga Jamieson memiliki rumah yang termahal di daerah Orchard (The Jamieson family owns the most expensive house in Orchard area)

2. Rumah yang termahal di daerah Orchard dimiliki oleh keluarga Jamieson (The most expensive house in Orchard area is owned by the Jamison family)

3. Keluarga Jamieson memiliki bangunan yang termahal di daerah Orchard (The Jamieson family owns the most expensive building in Orchard area)

4. Keluarga Jamieson tidak memiliki rumah yang termahal di daerah Orchard (The Jamieson family did not own the most expensive house in Orchard area)

Set 16
1. Usain Bolt adalah pelari yang terlaju di dunia (Usain Bolt is the fastest runner in the world)

2. Pelari yang terlaju di dunia adalah Usain Bolt (The fastest runner in the world is Usain Bolt)

3. Usain Bolt adalah atlet yang terlaju di dunia (Usain Bolt is the fastest athlete in the world)

4. Usain Bolt bukan pelari yang terlaju di dunia (Usain Bolt is not the fastest runner in the world)

Set 17

1. Laksa Mak Jah adalah laksa yang terenak di Singapura (Mak Jah’s laksa is the most delicious laksa in Singapore)

2. Laksa yang terenak di Singapura adalah laksa Mak Jah (The most delicious laksa in Singapore is Mak Jah’s laksa)

3. Kek coklat Mak Jah adalah kek yang terenak di Singapura (Mak Jah’s chocolate cake is the most delicious cake in Singapore)

4. Laksa Mak Jah bukan laksa yang terenak di Singapura (Mak Jah’s laksa is not the most delicious laksa in Singapore)

Set 1

1. Jam tangan itu mahal harganya (That wrist watch is expensive)

2. Jam tangan itu tidak murah (That wrist watch is not cheap)

3. Kasut lari itu mahal harganya (That running shoes are expensive)

4. Jam tangan itu murah harganya (That wrist watch is cheap)
Set 2
1. Tulisan tangan Leah kemas (*Leah’s handwriting is neat*)
2. Tulisan tangan Leah tidak hodoh (*Leah’s handwriting is not ugly*)
3. Ruang tamu rumah Leah kemas (*Leah’s living room is neat*)
4. Tulisan tangan Leah hodoh (*Leah’s handwriting is the messy*)

Set 3
1. Pembuka selera keropok yang disediakan di restoran itu garing (*The appetizer that was served in the restaurant was crispy*)
2. Pembuka selera keropok yang disediakan di restoran itu tidak lemau (*The appetizer that was served in the restaurant was not non-crispy/soft/stale*)
3. Ayam goreng yang disediakan di restoran itu garing (*The fried chicken that was served in the restaurant was crispy*)
4. Pembuka selera keropok yang disediakan di restoran itu lemau (*The appetizer that was served in the restaurant was non-crispy/soft/stale*)

Set 4
1. Maxwell adalah seorang murid yang baik (*Maxwell is a good student*)
2. Maxwell adalah seorang murid yang tidak nakal (*Maxwell is not a mischievous student*)
3. Maxwell adalah seorang pekerja yang baik (*Maxwell is a good worker*)
4. Maxwell adalah seorang murid yang nakal (*Maxwell is a mischievous student*)

Set 5
1. Christine suka makanan pedas (*Christine likes spicy food*)
2. Christine tidak suka makanan yang tidak pedas (*Christine does not like food that is not spicy*)

3. Christine suka perangai Johan (*Christine likes Johan’s attitude*)

4. Christine tidak suka makanan pedas (*Christine does not like spicy food*)

**Set 6**

1. Noelle menangis kerana dia lulus peperiksaannya (*Noelle cried as she passed her exam*)

2. Noelle menangis kerana dia tidak gagal peperiksaannya (*Noelle cried as she did not fail her exam*)

3. Noelle menangis kerana kesakitan kepalanya (*Noelle teared as she has a headache*)

4. Noelle menangis kerana dia gagal peperiksaannya (*Noelle cried as she had failed her exam*)

**Set 7**

1. Masakkan resipi ibu rumit (*Mother’s recipe is complicated*)

2. Masakkan resipi ibu tidak mudah (*Mother’s recipe is not easy*)

3. Cara hidup ibu rumit (*Mother’s way of life is complicated*)

4. Masakkan resipi ibu mudah (*Mother’s recipe is easy*)

**Set 8**

1. Andre adalah seorang pelajar yang rajin (*Andre is a hardworking student*)

2. Andre adalah seorang pelajar yang tidak malas (*Andre is not a lazy student*)

3. Andre adalah seorang pekerja yang rajin (*Andre is a hardworking worker*)
4. Andre adalah seorang pelajar yang malas (*Andre is a lazy student*)

**Set 1**

1. Rohaya terlap notis penting itu di papan tulis bapanya (*Rohaya accidentally erased the important notice on her father’s whiteboard*)
2. Rohaya mengilap notis penting itu di papan tulis bapanya dengan tidak sengaja (*Rohaya erased the importance notice on her father’s whiteboard unintentionally*)
3. Rohaya terlap nombor penting itu di papan tulis bapanya (*Rohaya accidentally erased the important number on her father’s whiteboard*)
4. Rohaya mengilap notis penting itu di papan tulis bapanya (*Rohaya erased the important notice on her father’s whiteboard*)

**Set 2**

1. Naima terbasuh songkok rakan sebiliknya (*Naima accidentally washed her roommate’s songkok*)
2. Naima membasuh songkok rakan sebiliknya dengan tidak sengaja (*Naima washed her roommate’s songkok unintentionally*)
3. Naima terbasuh bantal rakan sebiliknya (*Naima accidentally washed her roommate’s pillow*)
4. Naima membasuh songkok rakan sebiliknya (*Naima washed her roommate’s songkok*)

**Set 3**

1. Ismail terbengkok sudu makan di restoran Istimewa (*Ismail accidentally had bent the spoon at Istimewa restaurant*)
2. Ismail membengkok sudu makan di restoran Istimewa dengan tidak sengaja

(Ismail had bent the spoon at Istimewa restaurant unintentionally)

3. Ismail terbengkok iPhone rakannya di restoran Istimewa (Ismail accidentally had bent his friend’s iPhone at Istimewa restaurant)

4. Ismail membengkok sudu makan di restoran Istimewa (Ismail had bent the spoon at Istimewa restaurant)

Set 4

1. Sambil merawati kepala Rafiz, jururawatnya terbalut mata Rafiz (While nursing Rafiz’s head, the nurse accidentally bandaged his eyes)

2. Sambil merawati kepala Rafiz, jururawatnya membalut mata Rafiz dengan tidak sengaja (While nursing Rafiz’s head, the nurse bandaged his eyes unintentionally)

3. Sambil merawati kepala Rafiz, jururawatnya terbalut jari Rafiz (While nursing Rafiz’s head, the nurse accidentally bandaged his fingers)

4. Sambil merawati kepala Rafiz, jururawatnya membalut mata Rafiz (While nursing Rafiz’s head, the nurse bandaged his eyes)

Set 5

1. Mira bersandar di tepi kereta dan tertutup tingkap keretanya (Mira leaned on the side of the car and accidentally closed her car windows)

2. Mira bersandar di tepi kereta dan menutup tingkap keretanya dengan tidak sengaja (Mira leaned on the side of the car and closed her car windows unintentionally)

3. Mira bersandar di tepi kereta dan tertutup bonet keretanya (Mira leaned on the side of the car and accidentally closed her car bonnet/hood)
4. Mira bersandar di tepi kereta dan menutup tingkap keretanya (*Mira leaned on the side of the car and closed her car windows*)

Set 6

1. Ketika Bruno membaring di atas abangnya, dia tercekiknya (*When Bruno lied on top of his brother, he accidentally choked him*)

2. Ketika Bruno membaring di atas abangnya, dia mencekiknya dengan tidak sengaja (*When Bruno lied on top of his brother, he choked him*)

3. Ketika Bruno membaring di atas tetikusnya, dia tercekiknya (*When Bruno lied on top of his mouse, he accidentally choked it*)

4. Ketika Bruno membaring di atas abangnya, dia mencekiknya (*When Bruno lied on top of his brother, he choked him*)

Set 7

1. Nelayan itu bertujuan untuk menangkap kerang tetapi tertangkap seekor udang (*The fisherman intended to catch cockles but accidentally caught a prawn instead*)

2. Nelayan itu bertujuan untuk menangkap kerang tetapi menangkap seekor udang dengan tidak sengaja (*The fisherman intended to catch cockles but caught a prawn unintentionally instead*)

3. Nelayan itu bertujuan untuk menangkap kerang tetapi tertangkap siput (*The fisherman intended to catch cockles but accidentally caught a snail instead*)

4. Nelayan itu bertujuan untuk menangkap kerang tetapi menangkap seekor udang (*The fisherman intended to catch cockles but caught a prawn*)
Appendix B

Language Questionnaire for Malay Speakers.

**Language Experience Questionnaire**

Participant #: 

Age:  Gender:  M  F  I prefer another descriptor

Native Country:  Father's Native Language:

Native Language:  Father's Other Languages:

Second Language:  Mother's Native Language:

Mother's Other Languages:

List the languages you know in the order:

a) in which you learned them:

b) from the one you know best to the one you know least:
Language spoken most frequently at home with your family:

1.

2. What percentage of time are you currently exposed to each of the following languages in your daily activities?

   **English**

   **Malay**

   Other

**Experience with English**

For each of the following English language skills, please indicate the age at which you first started to acquire the skill, the place in which you learned the skill (e.g. home, school), and rate the fluency with which you can currently perform the skill. (circle one number per skill). If you were exposed to a language from birth, put 0 for age in Understanding.

<table>
<thead>
<tr>
<th>skill</th>
<th>starting age</th>
<th>place</th>
<th>fluency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding</td>
<td>none</td>
<td>fluent</td>
<td>very</td>
</tr>
</tbody>
</table>
Experience with Malay

For each of the following Malay language skills, please indicate the age at which you first started to acquire the skill, the place in which you learned the skill (e.g. home, school), and rate the fluency with which you can currently perform the skill. (circle one number per skill). If you were exposed to a language from birth, put 0 for age in Understanding.

<table>
<thead>
<tr>
<th>Skill</th>
<th>Starting Age</th>
<th>Place</th>
<th>Fluency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaking</td>
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<td>Reading</td>
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<tr>
<td>Writing</td>
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</tr>
<tr>
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<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Speaking</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Writing</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**School Experience**

Indicate the type of schooling that you received at each grade level by placing an x in the appropriate box.
<table>
<thead>
<tr>
<th>Malay Literature (Sastera) / Malay Studies</th>
<th></th>
</tr>
</thead>
</table>
## Appendix C

Complete List of Stimuli for Experiment 2.

### Critical sentences

<table>
<thead>
<tr>
<th>EXAMPLE 1</th>
<th>Intention-related</th>
<th>Intention-unrelated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unambiguous (of unintentionality to English and Malay speakers)</strong></td>
<td>Jackie left the salon and had forgotten to tip her hairdresser.</td>
<td>Jackie left the salon and had forgotten to tip her hairdresser.</td>
</tr>
<tr>
<td></td>
<td>The next time she went for a haircut, she <strong>apologized</strong></td>
<td>The next time she went for a haircut, she <strong>walked</strong></td>
</tr>
<tr>
<td><strong>Ambiguous (of unintentionality to English speakers)</strong></td>
<td>Jackie left the salon without tipping her hairdresser.</td>
<td>Jackie left the salon without tipping her hairdresser.</td>
</tr>
<tr>
<td></td>
<td>The next time she went for a haircut, she <strong>apologized</strong></td>
<td>The next time she went for a haircut, she <strong>walked</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXAMPLE 2</th>
<th>Related (to unintentionality)</th>
<th>Unrelated (to unintentionality)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unambiguous (of unintentionality to English and Malay speakers)</strong></td>
<td>Lea attended Katie’s pot-luck party without the bottle of wine she dropped on her</td>
<td>Lea attended Katie’s pot-luck party without the bottle of wine she dropped on her</td>
</tr>
<tr>
<td>Ambiguous (of unintentionality to English speakers)</td>
<td>Lea attended Katie’s pot-luck party without a bottle of wine. When Katie handed her a beer from her refrigerator, Lea was embarrassed</td>
<td>Lea attended Katie’s pot-luck party without a bottle of wine. When Katie handed her a beer from her refrigerator, Lea was nauseated</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>EXAMPLE 3</td>
<td>Related (to unintentionality)</td>
<td>Unrelated (to unintentionality)</td>
</tr>
<tr>
<td>Unambiguous (of unintentionality to English and Malay speakers)</td>
<td>Having finished his dinner, Alex left the restaurant forgetting to pay the bill. He took several steps and immediately returned</td>
<td>Having finished his dinner, Alex left the restaurant forgetting to pay the bill. He took several steps and immediately sneezed</td>
</tr>
<tr>
<td>Ambiguous (of unintentionality to English)</td>
<td>Having finished his dinner, Alex left the restaurant</td>
<td>Having finished his dinner, Alex left the restaurant</td>
</tr>
</tbody>
</table>
He took several steps and immediately returned without paying the bill.

<table>
<thead>
<tr>
<th>EXAMPLE 4</th>
<th>Related (to unintentionality)</th>
<th>Unrelated (to unintentionality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous (of unintentionality to English and Malay speakers)</td>
<td>Sebastian forgets that most of his classmates speak English and only few of them speak French.</td>
<td>Sebastian is aware that most of his classmates speak English and only few of them speak French.</td>
</tr>
<tr>
<td></td>
<td>He often speaks French to his classmates and feels guilty</td>
<td>He often speaks French to his classmates and feels feeble</td>
</tr>
<tr>
<td>EXAMPLE 5</td>
<td>Related (to unintentionality)</td>
<td>Unrelated (to unintentionality)</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Unambiguous (of unintentionality to English and Malay speakers)</td>
<td>Jamal mistakenly threw his keys along with the trash in his room into the garbage bin.</td>
<td>Jamal mistakenly threw his keys along with the trash in his room into the garbage bin.</td>
</tr>
<tr>
<td></td>
<td>When his mother asked him why he threw his keys away, he was <strong>perplexed</strong></td>
<td>When his mother asked him why he threw his keys away, he was <strong>groomed</strong></td>
</tr>
<tr>
<td>Ambiguous (of unintentionality to English speakers)</td>
<td>Jamal threw his keys along with the trash in his room into the garbage bin.</td>
<td>Jamal threw his keys along with the trash in his room into the garbage bin.</td>
</tr>
<tr>
<td></td>
<td>When his mother asked him why he threw his keys away, he was <strong>perplexed</strong></td>
<td>When his mother asked him why he threw his keys away, he was <strong>groomed</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXAMPLE 6</th>
<th>Related (to unintentionality)</th>
<th>Unrelated (to unintentionality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous (of)</td>
<td>Lexi quickly skimmed</td>
<td>Lexi quickly skimmed</td>
</tr>
</tbody>
</table>
unintentionality to English and Malay speakers) through the pages of Jerome’s essay that she borrowed and accidentally ripped it. She immediately froze

Ambiguous (of unintentionality to English speakers) Lexi quickly skimmed through the pages of Jerome’s essay that she borrowed and ripped it. She immediately froze

EXAMPLE 7 Related (to unintentionality) Unrelated (to unintentionality)

Unambiguous (of unintentionality to English and Malay speakers) The child picked up a tack on the floor and accidentally popped a balloon as he was standing back up. When his older sister
reprimanded him for his behaviour, he was **puzzled** behaviour, he was **exhausted**

Ambiguous (of unintentionality to English speakers)

The child picked up a tack on the floor and popped a balloon as he was standing back up. When his older sister reprimanded him for his behaviour, he was **puzzled** behaviour, he was **exhausted**

EXAMPLE 8

Related (to unintentionality) Unrelated (to unintentionality)

Unambiguous (of unintentionality to English and Malay speakers) Lance strolled by the park and unexpectedly stepped on a snail. As he looked down at the snail, he was **disturbed** snail, he was **scratching**

Ambiguous (of) Lance strolled by the park Lance strolled by the park
unintentionality to English speakers) and stepped on a snail. As he looked down at the snail, he was disturbed

EXAMPLE 9 Related (to unintentionality) Unrelated (to unintentionality)

Unambiguous (of unintentionality to English and Malay speakers) The soccer player slipped and stepped on his opponent’s foot while chasing for the ball.

When he was called out by the referee, he was baffled

Ambiguous (of unintentionality to English speakers) The soccer player stepped on his opponent’s foot while chasing for the ball.

When he was called out by the referee, he was baffled

EXAMPLE 10 Related (to unintentionality) Unrelated (to

There is no Malay translation provided for these examples. The English text is repeated in both sections.
| Unambiguous (of unintentionality to English and Malay speakers) | Ben unwittingly drank his roommate’s beer that was left in his refrigerator. | He felt **foolish** |
| Ambiguous (of unintentionality to English speakers) | Ben drank his roommate’s beer that was left in his refrigerator. | He felt **bored** |

**EXAMPLE 11**

| Unambiguous (of unintentionality to English and Malay speakers) | Salma unexpectedly left her students’ essays in the office. | On her way to work the next day, she was **bloated** |
| Ambiguous (of unintentionality to English) | Salma left her students’ essays in the office. | On her way to work the next day, she was **worried** |
On her way to work the next day, she was **worried**

**EXAMPLE 12**

**Related (to unintentionality)**

Unambiguous (of unintentionality to English and Malay speakers)

Jeffery unintentionally swallowed his noodles without chewing.

He immediately **coughed**

**Unrelated (to unintentionality)**

Ambiguous (of unintentionality to English speakers)

Jeffery swallowed his noodles without chewing.

He immediately **coughed**

**EXAMPLE 13**

**Related (to unintentionality)**

Unambiguous (of unintentionality to English and Malay speakers)

Josh was daydreaming as he turned onto the oncoming lane.

**Unrelated (to unintentionality)**

Ambiguous (of unintentionality to English speakers)

Josh was daydreaming as he turned onto the oncoming lane.
<table>
<thead>
<tr>
<th>Sentence 1</th>
<th>Sentence 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>When he saw another car, he was <strong>stunned</strong></td>
<td>When he saw another car, he was <strong>aching</strong></td>
</tr>
</tbody>
</table>

**Ambiguous (of unintentionality to English speakers)**

| Josh turned onto the oncoming lane. | Josh turned onto the oncoming lane. |

**EXAMPLE 14**

<table>
<thead>
<tr>
<th>Related (to unintentionality)</th>
<th>Unrelated (to unintentionality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halim flicked his father’s lighter and accidentally burnt his bedsheets.</td>
<td>Halim flicked his father’s lighter and accidentally burnt his bedsheets.</td>
</tr>
<tr>
<td>Upon seeing a hole in the bedsheets, he was <strong>afraid</strong></td>
<td>Upon seeing a hole in the bedsheets, he was <strong>starving</strong></td>
</tr>
</tbody>
</table>

**Ambiguous (of unintentionality to English and Malay speakers)**

<table>
<thead>
<tr>
<th>Halim flicked his father’s lighter and burnt his bedsheets.</th>
<th>Halim flicked his father’s lighter and burnt his bedsheets.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon seeing a hole in the bedsheets, he was <strong>afraid</strong></td>
<td>Upon seeing a hole in the bedsheets, he was <strong>starving</strong></td>
</tr>
<tr>
<td>EXAMPLE 15</td>
<td>Related (to unintentionality)</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Unambiguous (of unintentionality to English and Malay speakers)</td>
<td>Jack tripped near the glass display at the jewellery store.</td>
</tr>
<tr>
<td></td>
<td>Upon hearing the loud sound of the shattering glass, he was shocked.</td>
</tr>
<tr>
<td>Ambiguous (of unintentionality to English speakers)</td>
<td>Jack broke the glass display at the jewellery store.</td>
</tr>
<tr>
<td></td>
<td>Upon hearing the loud sound of the shattering glass, he was shocked.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXAMPLE 16</th>
<th>Related (to unintentionality)</th>
<th>Unrelated (to unintentionality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous (of unintentionality to English and Malay speakers)</td>
<td>Veena unknowingly bit on a small hot pepper in her soup.</td>
<td>Veena unknowingly bit on a small hot pepper in her soup.</td>
</tr>
</tbody>
</table>
She shrieked

Ambiguous (of unintentionality to English speakers)

Veena bit on a small hot pepper in her soup.

Unambiguous (of unintentionality to English and Malay speakers)

EXAMPLE 17

Related (to unintentionality) Unrelated (to unintentionality)

The cashier at the small provision store unthinkingly scanned a customer’s item twice.

When the customer complained about it, the cashier was bewildered

Ambiguous (of unintentionality to English speakers)

The cashier at the small provision store scanned a customer’s item twice.

When the customer complained about it, the cashier was congested
cashier was **bewildered**  cashier was **congested**

**EXAMPLE 18**

Related (to unintentionality)  Unrelated (to unintentionality)

Unambiguous (of unintentionality to English and Malay speakers)

Maria locked the doors but Maria locked the doors but

did not see her sister did not see her sister

approaching the house from approaching the house from

a distance. a distance.

When her sister knocked When her sister knocked

furiously on the doors, furiously on the doors,

Maria was **surprised** Maria was **romantic**

Ambiguous (of unintentionality to English speakers)

Maria locked the doors as Maria locked the doors as

her sister was approaching her sister was approaching

the house from a distance. the house from a distance.

When her sister knocked When her sister knocked

furiously on the doors, furiously on the doors,

Maria was **surprised** Maria was **romantic**

**EXAMPLE 19**

Related (to unintentionality)  Unrelated (to unintentionality)
Unambiguous (of unintentionality to English and Malay speakers)  While Andrew debated with his friends, he accidentally crushed his can of coke that he was holding. He looked down at it and cackled

Ambiguous (of unintentionality to English speakers)  While Andrew debated with his friends, he crushed his can of coke that he was holding. He looked down at it and cackled

EXAMPLE 20  Related (to unintentionality)  Unrelated (to unintentionality)

Unambiguous (of unintentionality to English and Malay speakers)  Ali’s groupmates had neglected and omitted the paragraph typed by Ali in their group project. When Ali expressed his
<table>
<thead>
<tr>
<th>Ambiguous (of unintentionality to English speakers)</th>
<th>Ali’s groupmates omitted the paragraph typed by Ali in their group project.</th>
<th>Ali’s groupmates omitted the paragraph typed by Ali in their group project.</th>
</tr>
</thead>
<tbody>
<tr>
<td>When Ali expressed his disappointment to his groupmates, they seemed clueless</td>
<td>frugal</td>
<td>frugal</td>
</tr>
</tbody>
</table>

**EXAMPLE 21**

<table>
<thead>
<tr>
<th>Unambiguous (of unintentionality to English and Malay speakers)</th>
<th>Related (to unintentionality)</th>
<th>Unrelated (to unintentionality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just when Tina walked past the storage room, her sister accidentally frightened her by rushing out of the storage room.</td>
<td>Both Tina and her sister were terrified</td>
<td>Both Tina and her sister were healthy</td>
</tr>
<tr>
<td>Ambiguous (of unintentionality to English speakers)</td>
<td>Just when Tina walked past the storage room, her sister frightened her by rushing out of the storage room.</td>
<td>Just when Tina walked past the storage room, her sister frightened her by rushing out of the storage room.</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Both Tina and her sister were terrified</td>
<td>Both Tina and her sister were healthy</td>
<td></td>
</tr>
</tbody>
</table>

**EXAMPLE 22**

<table>
<thead>
<tr>
<th>Related (to unintentionality)</th>
<th>Unrelated (to unintentionality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hailey’s new neighbours called out to her across the fence but she did not hear them.</td>
<td>Hailey’s new neighbours called out to her across the fence but she did not hear them.</td>
</tr>
<tr>
<td>Hailey later admitted she was <strong>preoccupied</strong></td>
<td>Hailey later admitted she was <strong>flaunting</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambiguous (of unintentionality to English speakers)</th>
<th>Hailey’s new neighbours called out to her across the fence but she did not respond.</th>
<th>Hailey’s new neighbours called out to her across the fence but she did not respond.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hailey later admitted she</td>
<td>Hailey later admitted she</td>
<td>Hailey later admitted she</td>
</tr>
<tr>
<td>EXAMPLE 23</td>
<td>Related (to unintentionality)</td>
<td>Unrelated (to unintentionality)</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Unambiguous (of unintentionality to English and Malay speakers)</td>
<td>Sally focused on catching the frisbee and inadvertently knocked Tracy to the ground.</td>
<td>Sally focused on catching the frisbee and inadvertently knocked Tracy to the ground.</td>
</tr>
<tr>
<td></td>
<td>Sally extended her hand to <strong>help</strong></td>
<td>Sally extended her hand to <strong>write</strong></td>
</tr>
<tr>
<td>Ambiguous (of unintentionality to English speakers)</td>
<td>Sally focused on catching the frisbee and knocked Tracy to the ground.</td>
<td>Sally focused on catching the frisbee and knocked Tracy to the ground.</td>
</tr>
<tr>
<td></td>
<td>Sally extended her hand to <strong>help</strong></td>
<td>Sally extended her hand to <strong>write</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXAMPLE 24</th>
<th>Related (to unintentionality)</th>
<th>Unrelated (to unintentionality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous (of unintentionality)</td>
<td>Alif missed the baseball that</td>
<td>Alif missed the baseball that</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>unintentionality to English and Malay speakers</td>
<td>broke a car’s windshield in the parking lot.</td>
<td>broke a car’s windshield in the parking lot.</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Ambiguous (of unintentionality to English speakers)</td>
<td>Alif threw the baseball that broke a car’s windshield in the parking lot.</td>
<td>Alif threw the baseball that broke a car’s windshield in the parking lot.</td>
</tr>
</tbody>
</table>

**Filler sentences**

**EXAMPLE 1**

<table>
<thead>
<tr>
<th>Unambiguous</th>
<th>Related (emotions)</th>
<th>Unrelated (emotions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous</td>
<td>Billy was reprimanded by his mother.</td>
<td>Billy was reprimanded by his mother.</td>
</tr>
<tr>
<td></td>
<td>He retreated to his room and <strong>drifed</strong></td>
<td>He retreated to his room and <strong>krappe</strong></td>
</tr>
<tr>
<td>Ambiguous</td>
<td>Billy had a talk with his mother.</td>
<td>Billy had a talk with his mother.</td>
</tr>
<tr>
<td></td>
<td>He retreated to his room and <strong>drifed</strong></td>
<td>He retreated to his room and <strong>krappe</strong></td>
</tr>
<tr>
<td>Example</td>
<td>Related (emotions)</td>
<td>Unrelated (emotions)</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td><strong>Unambiguous</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example 2</td>
<td>Kira received an acceptance letter by the school of her choice.</td>
<td>Kira received an acceptance letter by the school her choice.</td>
</tr>
<tr>
<td></td>
<td>Later that day, she could not stop <strong>smoosing</strong></td>
<td>Later that day, she could not stop <strong>gloofing</strong></td>
</tr>
<tr>
<td>Ambiguous</td>
<td>Kira received a letter by the school of her choice.</td>
<td>Kira received a letter by the school of her choice.</td>
</tr>
<tr>
<td></td>
<td>Later that day, she could not stop <strong>smoosing</strong></td>
<td>Later that day, she could not stop <strong>gloofing</strong></td>
</tr>
<tr>
<td><strong>Example 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unambiguous</td>
<td>Lizzy and her husband were often arguing about the children.</td>
<td>Lizzy and her husband were often arguing about the children.</td>
</tr>
<tr>
<td></td>
<td>She felt <strong>flastered</strong></td>
<td>She felt <strong>flisbord</strong></td>
</tr>
<tr>
<td>Ambiguous</td>
<td>Lizzy and her husband were often talking about the children.</td>
<td>Lizzy and her husband were often talking about the children.</td>
</tr>
</tbody>
</table>
She felt **flastered**  

She felt **flisbord**

---

**EXAMPLE 4**

<table>
<thead>
<tr>
<th>Related (emotions)</th>
<th>Unrelated (emotions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unambiguous</strong></td>
<td></td>
</tr>
<tr>
<td>The boss ordered Neil to finish his work at the end of the week.</td>
<td>The boss ordered Neil to finish his work at the end of the week.</td>
</tr>
<tr>
<td>Neil was overwhelmed with <strong>stroes</strong></td>
<td>Neil was overwhelmed with <strong>trabes</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambiguous</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The boss discussed with Neil about his work at the end of the week.</td>
<td>The boss discussed with Neil about his work at the end of the week.</td>
</tr>
<tr>
<td>Neil was overwhelmed with <strong>stroes</strong></td>
<td>Neil was overwhelmed with <strong>trabes</strong></td>
</tr>
</tbody>
</table>

---

**EXAMPLE 5**

<table>
<thead>
<tr>
<th>Related (emotions)</th>
<th>Unrelated (emotions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unambiguous</strong></td>
<td></td>
</tr>
<tr>
<td>Natalie mocked her brother’s Halloween outfit.</td>
<td>Natalie mocked her brother’s Halloween outfit.</td>
</tr>
<tr>
<td>She could not stop <strong>bleeking</strong></td>
<td>She could not stop</td>
</tr>
</tbody>
</table>
Natalie commented on her brother’s Halloween outfit. She could not stop bleeking. She was trupified. She was hobboted.

The house was infested with cockroaches and spiders. She was trupified. She was hobboted.

Finn had an abusive childhood experience. Finn was often described as
<table>
<thead>
<tr>
<th>Ambiguous</th>
<th>Finn had a relatively different childhood experience.</th>
<th>Finn had a relatively different childhood experience.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Finn was often described as an individual who was</td>
<td>Finn was often described as an individual who was</td>
</tr>
<tr>
<td></td>
<td>nimple</td>
<td>lufus</td>
</tr>
</tbody>
</table>

**EXAMPLE 8**

<table>
<thead>
<tr>
<th>Unambiguous</th>
<th>Related (emotions) The unsupervised toddler vandalized all over in the kitchen with crayons.</th>
<th>Unrelated (emotions) The unsupervised toddler vandalized all over in the kitchen with crayons.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upon seeing the drawings, the nanny was <strong>furion</strong></td>
<td>Upon seeing the drawings, the nanny was <strong>metalop</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambiguous</th>
<th>The unsupervised toddler drew all over in the kitchen with crayons.</th>
<th>The unsupervised toddler drew all over in the kitchen with crayons.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upon seeing the drawings, the nanny was <strong>furion</strong></td>
<td>Upon seeing the drawings, the nanny was <strong>metalop</strong></td>
</tr>
<tr>
<td>EXAMPLE 9</td>
<td>Related (verbs)</td>
<td>Unrelated (verbs)</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Unambiguous</strong></td>
<td>The carpet that Imran sat on was prickly.</td>
<td>The carpet that Imran sat on was prickly.</td>
</tr>
<tr>
<td></td>
<td>He started <strong>slatching</strong></td>
<td>He started <strong>yerning</strong></td>
</tr>
<tr>
<td><strong>Ambiguous</strong></td>
<td>The carpet that Imran sat on was uncomfortable.</td>
<td>The carpet that Imran sat on was uncomfortable.</td>
</tr>
<tr>
<td></td>
<td>He started <strong>slatching</strong></td>
<td>He started <strong>yerning</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXAMPLE 10</th>
<th>Related (verbs)</th>
<th>Unrelated (verbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unambiguous</strong></td>
<td>Tengku spotted a lion behind a bush from a distance.</td>
<td>Tengku spotted a lion behind a bush from a distance.</td>
</tr>
<tr>
<td></td>
<td>He <strong>meeled</strong></td>
<td>He <strong>retrtraned</strong></td>
</tr>
<tr>
<td><strong>Ambiguous</strong></td>
<td>Tengku spotted an animal behind a bush from a distance.</td>
<td>Tengku spotted an animal behind a bush from a distance.</td>
</tr>
<tr>
<td></td>
<td>He <strong>meeled</strong></td>
<td>He <strong>retrtraned</strong></td>
</tr>
<tr>
<td>EXAMPLE 11</td>
<td>Related (verbs)</td>
<td>Unrelated (verbs)</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
<td>------------------</td>
</tr>
<tr>
<td><strong>Unambiguous</strong></td>
<td>Erffa saw a poisonous snake moved in her backyard.</td>
<td>Erffa saw a poisonous snake moved in her backyard.</td>
</tr>
<tr>
<td></td>
<td>She decided not to <strong>pellot</strong></td>
<td>She decided not to <strong>atrik</strong></td>
</tr>
<tr>
<td><strong>Ambiguous</strong></td>
<td>Erffa saw something moved in her backyard.</td>
<td>Erffa saw something moved in her backyard.</td>
</tr>
<tr>
<td></td>
<td>She decided not to <strong>atrik</strong></td>
<td>She decided not to <strong>pellot</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXAMPLE 12</th>
<th>Related (verbs)</th>
<th>Unrelated (verbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unambiguous</strong></td>
<td>People talked about Jenner’s weight gain in college.</td>
<td>People talked about Jenner’s weight gain in college.</td>
</tr>
<tr>
<td></td>
<td>She was determined to <strong>yaxlie</strong></td>
<td>She was determined to <strong>traxertize</strong></td>
</tr>
<tr>
<td><strong>Ambiguous</strong></td>
<td>People talked about Jenner’s body shape in college.</td>
<td>People talked about Jenner’s body shape in college.</td>
</tr>
<tr>
<td>EXAMPLE 13</td>
<td>Related (verbs)</td>
<td>Unrelated (verbs)</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Unambiguous</td>
<td>Building a family in a war zone is rather difficult.</td>
<td>Building a family in a war zone is rather difficult.</td>
</tr>
<tr>
<td></td>
<td>In search of a better life, the family decided to <strong>micrane</strong></td>
<td>In search of a better life, the family decided to <strong>deficry</strong></td>
</tr>
<tr>
<td>Ambiguous</td>
<td>Building a family is rather difficult.</td>
<td>Building a family is rather difficult.</td>
</tr>
<tr>
<td></td>
<td>In search of a better life, the family decided to <strong>micrane</strong></td>
<td>In search of a better life, the family decided to <strong>deficry</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXAMPLE 14</th>
<th>Related (verbs)</th>
<th>Unrelated (verbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous</td>
<td>Fadli has kept his marriage plans a secret from Syifa for a few months.</td>
<td>Fadli has kept his marriage plans a secret from Syifa for a few months.</td>
</tr>
<tr>
<td></td>
<td>He plans on <strong>polotting</strong></td>
<td>He plans on <strong>gumbling</strong></td>
</tr>
<tr>
<td>Ambiguous</td>
<td>Fadli has kept a secret from Syifa for a few months.</td>
<td>Fadli has kept a secret from Syifa for a few months.</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>He plans on <strong>poloting</strong></td>
<td>He plans on <strong>gumbling</strong></td>
</tr>
</tbody>
</table>

**EXAMPLE 15**

<table>
<thead>
<tr>
<th>Related (verbs)</th>
<th>Unrelated (verbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous</td>
<td>Rena’s neighbour accused her of the mess that was made outside their house.</td>
</tr>
<tr>
<td></td>
<td>She immediately <strong>ratttered</strong></td>
</tr>
<tr>
<td>Ambiguous</td>
<td>Rena’s neighbour asked her about the mess that was made outside their house.</td>
</tr>
<tr>
<td></td>
<td>She immediately <strong>ratttered</strong></td>
</tr>
</tbody>
</table>

**EXAMPLE 16**

<table>
<thead>
<tr>
<th>Related (verbs)</th>
<th>Unrelated (verbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous</td>
<td>The news revealed that there are more Asians than Hispanics in South</td>
</tr>
</tbody>
</table>
It later turned out to be jullitory.

Ambiguous

The news revealed that there is a large difference in the number of Asians and Hispanics in South America.

It later turned out to be jullitory.

EXAMPLE 17

Unambiguous

Halimah has admirable leadership skills.

She is well-suited as a policitor.

Ambiguous

Halimah has admirable skills.

She is well-suited as a brooter.
<table>
<thead>
<tr>
<th>Example 18</th>
<th>Related (nouns/adjective)</th>
<th>Unrelated (nouns/adjective)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous</td>
<td>The cost of living in Toronto is extremely high.</td>
<td>The cost of living in Toronto is extremely high.</td>
</tr>
<tr>
<td></td>
<td>It is important to be truthful</td>
<td>It is important to be traffy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example 19</th>
<th>Related (nouns/adjective)</th>
<th>Unrelated (nouns/adjective)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous</td>
<td>Bobby is aware that abusing drugs and alcohol is detrimental to his health.</td>
<td>Bobby is aware that abusing drugs and alcohol is detrimental to his health.</td>
</tr>
<tr>
<td></td>
<td>However, he is reluctant to give up <em>weat</em></td>
<td>However, he is reluctant to give up <em>rojoin</em></td>
</tr>
</tbody>
</table>
Ambiguous  

Bobby is aware that abusing substances is detrimental to his health. However, he is reluctant to give up weat

EXAMPLE 20  

Related (nouns/adjective)  

Unrelated (nouns/adjective)

Unambiguous  

Renal and her friends did not want to take the bus to their prom. She hired a foller

Ambiguous  

Renal and her friends did not want to take public transportation to their prom. She hired a foller

EXAMPLE 21  

Related (nouns/adjective)  

Unrelated (nouns/adjective)

Unambiguous  

He asked his wife out for

He asked his wife out for
<table>
<thead>
<tr>
<th>Example</th>
<th>Related (nouns/adjective)</th>
<th>Unrelated (nouns/adjective)</th>
</tr>
</thead>
</table>

**Ambiguous**

<table>
<thead>
<tr>
<th>Dinner on Valentine’s Day.</th>
<th>dinner on Valentine’s Day.</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was <em>rapatour</em></td>
<td>It was <em>flettery</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>He asked his wife out to eat.</th>
<th>He asked his wife out to eat.</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was <em>rapatour</em></td>
<td>It was <em>flettery</em></td>
</tr>
</tbody>
</table>

**Example 22**

<table>
<thead>
<tr>
<th>Related (nouns/adjective)</th>
<th>Unrelated (nouns/adjective)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christa is trying to buy a new car as the car she owns is slightly rusty.</td>
<td>Christa is trying to buy a new car as the car she owns is slightly rusty.</td>
</tr>
<tr>
<td>Her car does not look gliffity</td>
<td>Her car does not look creffty</td>
</tr>
</tbody>
</table>

**Example 23**

<table>
<thead>
<tr>
<th>Related (nouns/adjective)</th>
<th>Unrelated (nouns/adjective)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christa is trying to buy a new car as the car she owns is slightly damaged.</td>
<td>Christa is trying to buy a new car as the car she owns is slightly damaged.</td>
</tr>
<tr>
<td>Her car does not look gliffity</td>
<td>Her car does not look creffty</td>
</tr>
<tr>
<td></td>
<td>Unambiguous</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Boys' room smell</td>
<td>The boys room smells like manure.</td>
</tr>
<tr>
<td></td>
<td>Their mother felt compelled to <strong>brithe</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Example 24</td>
<td>Related (nouns/adjective)</td>
</tr>
<tr>
<td>Unambiguous</td>
<td>Josh fell and fractured multiple bones.</td>
</tr>
<tr>
<td></td>
<td>He was in <strong>agorny</strong></td>
</tr>
<tr>
<td>Ambiguous</td>
<td>Josh fell and hurt himself.</td>
</tr>
<tr>
<td></td>
<td>He was in <strong>agorny</strong></td>
</tr>
</tbody>
</table>

**Note.** Scenarios are presented as auditory stimuli. Bolded words are visually presented in a lexical decision task.
Appendix D
Language Questionnaire for Malay-English Bilinguals and English Monolinguals.

Language Experience Questionnaire

Participant #:

Age:  Gender:  M  F  I prefer another descriptor

Native Country:  Father's Native Language:

Native Language:  Father's Other Languages:

Second Language:  Mother's Native Language:

Mother's Other Languages:

List the languages you know in the order:

a) in which you learned them:

b) from the one you know best to the one you know least:

Language spoken most frequently at home with your family:

1.

2.
3. What percentage of the time are you *currently* exposed to English in your daily activities? __________ %

**Experience with English**

For each of the following English language skills, please indicate the age at which you first started to acquire the skill, the place in which you learned the skill (e.g. home, school), and rate the fluency with which you can currently perform the skill. (circle one number per skill). If you were exposed to a language from birth, put 0 for age in Understanding.

<table>
<thead>
<tr>
<th>skill</th>
<th>starting age</th>
<th>place</th>
<th>fluency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>none</td>
<td>very fluent</td>
</tr>
<tr>
<td>Speaking</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
School Experience

When you were in elementary school and high school, did you receive instruction in a language *other than English* for more than 1 class per day?

If so, in which grades did you have more intensive instruction given in another language?
Appendix E

Ethics Approval

Date: 8 June 2018
To: Prof. Debra Jerald
Project ID: 12006

Study Title: Text processing in bilingual and monolingual readers
Application Type: NMRE4 Initial Application
Review Type: Delegated
Full Board Reporting Date: 06/Jul/2018
Date Approval Issued: 08/Jan/2018 14:23
RES Approval Expiry Date: 06/Jan/2019

Dear Prof. Debra Jerald

The Western University Non-Medical Research Ethics Board (NMRE) has reviewed and approved the NRKEM application form for the above mentioned study, as of the date noted above. NMRE approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMRE Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. All other required institutional approvals must also be obtained prior to the conduct of the study.

Documents Approved:

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document Type</th>
<th>Document Date</th>
<th>Document Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debriefing Form - study 1</td>
<td>Debriefing document</td>
<td>15 May 2018</td>
<td></td>
</tr>
<tr>
<td>Debriefing Form - study 2</td>
<td>Debriefing document</td>
<td>15 May 2018</td>
<td></td>
</tr>
<tr>
<td>Language Questionnaire - Malay</td>
<td>Paper Survey</td>
<td>22 May 2018</td>
<td></td>
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<tr>
<td>Language Questionnaire - English</td>
<td>Paper Survey</td>
<td>22 May 2018</td>
<td></td>
</tr>
<tr>
<td>LOI-Study 1</td>
<td>Imprinted Consent Assent</td>
<td>15 May 2018</td>
<td></td>
</tr>
<tr>
<td>LOI-Study 1A (Malay) - revised</td>
<td>Written Consent Assent</td>
<td>06 Jun 2018</td>
<td>2</td>
</tr>
<tr>
<td>LOI-Study 1B - revised</td>
<td>Written Consent Assent</td>
<td>06 Jun 2018</td>
<td>2</td>
</tr>
<tr>
<td>LOI-Study 1A (translated Malay) - revised</td>
<td>Written Consent Assent</td>
<td>06 Jun 2018</td>
<td>2</td>
</tr>
<tr>
<td>LOI-Study 1B - revised</td>
<td>Written Consent Assent</td>
<td>06 Jun 2018</td>
<td>2</td>
</tr>
<tr>
<td>NTU Poster 2018</td>
<td>Recruitment Materials</td>
<td>22 May 2018</td>
<td></td>
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<tr>
<td>Recruitment form - eng 3x SOHA</td>
<td>Recruitment Materials</td>
<td>22 May 2018</td>
<td></td>
</tr>
<tr>
<td>Recruitment Form - eng 34</td>
<td>Recruitment Materials</td>
<td>22 May 2018</td>
<td></td>
</tr>
<tr>
<td>Recruitment Form - eng 2</td>
<td>Recruitment Materials</td>
<td>22 May 2018</td>
<td></td>
</tr>
<tr>
<td>Sample stimuli - Experiment 1</td>
<td>Online Survey</td>
<td>22 May 2018</td>
<td></td>
</tr>
<tr>
<td>Sample stimuli - Experiments 2 and 3</td>
<td>Other Data Collection Instruments</td>
<td>22 May 2018</td>
<td></td>
</tr>
</tbody>
</table>

Documents Acknowledged:

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document Type</th>
<th>Document Date</th>
<th>Document Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Translation materials</td>
<td>Additional Consent Documents</td>
<td>06 Jul 2018</td>
<td>1</td>
</tr>
</tbody>
</table>

No deviations from, or changes to the protocol shall be initiated without prior written approval from the NMRE, except when necessary to eliminate immediate harm to study participants or when the change(s) involves only administrative or logistical aspects of the trial.
Curriculum Vitae

Name: Mirrah Maziyah Mohamed

Languages: English, Malay, Arabic

Post-secondary: University of Western Ontario

Education and Degrees:
- University at Buffalo, State University of New York
  B.A. Psychology (Magna Cum Laude), 2013 – 2016

Research: 2016 – 2017

Experience: Ministry of Social and Family Development, Singapore
  2015 – 2016
  Cognitive Psychology Lab, Buffalo, NY

Research: E-Prime – Psychology Software Tools

Skills:
- Qualtrics
- R Statistical Software
- SPSS Statistical Software
- Jamovi Statistical Software
OpenSesame

**Teaching**

Graduate Teaching Assistant

**Experience**

2019: Neuroscience of Motivation and Emotion

2018: Neuropsychology and Cognitive Neuroscience

2017 – 2018: Research Methods in Psychology

**Conference**


**Workshops**

2019

**And Professional Skills**

Presenting Your Research to Interdisciplinary and Professional Audiences, Western University
Rethink Your CV: Using a Personal Website to Creatively Showcase Your Graduate Experience, Western University

2018
Eye-tracking Workshop: How to Gain Insight into Reading Processes – Recreating eye-tracking studies from the Turku eye movement lab, McMaster University, Hamilton

Memberships
Graduate Student Reviewer, Western Research Psychology Journal
International Graduate Student Issues Committee