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Bilingual Cogito:

Inner speech in acculturated bilinguals

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Abstract

This paper investigates the extent of second language (L2) use in domains belonging to inner speech. The participants consist of 149 highly educated L2-competent sequential Polish-English bilinguals resident in the UK*. The independent variables include acculturation level, social network profile, length of residence, and predicted future domicile. The study combines both quantitative and qualitative approaches. All participants completed an online questionnaire, and 14 of these were also interviewed by the researcher. Results show that bilinguals who acculturate to a higher level, operate in majority L2-speaking social networks, and intend to remain in the UK indefinitely, use significantly more L2 across domains belonging to inner speech.

Keywords

Inner speech, bilinguals, L2 use, domains, acculturation, social network.

* 12 out of the 149 participants were residing outside the UK (Republic of Ireland, USA, Canada, Australia).

Introduction

Husserl used ‘cogito’ as an abbreviation for the famous ‘cogito ergo sum’ – ‘I think, therefore I am’ – from Descartes, the expression which links inner thoughts with the self (Moran and Cohen 2012). Inner speech is defined as a ‘sub-vocal or silent self-talk; i.e. mental activity that takes place in an identifiable linguistic code and is directed primarily at the self’ (Pavlenko 2011, 242). Humboldt is said to have originated discussions of language choice for inner speech in bilinguals, and it is commonly agreed that inner speech involves a substantial part of thinking activity (Guerrero 2005). According to Fields (2002, 255) ‘this nearly continuous inner conversation is so much a part of our everyday experience, that we rarely notice or remark on it’. Experiments investigating internal thinking show that people experience inner speech with the involvement of language over 50% of the time (Carruthers 2003). Sokolov (1972, 34) pointed out that inner speech is especially called into being at times when ‘solving difficult problems [as] we enter into a kind of discussion with ourselves: we formulate mentally a number of propositions, criticize them from various points of view, and finally select one of them, rejecting the rest’. Bilingual speakers’ preferences to use their L1 or L2 refer to both external and internal language use, serving both communicative and reflective purposes (Cook 1998; Cook and Bassetti 2011; Dewaele 2006a; Schrauf 2009). A notable example of choosing the L2 for non-verbal purposes is that of Eva Hoffman’s diary (1989), which uniquely describes a personal experience of language shift at the individual level (cf. Hammer 2015). Dewaele (2015b) found that languages acquired earlier in life are used more frequently in inner speech, and especially in emotional inner speech, but that decreased frequency of L1 use, high proficiency levels in L2, and increased L2 socialisation, may indeed lead to the L2 being chosen for non-verbal purposes (Dewaele 2015b). He also stressed that it takes time for a language acquired later in life (LX) to become the ‘language of the heart’ in the life of the bilingual speaker (Dewaele 2015b, 25). Larsen and colleagues (2002), who studied inner speech in

Polish-English bilinguals resident in Denmark, concluded that changes in language use for inner speech are connected to proficiency levels, and are a marker of cultural assimilation. Studies by Dewaele (2015b) and Larsen et al. (2002) link with the concept of life in a new language, which involves a shift in language use from L1 to a language learnt later in life (Hammer 2015; Hoffman 1989). Researching shifts in language use at the individual level is part of a growing field of language development over lifespan (de Bot and Schrauf 2009; Guerrero 2009). Empirical studies devoted to language use for inner speech in bilinguals are still at a very early stage (Pavlenko 2011). Grosjean (1997, 2010) stresses that bilinguals use different languages in different domains of their life, a notion known as the ‘Complementarity Principle’, which he calls for inclusion in the operationalisation process when investigating language use patterns in bilinguals. The aim of this paper is to continue the line of enquiry into inner speech in sequential bilinguals, employing an acculturation perspective, and including the Complementarity Principle in the operationalisation process. Similar to Hoffman’s diary (1989) and studies by Larsen et al. (2002), this contribution focuses on Polish-English sequential bilinguals who embarked on a life in a new language.

Literature review

Language use for inner speech

Dewaele and Pavlenko (2001) included two queries referring to language use for inner speech as part of their Bilingualism and Emotions web Questionnaire (BEQ). These included one open-ended question: ‘If you do write in a personal diary - or were to write in one - what language(s) do you or would you use and why?’; and one closed-ended question: ‘If you form sentences silently (inner speech), how frequently do you typically use...’; the options available in the second case included language choice from L1 to L5, and frequency measures including:

Never, Rarely, Sometimes, Frequently, All the time, or Not applicable. Their findings, based on 1,454 responses, showed that L1 is the preferred language for inner speech and that this preference correlates strongly with self-reported language dominance in L1. At the same time, results showed that languages other than L1 could also be internalised and used for inner speech. Variables which linked with shift away from L1 use for inner speech included socialisation in the target language, frequency of use of the target language, self-reported proficiency, as well as age and context of acquisition of the target language (Pavlenko 2014).

Dewaele (2015b) used items from the BEQ to analyse language preferences for inner speech, and especially emotional inner speech, among multilinguals. The independent variables in his analysis included age and context of LX acquisition, self-perceived LX proficiency, general frequency of use, LX socialisation and perceived emotionality of L1 and LX, as well as sociobiographical information including age, gender and education level (Dewaele 2015b). His findings showed that languages acquired earlier in life are used more frequently in inner speech, and especially in emotional inner speech. Other factors linked to the LX being used in inner speech included decreased proficiency and frequency of L1 use, increased proficiency and frequency of use of the LX, as well as fading emotionality of L1. The latter refers to circumstances where the language which used to be perceived as emotionally evocative and resonant, gradually becomes less emotionally charged and increasingly distant. He also concluded that ‘it takes a while before LX becomes internalised to the point of becoming the multilingual’s “language of the heart”’ (Dewaele 2015b, 25). This points at length of residence as a potentially important variable to include in future studies.

Cook (1998) designed a questionnaire to investigate internal L2 use in 59 multilinguals. Participants were to declare the use of both languages on a scale from ‘always L1’ to ‘always L2’. Participants included different ethnic and age groups, the latter ranging from under 18 to over 60, and their L2 learning trajectories varied. The study focused on internal language use

for organisation tasks (making appointments, shopping lists, keeping a diary, cheque stubs), mental tasks (counting, adding up, working out sums), memory tasks (phone numbers, working out routes, days of the week, historical dates), unconscious uses (dreaming, singing to oneself, talking to oneself), emotional uses (feeling pain or sadness, feeling tired, reaction to things going wrong, feeling happy), as well as praying and talking to non-communicators such as infants or animals. The questionnaire also queried participants' external language use in order to make a comparison between internal and external language use. The findings showed that external language use was more L2-oriented, while praying and non-communicative language use was more L1-oriented. On the basis of his findings, Cook (1998) suggested that there is a strong likelihood that the language used externally for a given purpose is the same as the language used internally.

Larsen et al. (2002) conducted a study on 20 Polish-Danish bilinguals who migrated from Poland to Denmark in adulthood. The authors aimed to investigate language use for inner speech and autobiographical memory in bilinguals following migration. The participants were sequential bilinguals, born and brought up in Poland, who migrated to Denmark at different stages of adulthood. Processes of acculturation and language learning were said to require a substantial cognitive effort and had it not been for migration, the participants would have undergone further stable processes of cognitive development in Polish. A group of younger and older respondents were compared as part of the study, in order to identify possible differences in their use of the two languages. The findings showed that younger bilinguals used L2 Danish more frequently for inner speech than their older counterparts. Also L2 proficiency correlated positively with L2 use for inner speech, which was later confirmed by studies carried out by Matsumoto and Stanny (2006), who suggested that proficiency and length of exposure are linked to internal language use. The results showed that participants experienced a gradual internal language shift as a result of migration. Larsen and colleagues (2002) concluded that

such language shift is a significant marker of full-scale cultural assimilation and that language is a crucial element of the acculturation process.

Schrauf (2009) studied domain-specific language use in 60 older Spanish-English bilinguals who migrated to the mainland US in early adulthood, and analysed it against language proficiency and levels of biculturality. Private, psychological domains of language use included both cognitive and affective domains such as talking to oneself, writing notes to oneself, counting, thinking, as well as dreaming, praying, swearing, expressing feelings and telling jokes. Participants were divided into three groups according to L2 proficiency (fluent, high intermediate, low intermediate) and their levels of biculturality were recorded using the Puerto Rican Bicultural Scale. Results showed that lower proficiency levels in L2 correlated positively with lower levels of acculturation, which links with findings by Hammer and Dewaele (2015). Higher proficiency groups were reported to use English significantly more frequently across different domains, when compared with low proficiency groups. Schrauf (2009, 158) concluded that participants' 'extensive patterns of English usage' were evidence for 'interiorisation of English [which] corresponds to increasing levels of acculturation to American society'.

Language dominance and length of residence in the host country following migration were also found to be linked with language use for inner speech in bilinguals. Vaid and Menon (2000) studied a group of 552 Spanish-English bilinguals in the US and found that L2-dominant bilinguals were much more likely to use the L2 for inner speech when compared with the L1-dominant group. Further analyses were made within the L1- and L2-dominant groups and comparisons revealed that 43% of L1-dominant participants declared using exclusively L1 for inner speech, while 44% of L1-dominant participants declared thinking both in L1 and L2. In the L2-dominant group, 71% declared using L2 exclusively for inner speech, while only 20% of the L2-dominant participants declared thinking both in L1 and L2 (Vaid and Menon 2000).

It would also be interesting to investigate language preferences of the participants, in order to establish what comes first: a general preference for using a given language, or a preference for using it in inner speech. Vaid and Menon (2000) concluded that language dominance and length of residence in the host country are strongly linked to the use of L2 for inner speech.

Length of residence has also been linked to enhanced linguistic performance (Bialystok 1997), as well as to processes of cognitive restructuring in bilinguals (Pavlenko 2011, 199). The notion of cognitive restructuring, which may occur following migration, is understood as the L2 taking over the majority of cognitive operations which used to be attended by L1 (Grosjean 2010). The effects of cognitive restructuring are manifested in the internalisation of new interpretive frames, and adoption of L2 for inner speech (Pavlenko 2014); phenomena which are intrinsically linked with the integration of L2-linguistic forms with autobiographical memories (Larsen et al. 2002; Marian and Kaushanskaya 2004; Marian and Neisser 2000; Matsumoto and Stanny 2006; Schrauf and Rubin 2000). Schrauf and Hoffman (2007) also point out that migration creates two contexts of language use in bilingual speakers, before and after the experience, respectively. Empirical research found that immersion in L2-speaking contexts has an impact on how bilingual speakers perceive and express emotions (Ożańska-Ponikwia 2013, 2014). Length of residence and L2-dominant context of language use have been described as reliable predictors of cognitive restructuring in bilinguals (Pavlenko 2014). L2 socialisation-driven processes of cognitive restructuring in sequential bilinguals facilitate internalisation of translation non-equivalents, as well as lexicalisation of emotions (Pavlenko and Driagina 2007). Immersion in the L2 context and high frequency of L2 use were found to be linked with an increased use of L2 for inner speech (Dewaele 2006b), where the latter is a sign of cognitive restructuring in bilinguals (Pavlenko 2014).

Language shift towards L2 in inner speech following migration is the result of gradual processes of L2 internalisation which usually follows an initial dissociation between the

external and the internal language use (Vitanova 2010). This confirms findings by Dewaele (2006b) who found that people who speak more than one language are more likely to use languages acquired later in life for social purposes, rather than for inner speech. The historian Gerda Lerner (1997) recalls her experience of the dissociation between her two languages following migration into the US:

'For nearly two years, I managed on that level of crude communication [in English], while my thoughts and dreams went on unperturbed in German.' (Lerner 1997, 35)

The process of L2 internalisation is said to come with time and is accompanied by the experience of second culture, not devoid of the individual's conscious involvement in that process, as described by Hoffman (1989):

'All around me, the Babel of American voices, hardy midwestern voices, sassy New York voices, quick youthful voices, voices arching under the pressure of various crosscurrents... Since I lack a voice of my own, the voices of others invade me as if I were a silent ventriloquist. They ricochet within me, carrying on conversations, lending me their modulations, intonations, rhythms. I do not yet possess them; they possess me. But some of them satisfy a need; some of them stick to my ribs... Eventually, the voices enter me; by assuming them, I gradually make them mine...' (Hoffman 1989, 219–20)

Empirical studies confirm that initially the process of L2 internalisation is based on a spontaneous and more or less conscious playback of the above quoted conversations, intonations, rhythms; for L2 words and sentences may be repeated both internally, verbally and in private writing (Burck 2005; Guerrero 2005; Pavlenko 2014; Vitanova 2010). Some of that

rehearsal may involve repetition of elements of conversations with others, which connects with Vygotsky's (1986) understanding of inner speech as internalised version of the interpersonal speech, the formation of which is a crucial developmental stage in childhood. As the L2 internalisation trajectory progresses, the L2 begins to be used internally in ways other than rehearsal. It begins to include language play and conversation with the self, which is associated with the final stages of the transition into the L2 (Guerrero 2005; Pavlenko and Lantolf 2000; Smith 2007). The benefits of such transition may result in the perception of feeling natural when speaking L2, and being able to fully express oneself:

'It took several years before I began to think in English. It was exciting when it actually happened and it made a qualitative difference in the way I lived. I began to be able to express myself with the speed and precision characteristic of me and most of the time I could find the word I needed without resorting to a dictionary.' (Lerner 1997, 40)

'Perhaps I've read, written, eaten enough words so that English now flows in my bloodstream. But once this mutation takes place, once the language starts speaking itself to me from my cells, I stop being so stuck on it. Words are no longer spiky bits of hard matter, which refer only to themselves. They become, more and more, a transparent medium in which I live and which lives in me — a medium through which I can once again get to myself and to the world.' (Hoffman 1989, 243)

Pavlenko (2014, 221) points out, however, that 'this is not to say that a transition to a new language - and new inner speech - is an obligatory part of the immigrant experience. Many immigrants live their lives in their native languages, keeping the other language at bay (...) Other bi- and multilinguals may have more than one language of inner speech'. The latter is

especially relevant in the context of recalling memories in bilinguals (Marian and Neisser 2000; Schrauf and Rubin 2000).

Marian and Neisser (2000) conducted a study on groups of 20 and 24 Russian-English bilinguals in order to test their memory retrieval patterns. The participants were given a word prompt in both languages and their task was to tell a story from their life which linked with the topic of the prompt. Results showed that the language in which the prompt word was presented would generally induce memories of stories which happened in that particular language. Marian and Neisser (2000) provided evidence for language dependent recall, namely the phenomenon in which language of retrieval tends to be congruent with language of encoding.

Schrauf and Rubin (2000) obtained similar results when studying a group of eight older Spanish-English bilinguals who migrated to the US at the average age of 28. They found that events which occurred before migration were reported as being internally recalled in the language in which they were encoded, namely L1. Frequency of recall in L1 would drop significantly when recalling events that occurred after migration. This coincided with findings on language use for inner speech by Larsen and colleagues (2002). Age at migration and timing of events (whether they occurred before or after migration) were found to have an effect on the internal language use to think of past events. Schrauf and Rubin (2000) concluded that language in which events are encoded is the preferred language of recall for those events, in other words, language congruence.

Psycholinguistic aspects of acculturation

At the individual level, acculturation is understood as the 'process of becoming adapted to a new culture' in which reorientation of thinking and feeling occurs (Brown 1994, 169). This phenomenon is also referred to in literature as psychological acculturation (Graves 1967; Sam and Berry 2006). Psychological changes happen alongside sociocultural adjustment, which

together results in a cultural transition (Searle and Ward 1990). Whether the individual decides to integrate into the new sociocultural reality, and to what degree, depends on the attitude to the host and heritage cultures, as well as on the psychological make-up of the individual (Adler 1977; Dewaele and Stavans 2012). Psychological acculturation refers to changes taking place in the individual who experiences culture contact, and who is influenced by the surrounding new culture, while still being internally under the influence of the changing culture of origin (Graves 1967). Acculturative changes include processes of learning the new culture, referred to as cultural adaptation, and abandoning elements of the old culture, where the latter is referred to as culture shedding (Berry 1980; Berry 1992). Acculturative changes include language practices; also, assimilation to the new society and culture have been linked with patterns of language use (Schrauf 2009).

Lifespan approach to language development rests on the empirical and intuitive understanding that both first and second language development are dynamic processes susceptible to change at different developmental stages in life. Changes in language use reflect language development across lifespan and they can be brought about by a combination of ‘cognitive, psychological, social and cultural shifts, reversals and advances’ (de Bot and Schrauf 2009, 1). Processes of migration and acculturation are considered as powerful variables which combine both sociocultural and psychological aspects, and have the potential to influence second language development over lifespan. They are powerful enough to potentially alter lines of development, which deflects lifespan approach to language from the more traditional tendency to gravitate toward the initial point of departure, potentially overlooking the richness and complexity of experience acquired throughout the life stages that follow. Individual life trajectory of the bilingual determines the development of the two languages in the mind across lifespan. Changes of a psychological nature, which lie at the convergence of nature and culture, are said to have the potential to lead to language shift towards L2, which is

reflected in gradual processes of L2 internalisation (Guerrero 2009). Progressing processes of L2 internalisation cease the pre-intellectual stage of language use, which relies on internal translation from L1. Internal translation is understood as a limitation, for it curbs spontaneity and so potentially feeds the perception of not feeling natural in L2 (cf. Pavlenko 2014). Sequential L2 development is said to consist of virtually the same stages as language development in childhood, which involves the internalisation of L2 from its initial communicative function, through the cognitive processes of concept formation, into private, inner speech in L2. Inner speech is the last phase of the developmental progression of speech intellectualisation (Guerrero 2009). The intention of a lifespan approach to second language development is to investigate *why* changes to the L2 occur at particular stages in life, and *how* they occur (de Bot and Schrauf 2009).

Methodology

Research questions

Two research questions have been formulated to investigate L2 use in domains belonging to inner speech, including: (a) thinking of events experienced in L2 (later referred to as ‘thinking L2 events’); (b) diary writing (later referred to as ‘diary’); (c) praying/internal monologue (later referred to as ‘praying’); and (d) thinking of events experienced in L1 (later referred to as ‘thinking L1 events’):

- (1) To what extent do sequential bilinguals use the L2 in different domains belonging to inner speech following migration?
- (2) What are sources of variation?

Participants

Respondents consisted of 149 highly educated L2-competent sequential Polish-English bilinguals who relocated to the UK in early adulthood. The average age at migration was 23, and ranged from 18 to 41 years old (Mean = 23.6, SD = 3.8). The average length of residence was eight years. The overwhelming majority of the participants (128) had relocated by the age of 26. All participants were university/college graduates holding academic qualifications including MAs (58.4%), BAs (26.2%), PhDs (10.1%), and College Diplomas (5.3%). All participants were professionally or academically active; the average age within the sample was 31, ranging from 23 to 45 years old (Mean = 31.1, SD = 4.7). Respondents were competent users of English and according to the Common European Framework of Reference for Languages (CEFR), 45.6% of the participants were proficient L2 users, 38.3% reported native-like proficiency, and 16.1% were independent users of English (Council of Europe 2011). The average age of onset of L2 acquisition (AoA) was 12 years old and the lowest AoA recorded within the sample was 3 years old (Mean = 12.3 years, SD = 4.6). More than a half of the respondents started learning English before the age of 13. Participants consisted of 86% females and 14% males, reflecting a typical gender representation in online questionnaires concerning language use (Wilson and Dewaele 2010).

Procedure

The present study applied both etic and emic research methods, permitting the combination of statistical quantification with individual experience (Dewaele 2015a; Dörnyei 2007). All respondents completed an online questionnaire including closed- and open-ended questions, as well as a table of language use (Hammer 2012). In addition, 14 participants were interviewed in English by the researcher.

Similar to the BEQ by Dewaele and Pavlenko (2001) the present study adopted a monolingual design. The questionnaire and the interviews were conducted in English, which is the dominant language of the country where the research was conducted (UK). This is particularly relevant in acculturation-oriented approaches, which the present study is an example of. Methodologically, this study did not attempt to employ an experimental approach by means of including questions in the participants' two languages, and measuring hypothetical qualitative effects thereof. The strength of the present design is that it can be used to investigate language use for inner speech in bilinguals with any language combination, and in different contexts. Data collection techniques in this study are congruent with those used in previous studies devoted to inner speech in bilinguals, which involved questionnaires, interviews, diaries and self-reporting (Dewaele and Pavlenko 2001; Larsen et al. 2002; Schrauf 2009). According to Mackey (1962), an extensive inter-individual variation in internal language use in bilinguals can be measured by means of a well-designed questionnaire.

Language use for inner speech data were collected using the table of language use, which was part of the online questionnaire. The table employed the Complementarity Principle in the operationalisation process, i.e. the extent of L1/L2 use was recorded for different domains of life by using a set of domain-specific language choice drop-down menus. The table of language use listed a total of 20 domains, and the four inner speech domains analysed in this paper include: (1) thinking of events experienced in L2, (2) diary writing, (3) praying/internal monologue, and (4) thinking of events experienced in L1 (Hammer 2012). As part of the table, language use information for inner speech domains was collected by means of four drop-down menus, each attached to one of the four inner speech domains, and each using a Likert scale based on 5 points: (1) Polish, (2) Mainly Polish, (3) Equally Polish and English, (4) Mainly English, (5) English. The participants were asked to think of what languages they use in the areas of life listed in the table, and to select one of the Likert-scale options for each of the inner

speech domains. Schrauf (2014) provided empirical validation for the employment of domain-specific Likert-scale self-reporting in measuring language use in bilinguals. High internal consistency reliability for language use scores across all domains listed in the table was provided by computing the Cronbach alpha score which equalled = .88. A series of one-sample Kolmogorov-Smirnov tests revealed that the scores for language use across all domains were not normally distributed (Kolmogorov-Smirnov Z values vary between 1.9 and 6.5, all $p < .0001$); therefore a non-parametric equivalent of a one-way ANOVA was used in each case.

As part of the questionnaire, the open-ended questions collected biographical information including education level, age at migration, current age, as well as the experience of a linguistic transition. The closed-ended Likert scale questions elicited key sociocultural variables including acculturation level, social network profile, and predicted future domicile. Acculturation level scores were validated by means of correlating them with other relevant variables, including: social network profile ($r_s = .454^{**}$; $p < .0001$); predicted future domicile ($r_s = .279^{**}$; $p < .001$); L2 dominance ($r_s = .450^{**}$; $p < .0001$) and length of residence ($r_s = .264^{**}$; $p < .001$). Social network analysis adopted an egocentric approach by means of investigating the participants' personal network (Daming, Xiaomei, and Wei 2009).

The semi-structured interviews were held after online data collection, and investigated changes in language use for inner speech following migration. The interview included the following questions:

(1) "Has the frequency of the use of Polish and English changed since you relocated? Could you describe this process?"

(2) "Do you sometimes think of your memories from Poland in English? If so, why not in Polish?"

During the interviews, participants were presented with a visual aid listing the four inner speech domains analysed in this paper, and were asked the following question:

(3) “Do you have any interesting observations on your change in the use of Polish and English in those areas of life?”.

The interviews were recorded and subsequently transcribed, and the transcript was read multiple times as part of the preliminary analysis. The aim of the initial reading was to allow the themes to emerge naturally and short descriptions of the topics covered were noted (Richards 2009). Following the initial reading, a deeper, second-level analysis of the text began, which included (1) coding, (2) growing ideas, and (3) interpreting the data (Dörnyei 2007). Patterns of experience emerging from the data were coded according to the themes they represented. The themes included (1) language choice in the four individual inner speech domains, (2) the overall experience of L1/L2 use in inner speech, (3) language choice for inner speech preferences, and (4) possible rationale behind selecting L1/L2 for inner speech. As part of the second-level analysis, links were made between the qualitative extracts and the research questions. The qualitative fragments quoted in this paper represent relevant patterns of experience which were particularly resonant and relevant (Smith 2011; Straub 2006).

Results

Frequency of L2 use in inner speech domains

Across all participants, the highest L2 use scores were recorded for the domain of thinking of events experienced in L2 (3.8), followed by diary (3.0) and finally at an equal level, praying (2.7) and thinking of events experienced in L1 (2.7). Figure 1 presents frequency of L2 use in inner speech domains.

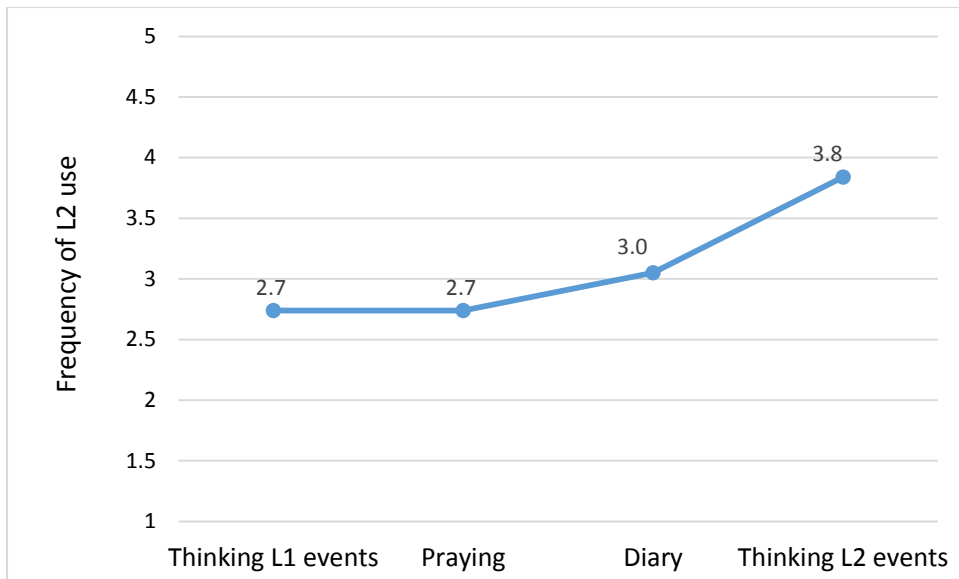


Figure 1. Frequency of L2 use in inner speech domains.

Acculturation level and L2 use in inner speech domains

Domain of thinking of events experienced in L2

A Kruskal-Wallis test showed that there is a significant effect of acculturation level on frequency of L2 use in domain of thinking of events experienced in L2 ($\chi^2 = 19.3$, $p < .0001$) with a mean rank of 50.0 for the slightly acculturated group, 53.1 for the moderately acculturated group, 77.3 for the highly acculturated group, and 92.3 for the completely acculturated group.

Domain of diary writing

A Kruskal-Wallis test showed that there is a significant effect of acculturation level on frequency of L2 use in domain of diary ($\chi^2 = 18.5$, $p < .0001$) with a mean rank of 44.0 for the

slightly acculturated group, 55.7 for the moderately acculturated group, 76.4 for the highly acculturated group, and 92.9 for the completely acculturated group.

Domain of praying/internal monologue

A Kruskal-Wallis test showed that there is a significant effect of acculturation level on frequency of L2 use in domain of praying/internal monologue ($\chi^2 = 12.9$, $p < .005$) with a mean rank of 50.6 for the slightly acculturated group, 59.3 for the moderately acculturated group, 75.5 for the highly acculturated group, and 90.4 for the completely acculturated group.

Domain of thinking of events experienced in L1

A Kruskal-Wallis test showed that there is a significant effect of acculturation level on frequency of L2 use in domain of thinking of events experienced in L1 ($\chi^2 = 13.8$, $p < .003$) with a mean rank of 47.6 for the slightly acculturated group, 61.8 for the moderately acculturated group, 73.6 for the highly acculturated group, and 92.3 for the completely acculturated group.

Synthesis of acculturation level and frequency of L2 use in inner speech domains

The results showed that higher acculturation levels were tightly linked to higher levels of frequency of L2 use in domains of, in decreasing order: thinking of events experienced in L2, diary, thinking of events experienced in L1, and praying/internal monologue. Higher levels of acculturation were linked to higher levels of frequency of L2 use across all four domains. Figure 2 below presents a comparative illustration of the effect of acculturation level on frequency of L2 use in all inner speech domains.

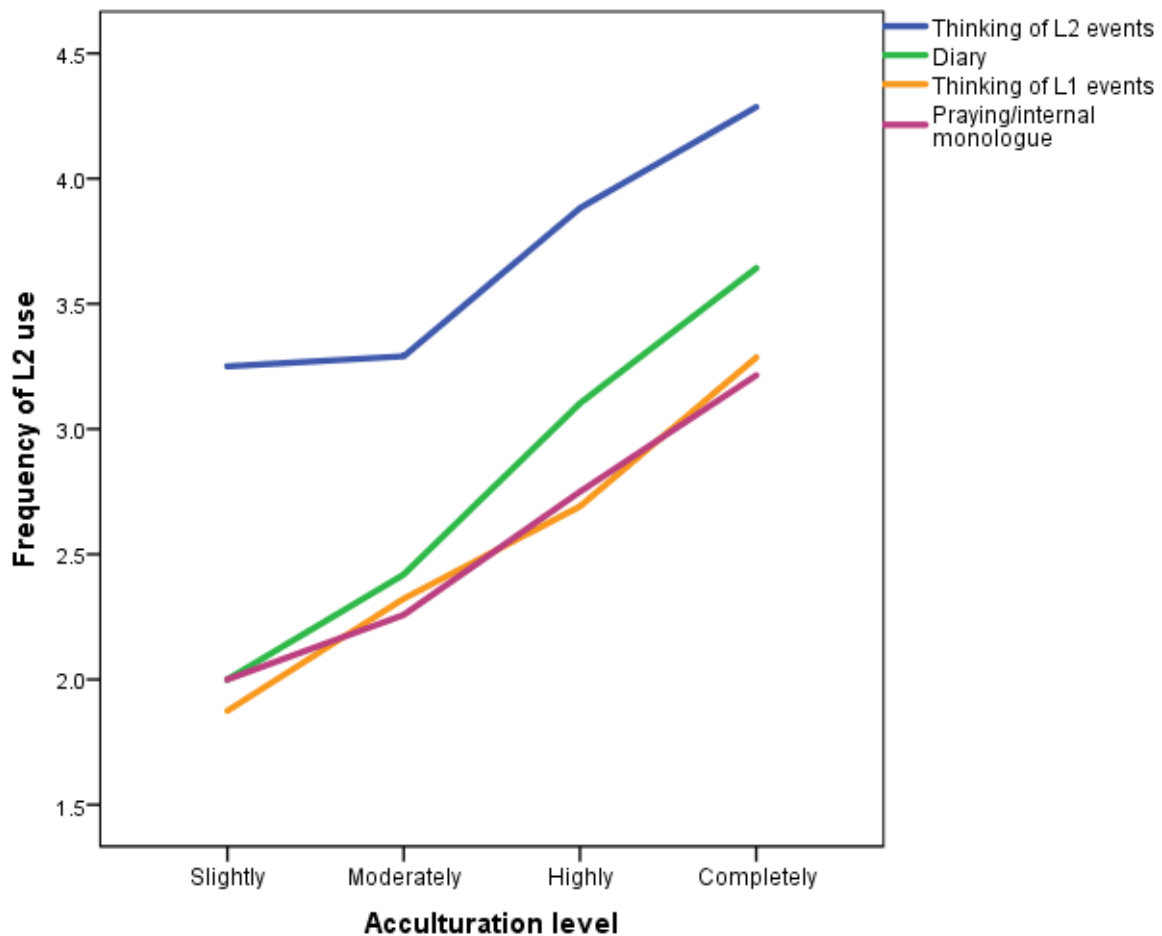


Figure 2. Acculturation level and frequency of L2 use in inner speech domains.

Social network profile and frequency of L2 use in inner speech domains

Domain of thinking of events experienced in L2

A Kruskal-Wallis test showed that there is a significant effect of social network profile on frequency of L2 use in domain of thinking of events experienced in L2 ($\chi^2 = 27.0$, $p < .0001$) with a mean rank of 52.5 for the majority Polish-speaking social network, 59.3 for the equally Polish and English-speaking social network, and 92.6 for the majority English-speaking social network.

Domain of diary writing

A Kruskal-Wallis test showed that there is a significant effect of social network profile on frequency of L2 use in domain of diary ($\chi^2 = 26.0$, $p < .0001$) with a mean rank of 42.3 for the majority Polish-speaking social network, 64.0 for the equally Polish and English-speaking social network, and 91.4 for the majority English-speaking social network.

Domain of praying/internal monologue

A Kruskal-Wallis test showed that there is a significant effect of social network profile on frequency of L2 use in domain of praying/internal monologue ($\chi^2 = 18.1$, $p < .0001$) with a mean rank of 41.3 for the majority Polish-speaking social network, 70.7 for the equally Polish and English-speaking social network, and 86.5 for the majority English-speaking social network.

Domain of thinking of events experienced in L1

A Kruskal-Wallis test showed that there is a significant effect of social network profile on frequency of L2 use in domain of thinking of events experienced in L1 ($\chi^2 = 25.7$, $p < .0001$) with a mean rank of 34.6 for the majority Polish-speaking social network, 69.8 for the equally Polish and English-speaking social network, and 88.8 for the majority English-speaking social network.

Synthesis of social network profile and frequency of L2 use in inner speech domains

The results showed that social network profile is tightly linked to higher levels of frequency of L2 use in domains of thinking of events experienced in L2, diary, thinking of events

experienced in L1, and praying/internal monologue, respectively. Majority L2-speaking social networks were linked to higher levels of frequency of L2 use across all domains. Balanced L1- and L2-speaking social networks were linked to higher frequencies of L2 use across all domains, when compared to majority L1-speaking social networks. Figure 3 below presents a comparative illustration of the effect of social network profile on frequency of L2 use in all inner speech domains.

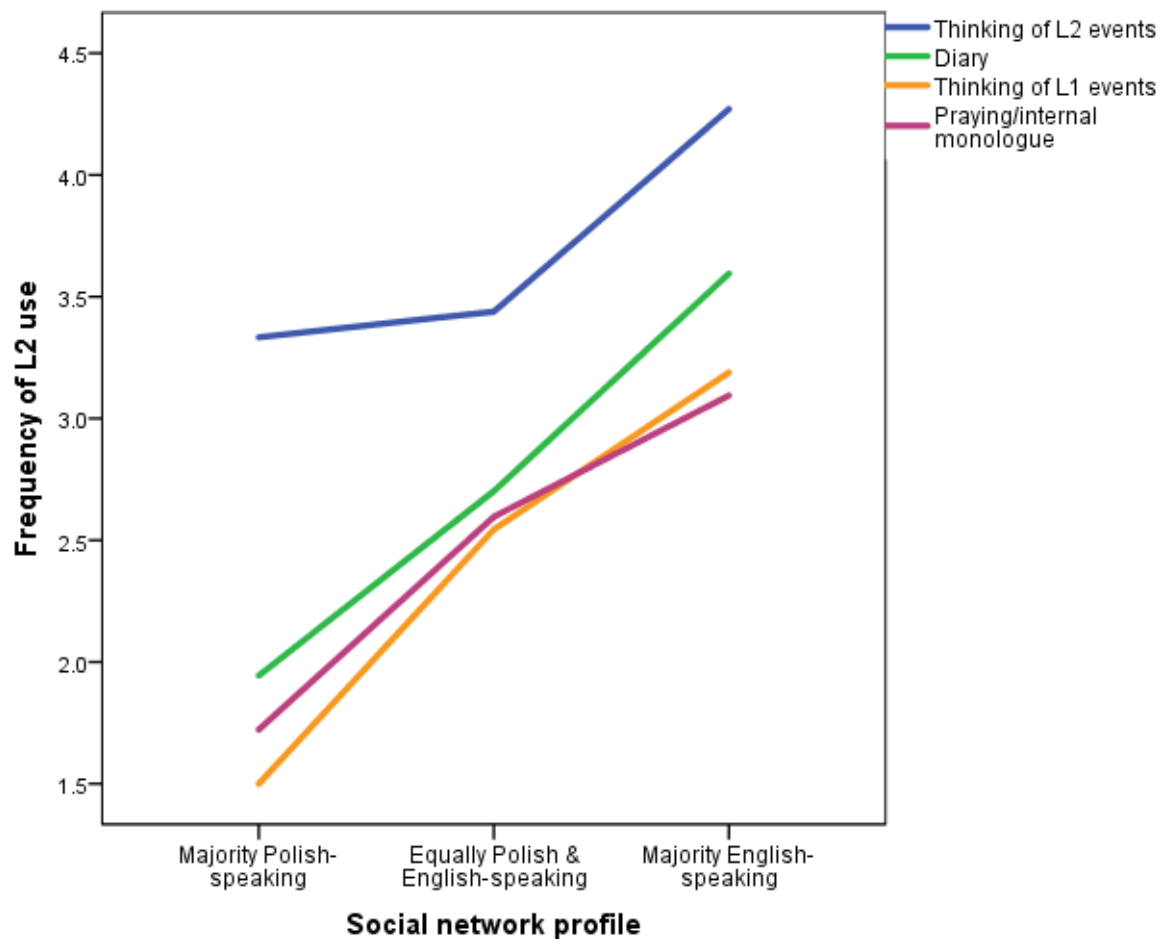


Figure 3. Social network profile and frequency of L2 use in inner speech domains.

Predicted future domicile and frequency of L2 use in inner speech domains

Domain of thinking of events experienced in L2

A series of Kruskal-Wallis tests showed that there is no significant effect of predicted future domicile on frequency of L2 use in domain of thinking of events experienced in L2 ($\chi^2 = 5.4$, $p = .069$) with a mean rank of 82.4 for the intention to stay in the L2-speaking country indefinitely, 66.9 for being unsure about predicted future domicile, and 65.9 for the intention to leave the L2-speaking country at one point in the future.

Domain of diary writing

A Kruskal-Wallis test showed that there is a significant effect of predicted future domicile on frequency of L2 use in domain of diary ($\chi^2 = 8.8$, $p < .012$) with a mean rank of 82.6 for the intention to stay in the L2-speaking country indefinitely, 70.7 for being unsure about predicted future domicile, and 46.04 for the intention to leave the L2-speaking country at one point in the future.

Domain of praying/internal monologue

A Kruskal-Wallis test showed that there is a significant effect of predicted future domicile on frequency of L2 use in domain of praying/internal monologue ($\chi^2 = 7.5$, $p < .024$) with a mean rank of 82.3 for the intention to stay in the L2-speaking country indefinitely, 70.2 for being unsure about predicted future domicile, and 50.2 for the intention to leave the L2-speaking country at one point in the future.

Domain of thinking of events experienced in L1

A Kruskal-Wallis test showed that there is a significant effect of predicted future domicile on frequency of L2 use in domain of thinking of events experienced in L1 ($\chi^2 = 7.6$, $p < .022$) with a mean rank of 81.1 for the intention to stay in the L2-speaking country indefinitely, 72.7 for being unsure about predicted future domicile, and 45.9 for the intention to leave the L2-speaking country at one point in the future.

Synthesis of predicted future domicile and frequency of L2 use in inner speech domains

The results showed that there is a significant effect of predicted future domicile on frequency of L2 use in domains of diary, praying/internal monologue, and thinking of events experienced in L1, but not on the domain of thinking of events experienced in L2. Figure 4 below presents a comparative illustration of the effect of predicted future domicile on frequency of L2 use in all inner speech domains.

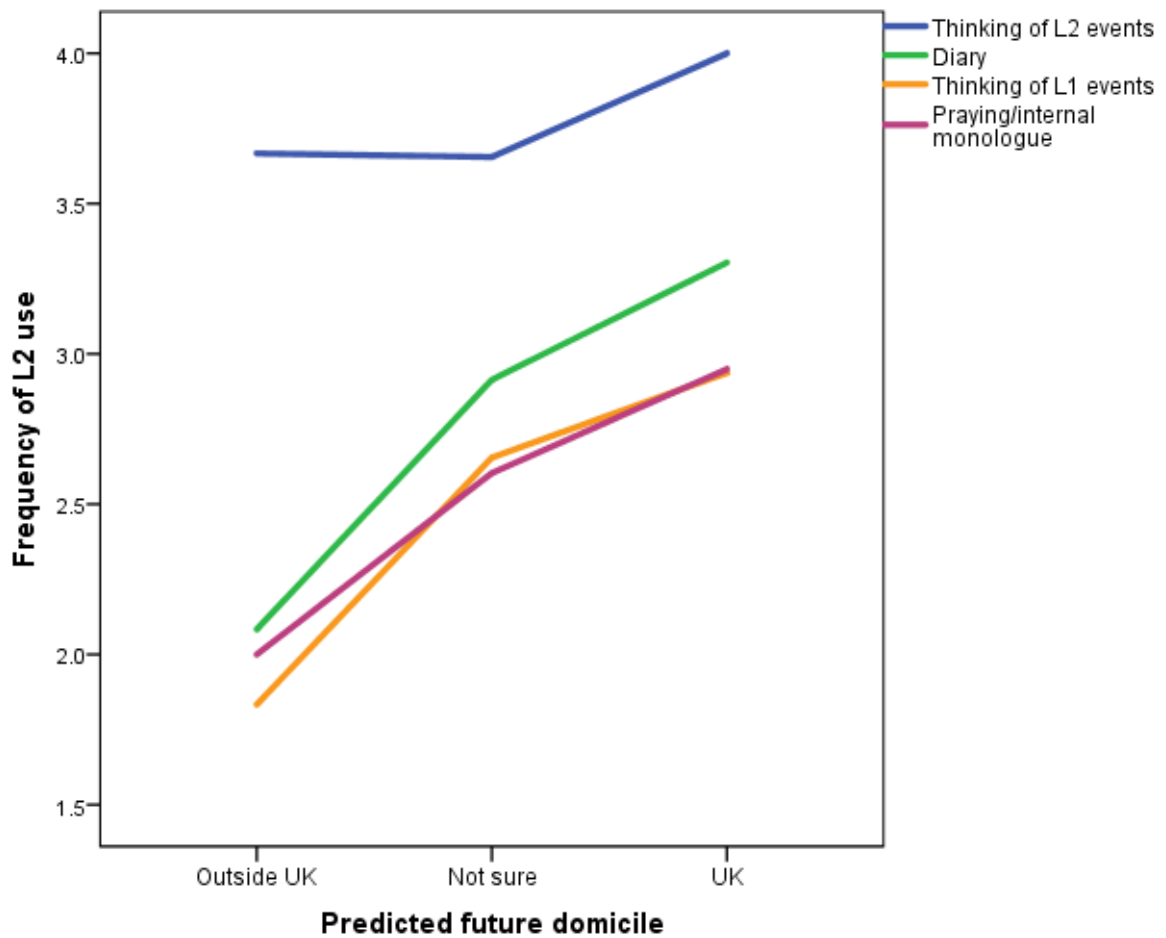


Figure 4. Predicted future domicile and frequency of L2 use in inner speech domains.

Length of residence and frequency of L2 use in inner speech domains

A series of Kruskal-Wallis tests showed no significant effects length of residence on frequency of L2 use in inner speech domains including: thinking of events experienced in L2, diary, praying/internal monologue, and thinking of events experienced in L1. The results are presented in Table 1 below:

Table 1. Length of residence and frequency of L2 use in inner speech domains.

Variable	Statistic	Domain				
		Thinking L2 events	Diary	Praying	Thinking L1 events	
Length of residence	χ^2	2.4	2.0	.234	1.2	
	p	.298	.372	.890	.541	
	Mean ranks (Kruskal-Wallis)	under 5 years	68.6	68.6	74.4	68.7
		between 5 and 10 years	75.1	75.5	74.2	77.5
10 years +		85.3	83.8	78.8	76.3	

Qualitative illustrations

The feedback from the open questions and interviews confirmed the statistical patterns. A selection of the most interesting and illustrative examples is presented below:

MI6 (highly acculturated) reported being more likely to use L1 to write her diary, as it would reflect her feelings better, but L2 for praying, as it would reflect the way she thinks about her future:

'I don't have a diary as such but I think if I had one I would have it in Polish. I think that it would be something that should reflect my feelings and I think I would be using Polish to write it down. But for praying, I think I would still use English, maybe, I don't know why, but yeah. I think that in a way moving here introduced quite a significant division in my life from before and now, so whatever is happening now tends to be happening in English, and also if I think of praying, that's usually for the future, so I'd be also using English.'

MI8 (completely acculturated) reported that her inner speech comprises both L1 and L2, depending on the context of a domain of language use:

'I'm pretty sure that depending on the context I will change from English to Polish, in my inner speech.'

N131 (moderately acculturated) reported that L1 is the language of her inner speech and that L2 is only used for professional purposes:

'Because I will always think in Polish, no matter how much I speak the language [English]. I was born in Poland and the language and culture will always be in my heart (...) English at work but Polish outside work...always!'

MI7 (highly acculturated) reported that recalling events experienced in the Polish context is richer in L1, as it brings amusement as opposed to an out-of-context recollection:

'I think when they [events] happen in Polish I can almost like refer them to someone in English, but there is more depth in Polish, just because they are culturally contextualised, so B. [English-speaking husband] wouldn't necessary get the events, because he wasn't there and he wouldn't find it funny or... [he would find it] more kind of as a recollection as opposed to the amusement...'

MI2 (completely acculturated) highlighted an interesting 'context-specificity of memory recall' itself, which in her view determines the language she uses:

'I think it would depend on the purpose that the memory came to mind; when a memory comes to mind, when you need it for something, when you need to relate it to current situation or whatever else you need it for... because you resort to memories in certain... for something, exactly, so it would depend on the reason, so if the reason happens in English, it would make sense to experience the memory in English, if you would have it in Poland and in Polish, it would make sense to have it in Polish... And this is why it's so difficult to say or to be sure how it happens exactly because it happens automatically.'

MI9 (moderately acculturated) reported that while the majority of her thought processes happen in L1, she also experiences some internal monologue in L2, especially when recalling recent events; she also reported that L1 would be her preferred language to keep a diary as she would not need to worry about language accuracy:

'Internal monologue - I noticed that sometimes I would do it in English but this is, hmm, yes sometimes I think I do it in English and this will only be about events experienced here recently, but I don't know the reason for it, maybe it's just easier in the context again, when I think about something that I experienced in English I just refer to it in English when thinking about it, but this is still 30% of the time maybe, I would definitely say that the majority of my thinking is done in Polish... But sometimes, when I have this internal monologue, it is maybe just to entertain myself, [I have it] in English, but I think this is just to practise or whatever, to check if this would work for me but yes, sometimes I do that. (...) Diary - I don't have one but if I had one I believe it would be in Polish. I think it's just easier if you speak in your native language. If you keep a diary just for you to keep track of things that happened recently, and you don't want to go back and spot a typo and lose your focus or think of the grammar for too long just so that it sounds perfect, this is just for your own usage so whichever language comes first, for me it will always be Polish.'

Discussion

The results showed that acculturation level had a significant effect on frequency of language use in all inner speech domains, including: thinking of events experienced in L2, diary writing, thinking of events experienced in L1, and praying/internal monologue. Participants with higher acculturation levels were found to use the L2 significantly more frequently across all four domains. The domain of thinking of events experienced in L2 noted the highest degree of L2 use across all acculturation groups, and this domain was found to attract the highest frequency of L2 use for both moderately and slightly acculturated participants, which distinguished this domain from the remaining inner speech domains. The remaining domains including diary writing, thinking of events experienced in L1 and praying/internal monologue, saw a steady monotonic increase in frequency of L2 use, proportional to acculturation levels. Participants with complete and high levels of acculturation were found to use the L2 more frequently in the domain of diary writing, than for thinking of events experienced in L1 and praying/internal monologue. This was in contrast to participants acculturated to moderate or slight levels, who used the L2 at a comparable level across those three domains, and did not use the L2 more frequently in the domain of diary writing.

Social network profile, which strongly correlates with acculturation level, was found to have a significant effect on frequency of L2 use in all domains belonging to inner speech. Participants operating in majority L2-speaking social networks recorded the highest levels of L2 use in all inner speech domains, the highest level being recorded for thinking of events experienced in L2, followed by diary writing, thinking of events experienced in L1 and praying/internal monologue, respectively. Participants operating in balanced or majority L1-speaking social networks were found to use the L2 significantly less in domains of diary writing, thinking of events experienced in L1 and praying/internal monologue, respectively.

The only domain for which they recorded a higher level of L2 was that of thinking of events experienced in L2.

Predicted future domicile was found to have significant effect on frequency of L2 use in domains of diary writing, praying/internal monologue, and thinking of events experienced in L1. No significant links were found between predicted future domicile and thinking of events experienced in L2, as participants who were not sure of their future domicile, and those who were planning to leave the UK at one point in time, were found to use the L2 at a similar level when thinking of events experienced in L2. An observable difference was noted, however, between the latter two groups; participants who planned to remain in the UK indefinitely seemed to use the L2 at a higher level within the domain of thinking of events experienced in L2.

The findings clearly reflected the effects of language congruence, linking with the work of Marian and Neisser (2000) and Schrauf and Rubin (2000). The two domains, namely, thinking of events experienced in L1, and thinking of events experienced in L2, noted significantly different levels of L2 use across all acculturation groups. The domain of thinking of events experienced in L1 noted a significantly higher level of L1 use when compared to the domain of thinking of events experienced in L2, which recorded a significantly higher level of L2 use. The domain of thinking of events experienced in L1 noted virtually the same frequency of L1 use as the L1-dependent domain of praying. Acculturation level was found to have a significant effect on the frequency of L2 use across both domains, and higher levels of acculturation attracted a significantly higher proportion of L2 use in both domains, when compared to lower acculturation levels. However, the domain of thinking of events experienced in L2 recorded a visibly higher frequency of L2 use even in slightly acculturated bilinguals. In fact, slightly and moderately acculturated bilinguals recorded virtually the same levels of frequency of L2 use for the domain of thinking of events experienced in L2, which provides

solid empirical evidence for language congruence (Marian and Neisser 2000; Schrauf and Rubin 2000). Despite their lower acculturation levels and lower frequency of L2 use across all other domains of inner speech, they were found to use significantly more L2 when thinking of events experienced in L2. This connects with context-specificity and the nature of memory retrieval in bilinguals (Larsen et al. 2002). This was particularly well-illustrated by a highly acculturated interviewee (MI7) who said that thinking of events experienced in L1 is richer when performed in L1, because the events are '*culturally contextualised*' and thus the overall experience of the memory is changed – that recalling it in L1 can bring '*amusement*' as opposed to '*recollection*'. The latter is a descriptive portrayal of a personal experience of language congruence. Events experienced in a particular language have a higher likelihood to be retrieved in the same language; however, as the present findings show, this also depends on acculturation levels. The language chosen to think about events experienced in the past was particularly well illustrated by one of the completely acculturated interviewees (MI2) who said that it depends on the '*purpose*' for which the memory comes to mind. She said that memories are called upon when they are '*needed for something*', for example, to '*relate it to current situation or whatever you need it for.*' Additionally, she expressed that language choice when thinking of a past memory would depend on the reason for which that memory is called for: '*if the reason happens in English*', it makes sense to experience the memory in English. This hints at something that could be referred to as an internal context-specificity of inner speech. This finding indicates that if the thought process happens in one language, memories may be '*accessed*' in that same language, reflecting the context of the thought process. Whether there are differences in how the memories are experienced or appraised remains an unanswered question at this stage, but such context-specific language selection to access memories could be linked to broader phenomena of frames of reference in the bilingual mind, as well as culturally-specific ways of appraising events (Marian and Kaushanskaya 2004; Panayiotou

2004a; Panayiotou 2004b; Pavlenko 2014). Highly acculturated bilinguals use the L2 significantly more across more domains of life, and they are more psychologically involved in the L2-speaking sociocultural context, which has an effect on their more frequent instances of accessing memories in L2. The present findings provide empirical evidence to support Larsen et al. (2002) in that language shift in inner speech is a marker of acculturation. Moreover, the findings suggest that highly acculturated bilinguals are more likely to undergo processes of cognitive restructuring, which is manifested in an increased L2 use for inner speech in those speakers.

The domain which recorded an intermediate frequency of L2 use within inner speech in highly acculturated bilinguals was the domain of diary writing. The frequency of L2 use in the domain of diary writing was the highest for completely and highly acculturated bilinguals, and would drop significantly for moderately and slightly acculturated bilinguals. The results indicate that the domain of diary writing perhaps connects the two timelines, the different stages of the life and experience, from before and after migration, and consolidates it in a form of, perhaps, bilingual diaries. Diaries are devoted to description of autobiographical memories, and if these are presented in both languages, it may indirectly suggest that an internalisation of L2-oriented interpretive frames has occurred, which is one of the markers of cognitive restructuring in bilinguals.

An interesting differentiation in domain-specific language preferences within inner speech was made by one of the interviewees (MI6) who shared that her diaries would be written in Polish, but that she would, surprisingly, pray in English. She explained it by saying that migration introduced a '*division*' in her life into '*before and now*', that most of her life now happens in English, and because praying is '*for the future*', she would choose English to pray in her own words. This insight directly links with Schrauf and Hoffman's (2007) notion of there being two contexts of language use in bilinguals following migration, and that L2

development in the life of the bilingual is tightly linked with their more general development across life stages (de Bot and Schrauf 2009).

Conclusion

This study provides empirical evidence that acculturation and its core constituents, namely social network profile and predicted future domicile, have a significant effect on frequency of L2 use in inner speech. Length of residence was found to strongly correlate with acculturation level, however it did not prove to be a causal variable in its own right. It appears that processes of L2 internalisation are tightly linked to processes of acculturation; in other words, it is not the length of residence that is at the core of the transformative process, but it is what happens during that length of residence that either facilitates or prohibits the spread of L2 within inner speech. Strong correlation between acculturation levels and length of residence suggests, however, that high acculturation levels are linked with greater length of residence, but the study provides empirical evidence that it is not the latter variable that is the driving force, but the former. The present study provides evidence that acculturation is strongly linked to increased levels of L2 use in inner speech. Adoption of L2 in inner speech, in turn, indicates ongoing processes of cognitive restructuring in acculturated bilinguals (Dewaele 2015b; Pavlenko 2011).

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