The Relationship Between Emotion and Codeswitching in Spanish-English Bilingual Speakers

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The Relationship Between Emotion and Codeswitching in Spanish-English Bilingual Speakers

A thesis submitted in partial fulfillment of the requirement for the degree of Bachelor of Science in Linguistics from The College of William and Mary

by

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Abstract

Past research has found that there appears to be some relationship between emotion and language, with evidence suggesting that emotion may influence a bilingual speaker to codeswitch from their L1 to their L2 (Aycicegi & Harris, 2004; Ladegaard, 2018). The present research examined from a corpus 10 sociolinguistic interviews with second-generation bilingual Spanish-English speakers, comparing the amount of codeswitching that occurred in emotional segments of discourse versus non-emotional segments of discourse. This study aimed to answer the question of whether the presence of emotion effects the tendency for a bilingual speaker to engage in codeswitching in order to better understand why bilingual speakers engage in codeswitching and uncover potential motivations for doing so. While the present study hypothesized, in line with past research, that emotion would lead to bilingual speakers codeswitching more, results indicated that discourse that is not strongly associated with affect-producing topics of conversation resulted in more codeswitching. This was demonstrated by codeswitching occurring in only 30.5% of emotional discourse while 54.9% of non-emotional discourse contained a codeswitch. The fact that the tendency to codeswitch was strongly related to what were considered ‘non-emotional’ contexts motivated a closer examination of codeswitching by individual discourse topics, yielding a significant relationship between discursive topic and codeswitching.
1. Introduction

The goal of this research is to investigate the relationship between emotion and codeswitching, or the tendency to use two languages within a discourse (Poplack, 1980) among bilingual English-Spanish speakers. Particularly, this study considers whether emotion-provoking topics (whether related to positive affect or negative) result in a greater tendency to codeswitch than non-emotional topics. Several previous publications have alluded to an association between emotion and a bilingual speaker’s choice of language (Deriche, 2017; Sutton, Altarriba, Gianico & Basnight-Brown, 2007). However, to date, the overall body of research on the relationship between the psychological and physiological experience of emotion and bilingual speech behaviors is limited (Williams, Srinivasan, Liu, Lee & Zhou, 2019).

This investigation aims to add particularly to a lacking pool of research on emotion and language use, as well as contribute to a larger body of research on codeswitching more generally in an effort to ameliorate some of the stigma surrounding bilingual speech behaviors. Elaborating on the sparse literature available on this topic is important because, despite numerous studies indicating that bilingual mixed speech is not merely a result of lexical inadequacy or processing difficulty (Haugen, 1950; Weinreich, 1966), prejudices and negative judgements surrounding the linguistic behavior of bilingual individuals, specifically as related to codeswitching, persist. By adding to the research on the motivations behind codeswitching, in this case the emotional components of conversation, these prejudices become increasingly less warranted and defensible.

1.2 Codeswitching
Codeswitching in this study is defined as the use of two or more languages in discourse, without either language influencing the linguistic patterns of the other (Poplack, 1980). This type of linguistic behavior is intimately linked with bilingual individuals who possess functional mastery of two languages. While codeswitching theoretically involves either a change from language one to language two, or vice-versa, codeswitching in this study focuses particularly on codeswitches that occur from a Spanish base or ‘matrix’ language (Myers-Scotton, 1992), which will be also be referred to as the ‘community L1’ or simply ‘L1,’ into English, which will be referred to as the ‘community L2’ or just ‘L2.’ Typically, codeswitching refers to multiple-word strings of one language inserted or alternated with multiple-word strings of another language. However, discourse qualifying as having an utterance of codeswitching might also contain even a single-word other language string.

Take, for example, the following excerpt:

(1) From Poplack (1980)
me iban a lay off
‘they were going to lay me off’

In example (1), the speaker dips into English to say ‘lay off,’ an idea that they could have also expressed by continuing in Spanish. That is, the speaker could have used the Spanish term ‘despedirse’ to express the notion of getting laid off; instead, the speaker codeswitched into English for this phrase. For this reason, ‘lay off’ is considered an example of codeswitching.

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1 The designations of ‘L1’ for ‘Spanish’ and ‘L2’ for ‘English’ are not meant to imply anything about the order of learning or dominance for the participants of this study. For some, Spanish may have been learned first, but English may be dominant; alternatively, some participants may be equally proficient in English and Spanish, or a participant may have learned English and Spanish simultaneously in infancy. The use of ‘L1’ for ‘Spanish’ and ‘L2’ for ‘English’ are simply referents for the languages.
Codeswitching in this study is contrasted with another bilingual speech phenomenon: that of lexical borrowing. Lexical borrowing, or just ‘borrowing’ for short, is considered to be the incorporation of a single word or phrase with a single referent that has been incorporated into the lexicon of the recipient language. Lexical borrowing may be motivated by the need to reference a novel concept in one’s own language (L1), often a term or phrase specific to a culture or technology (Poplack, 1988). A borrowed word may start at the individual level, then branch out to circulate in a community.

A long-standing polemic in the field of bilingual speech research is the question of how to tell whether a single word in discourse is a single-word codeswitch or else an established lexical borrowing (Poplack, 1988). A single-word English-origin item is considered a borrowing when there would not be a reasonable Spanish-language substitute for the English-origin lexical item employed by the speaker.

For the purposes of this study, deciding whether any given single-word lexical item will be considered a codeswitch or a borrowing is determined on the basis of whether there exists in the recipient language (i.e. Spanish) a word or brief paraphrase for the ‘other language’ (i.e. English-origin) lexical item used. If there was fairly direct translation for the word into Spanish, it was considered a codeswitch. Take the following two examples:

(2) Yo pensé que veníamos a Disneyland no? (INF# 350M)
‘I thought we were going to Disneyland?’

(3) y.. y.. pero ya con.. como con.. dibujado, dibujado por mí ya en la cámara hecha, ¿you know? (INF# 010U)

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2 The borrowing may meet the functional and social factors to become a frequently-used word in the community; however, wide social distribution is not the sole criterion for considering a lexical item to be considered an established element in the lexicon of a recipient language.
‘and.. and.. but already with.. as with.. drawn, drawn by me in the camera already, you know?’

The word ‘Disneyland’ in example (2) was taken from English and employed in Spanish without any translation. This is considered a borrowing because ‘Disneyland’ is an English-origin lexical item for which there is no reasonable Spanish-language substitute. The speaker had no other choice but to employ the English-origin lexical item.

Example (3) is an example of where a single-word English-origin item is considered a codeswitch due to the presence of a term or another means of expressing the concept in Spanish. The phrase ‘you know’ used here by the participant in example (3) has a Spanish equivalent that was not used here (‘tú sabes?’); thus ‘you know’ is considered a codeswitch.

Another example, similar to example 3, is if the participant uses the word ‘New Jersey’ it is considered a codeswitch because there exists a fairly straightforward way of rendering this phrase in Spanish: ‘Nueva Jersey’ (compared to, for example, the commonly used expression ‘Nueva York’ for ‘New York’).

1.3 Emotion

The textbook definition of emotion is “relatively intense feelings characterized by physiological arousal and complex cognitions” (Kenrick, Neuberg, Cialdini & Lunderberg-Kenrick, 2020). Emotions can be further defined as biologically generated elements which must be enriched by meanings before becoming experiences. There are biological, cognitive and cultural factors that give rise to emotion (Panayiotou, 2004). Additionally, Panayiotou suggests that the expression of emotion is language-dependent, meaning language is a vehicle through which we access and express emotion.
1.3.1 Emotion, language choice and codeswitching

Studies by several scholars have suggested a link between emotion and one or another of a bilingual speaker’s languages. For example, Panayiotou (2004) investigated whether an identical scenario presented in two different languages would elicit differing interpretations and emotional responses by bilingual speakers. Her results indicated that bilinguals do react differently to two versions of the same story; they offer the “culturally appropriate” emotional responses based on the language they received the story in. This study found that changing the language in which a participant receives a narrative indexes a change in social or cultural code; in other words, a person’s emotional response to a discourse is cued, or motivated by, the language being used. This is further supported with the conclusion that bilingual speakers themselves report different emotional associations with their L1 and L2 with emotional experience (Williams, Srinivasan, Liu, Lee & Zhou, 2019).

Further bolstering the position that emotions are language-dependent, codeswitching itself has been linked to emotion in the work of several scholars. For instance, Ladegaard (2018) described codeswitching as a tool to pick an expression to best represent an emotional state. In other words, and in the opposite direction of Panayiotou’s study, an emotional state can give rise to a change in language being used. Likewise, Ferreira (2017)\(^3\) posits that codeswitching serves as a strategy to enrich emotive discourse through a less dominant language, L2. The

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\(^3\) The data from this study came from a sociolinguistic interview conducted between a mother and daughter. The mother did not have formal education in Galician in childhood and Spanish is her dominant language, while the daughter did receive formal education in Galician in childhood, but Spanish is her dominant language; however, the daughter is a more frequent user of Galician than her mother.
author claimed that affective meanings (for example, contempt or emotional reciprocity) are linked to either a speaker’s L1 or L2 depending on the experience, and that those affective meanings play a role in explaining language choice and emotional expression. In that study, the switch occurred from the speakers more dominant language, Spanish, into their less dominant language, Galician. In other words, the evidence from this study seems to suggest that the emotional cues (whether a positive or negative emotional cue) are strongly associated with an L2. However, this association of an L2 with emotional contexts may simply have been a reflection of the bilingual ability of the speakers that happened to be in her study.

There is evidence, however, in the literature that supports the idea that negative emotion in particular motivates a greater reliance on an L2, or a less-dominant language, and therefore there is greater tendency to codeswitch for emotional topics if an individual is speaking in their L1 at the time. While investigating bilingual speakers’ recall and recognition of emotion words, Aycicegi & Harris (2004) discovered that the emotional advantage was stronger in participants’ L2 than L1 through recall and recognition tasks. Participants received lists of words containing items of positive, negative and neutral emotional valence, as well as taboo words and words of reprimand. The study used the term ‘emotional advantage’ here to describe the advantage that an emotional connection provided in recognition and recall. The study concluded that an emotional word would be better recognized and recalled than a neutral (or ‘non-emotional’) word in the participant’s L2⁴. In particular, bilingual speakers processed negative emotion words more deeply in their second language, perhaps because the

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⁴ It is important to note that the participants in the Aycicegi & Harris (2004) study were late second-language learners; they learned English later in life and reported better proficiency in their L1, Turkish.
unpleasant feelings are more tolerable in a second, less dominant language. This claim is supported by Ladegaard’s (2018) study into codeswitching and emotional alignment. When domestic migrant worker returnees discussed their pasts, codeswitching was used as a means of emotional distancing; for example, speakers switched from their native L1 (Bahasa) to their less dominant L2 (English) when narrating emotionally-charged experiences, specifically negative occurrences.

While there remain varied positions in the literature on the exact relationship between emotion and codeswitching (for instance, whether emotion gives rise to language change, or language change inspires different emotional reactions), several studies support the notion that if codeswitching appears in emotional contexts, it occurs in the direction of bilingual speakers switching from their more dominant L1 into their less dominant L2. This can be seen from Ladegaard’s (2018) findings of codeswitching as a means of emotional distancing to Aycicegi & Harris’ (2004) results supporting a higher level of recall and recognition of emotional words in a speaker’s less dominant language. Thus, there appears to be some relationship between emotion and language, with evidence suggesting that emotion may influence a bilingual speaker to codeswitch from their L1 to their L2.

1.4 Research question

Many questions still surround bilingual mixed speech, specifically why people codeswitch at all. This led to the development of the research question at hand: does the presence of emotion impact the tendency for a bilingual speaker to engage in codeswitching?
and, in particular, how will emotional contexts affect the codeswitching behavior of functionally balanced bilingual speakers?

The following corpus analysis examines 10 sociolinguistic interviews with second-generation bilingual Spanish-English speakers to compare the amount of codeswitching that occurs in emotional segments of discourse versus non-emotional segments of discourse. This research aims to answer the question of whether the presence of emotion effects the tendency for a bilingual speaker to engage in codeswitching in order to better understand why bilingual speakers engage in codeswitching and uncover potential motivations for doing so. A main hypothesis was established in regard to the research question: speakers will tend to codeswitch more in emotional segments of discourse than in non-emotional segments of discourse. Although the participants have a high self-reported proficiency in both Spanish (as also demonstrated by engaging in extended conversations in Spanish) and English (by virtue of being raised in the United States), it was hypothesized that emotional discourse would lead to a greater overall tendency to codeswitch from Spanish (presumably the language of the home and first-learned language of many informants) to English (the latter-learned language for several of these individuals). Under this assumption, the hypothesis follows what appears to be suggested in past literature, that affect-evoking contexts will prompt a codeswitch from a speaker’s L1 to their L2.
2. Methods

2.1 Participants/about the corpus

Data for this study comes from the Otheguy-Zentella Corpus (OZC) of Spanish in New York City (Otheguy & Zentella, 2012), which is a stratified sample of interviews with Spanish speakers living in New York City. Informants are bilingual speakers of Spanish and English. Participants were recruited via a ‘snowballing technique’ (Oppenheim, 1992), meaning the first informants began as people who had a relationship with the research team (friends, family, etc.) who then referred additional participants to the investigation team. All informants belonged to one of six ethnonational groups: Puerto Rican (P), Dominican (D), Mexican (M), Cuban (U), Colombian (C) or Ecuadorian (E). For the purpose of the current investigation, the interviews had already been completed and a subsample was used from the already existing corpus.

The informants are stratified according to five principal sociodemographic traits: (1) ethnonational affiliation, (2) Latin American region of origin, (3) sex, (4) age of arrival to the U.S. and (5) occupational class. There was also an attempt to evenly distribute participants with six secondary variables: (6) age, (7) years in the U.S., (8) level of education, (9) English skills, (10) Spanish skills and (11) Spanish daily use.\(^5\)

Interviews were conducted using Labovian sociolinguistic interviewing techniques (Labov 1963; Otheguy & Zentella 2012), and informants were prompted to speak on similar topics to loosely structure the conversations. These topics included, but were not limited to, the speaker’s first time in the United States, life in New York, popular music, work, family,

\(^5\) See Otheguy & Zentella (2012) for more on these variables and selection traits.
personal relationships and education. Interviews were conducted in each informant’s home. Informants were aware that their participation in the interview was conditional upon their ability to speak Spanish, but it was never suggested that Spanish be the only or dominant language used. Some participants asked whether another language (i.e. English) may be used, to which they were told it was fine to do so. Interviews lasted approximately one hour.

2.2 Interview inclusion criteria

Of the 146-interview corpus, comprised of interviews with both first- and second-generation Spanish speakers, a sub-sample of $10^6$ were used for the purpose of this investigation. The selected interviews were those of the second-generation, who were also bilingual in English. Being of the second-generation was an inclusion criteria because these individuals are more likely to engage in codeswitching than are first-generation speakers (Varra, 2018). For the purpose of this analysis, ‘second-generation’ is defined as having been born and raised in the United States or arriving to the U.S. before the age of three.

2.3 Data and coding

Data for this study were English language codeswitches found in an otherwise Spanish-language discourse, as defined in section 1.2.

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6 The OZC contains 48 second-generation interviews; however, this investigation utilized interviews from only 27 individuals whose audio files were currently available, in case reference to those files were needed for additional analysis. One interview was excluded as it followed a different format, being that three speakers were present in the interview and therefore may have had a different interaction than the other 26 interviews. 10 of these interviews were used for the current study’s analysis.
In some cases, words that were of English-origin were not considered to be codeswitches because they were considered to be fully integrated into the lexicon of Spanish speakers in New York. These were therefore excluded from the study. There were a total of 468 excluded English-origin strings, all of which were of the following types: (1) words also used in the Spanish language, i.e. loanwords fully incorporated into the Spanish language (ex. proper nouns such as ‘Manhattan’ and ‘Michael Jackson’); (2) international loanwords, defined by Haugen (1950) as words that are common to most west European languages to have a similar spelling and meaning regardless of difference in pronunciation (ex. musical terms such as ‘rock’ and ‘reggae’); or (3) words that could have been uttered in either Spanish or English (ex. oh, umm, wow). These words were thus not considered to be codeswitches for the purpose of this investigation.

2.3.1 Coding procedure

First, discourse topics were categorized as either ‘emotional’ or ‘non-emotional’ topics (see section 2.3.2). Then, all segments of discourse by discursive topic were extracted from 10 interviews. These 10 interviews were stratified by gender (five male and five female) and ethnicity two Colombian, one Dominican, three Ecuadorian, two Mexican, one Puerto Rican, one Cuban). Finally, each segment of discourse was coded for emotional valence, presence of codeswitching, amount of codeswitching and total words uttered in the discourse segment.
Each segment of discourse was coded for emotional valence, coded as either ‘emotional’ or ‘non-emotional’ (see section 2.3.2.). The word count\(^7\) of the emotional discourse segment was calculated and included as a procedural column used to calculate the word count in Excel. Total word count of the emotional discourse in an entire transcript was calculated by summing the procedural word count column and encoded in another total word count column.

Next, all English words used by an informant in their interview (initially including those items mentioned in the previous paragraph) were highlighted and double checked with a second reading. These were then extracted and inserted into an Excel spreadsheet, along with co-occurring discourse, for subsequent coding. ‘Exclusion items’ (i.e. those not considered to be part of the envelope of variation; see section 2.3) were removed.

Each segment of discourse was coded for codeswitch presence. In other words, the segment of discourse was coded as having a codeswitch or not having a codeswitch. The segment of discourse was further coded for the number of dips (i.e. the number of times in a segment of discourse that the speaker codeswitched) and the number of individual words of English used for codeswitching within that stretch of discourse.

2.3.2 Coding for emotional valence of discourse topic

For the purposes of this study, the emotional valence of a discourse was determined on the basis of the thematic content of the discourse, which corresponded to the structured modules of the sociolinguistic interview and the investigator’s own anecdotal experience of

\(^7\)For the purpose of this investigation, word counts are a count of strings of characters between white spaces, not indicative of the mental lexicon. Defining word count in this way does not skew the results in any direction.
topics that would be likely to provoke or be associated with strong positive or negative affect for a person.

There were seven discursive topics that were considered ‘emotional’ in line with the researcher’s U.S. culturally-bound experience with topics that tend to provoke affect (or not) for individuals. The ‘emotional’ discursive topics included: (1) segments of discourse with repeated words; (2) segments of discourse containing key words; (3) segments of discourse describing major life events; (4) segments of discourse describing family or significant others; (5) segments of discourse illustrating danger; (6) segments of discourse describing passions; and (7) segments of discourse highlighting cultural elements or holidays. There were seven discursive topics were considered ‘non-emotional’. The ‘non-emotional’ discursive topics included: (1) back-channeling and laughter; (2) yes and no responses or questions; (3) segments of discourse describing work; (4) segments of discourse describing general hobbies; (5) facts or general statements; (6) segments of discourse describing school; and (7) segments of discourse describing daily routine. For the sake of simplicity these discursive moments will heretofore be referred to as ‘emotional’ or ‘non-emotional’ discourse, respectively. For example, informant 333D discussing his job working with disabled children was marked as ‘emotional’ (passion) while his description of hanging out with his friends was marked as ‘non-emotional’.

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8 The determination of ‘emotional’ and ‘non-emotional’ topics is subjective in nature. It is important to note that a topic that provokes strong affect for one person may not provoke the same type or degree of affect for another. Additionally, there is a cultural component to affect that was interpreted to be ‘affect-invoking’ in a U.S. cultural context; however, these cultural components may not have the same type or degree of affect for those that also share cultural connections to other places. Nevertheless, it is reasonable to believe that, since the informants are second-generation and were raised in the U.S., there would be a correlation between what topics the investigator associates with affect and what these individuals would likewise associate with affect.
A topic change for the purpose of this analysis is defined in two ways. First, if the interviewer introduced a new question or subject, the topic was considered to be changed. Second, if the interviewee shifted to discussing a different topic or asked their own question, the topic was considered to be changed.

Examples of the discursive topics for which the segment of discourse was considered ‘emotional’ follow.

(1) Major Life Events – Ex. 1 Graduating
   yo si me gradué con un poco pero ese poquito que nos graduamos ingresamos a la universidad (INF# 300E)
   ‘I did graduate with a little but that little bit that we graduates entered the university’

(2) Major Life Events – Ex. 2 Death
   mi primo se murió (INF# 010U)
   ‘my cousin died’

(3) Major Life Events – Ex. 3 Marriage
   en el 96 ya fui preparado para terminar mi casa y casarme (INF# 334E)
   ‘in 96 I was already prepared to finish my house and get married’

(4) Major Life Events – Ex. 4 Divorce
   el divorcio de mis padres (INF# 024C)
   ‘my parent’s divorce’

(5) Family/Significant Other – Ex. 1 Family
   My mom will set you straight, la mamá te va a decir lo que tú haces mal, lo que tú haces bien, más lo que tú haces mal que otra cosa (INF# 333D)
   ‘My mom will set you straight, the mom will tell you what you do wrong, what you do well, more what you do wrong than anything else’

(6) Family/Significant Other – Ex. 2 Significant Other
   yo tenía una novia aquella.. que era.. parte del grupo (INF# 037D)
   ‘I had a girlfriend there.. that was... part of the group’

(7) Danger
   y... pero yo sinceramente vivo tranquila en el... en el barrio aunque yo sé que tiene su peligro y su... y su... Tú sabes su... su situación, sí... (INF# 010U)
‘and... but I sincerely live quietly in the... in the neighborhood although I know that it
has its danger and its... and its... you know its... its situation, yes...’

(8) Passion
cuando se gradúan que ya tienen tres años, que uno los manda para preschool, it’s a
joy to see them when they don’t need you anymore, when they don’t need your
services (INF# 333D)
‘when they graduate they are three years old, when they send them to preschool,
it’s a joy to see them when they don’t need you anymore, when they don’t need
your services.’

(9) Culture/Holidays
A mí me parece que la Navidad es muy diferente. ... la Navidad en Colombia es muy
alegre (INF# 024C)
‘It appears to me that Christmas is very different. ... Christmas in Colombia is very
happy’

Finally, a segment of discourse that would, by virtue of the topic, be considered ‘non-
emotional,’ might ultimately be classified coded as ‘emotional’ if particular linguistic behaviors
occurred, including repetition, use of intensifiers with qualitative evaluation or particular key
words (see examples 10 and 11).

(10) Repetition
Me gusta, me gusta mucho Michael Jackson (INF# 008U)
‘I like, I really like Michael Jackson’

(11) Key Words
Bueno esa es una pregunta bien heavy... (INF# 010U)
‘Well, that is a heavy question’

Examples of the seven discursive topics for which the segment of discourse was
considered ‘non-emotional’ follow.

(12) Back-Channeling/Laughter
Mhm. Mhm, Mhm. Mhm Sí. Jjj. (INF# 324E)

(13) Yes/No Responses, Questions
¿Tú conoces Silohé? (INF# 158C)
‘You know Silohé?’
(14) Work
No, tuvimos pérdidas, porque tenía que liquidar el ... y deudas que había, entonces, deudas que se habían adquirido como a largo plazo (INF# 158C)
‘No, we had losses, because we had to liquidate the ... and debts that were, then, debts that had been acquired as long-term’

(15) Hobbies (non-passionate)
Como no sé tanto de boxeo... No te puedo decir exactamente qué me gusta de Durán. Pero me gusta que e ... él se ha destacado dentro de los demás boxeadores. Quizás por su personalidad, que pelea, que habla muchas cosas y protesta y ... Se sale un poco de ... de lo normal (INF# 008U)
‘Since I don't know much about boxing... I can't tell you exactly what I like about Durán. But I like that he ... he has stood out among the other boxers. Perhaps because of his personality, that he fights, that he talks a lot of things and protests and ... He gets a little out of ... of the normal’

(16) Facts/Statements
Se trata de dos muchachas que viven con un muchacho (INF# 008U)
‘They are two girls who live with a box’

(17) School
Diferente, pero fácil para adaptarme, porque no... no... no había nadie que hablara español en mi clase, y a los pocos meses ya estaba hablando y defendiéndome en mi clase (INF# 173C)
‘Different, but easy to adapt to, because there was ... no ... there was no one who spoke Spanish in my class, and after a few months I was already speaking and defending myself in my class’

(18) Daily Routine and Life
Mi barriada no es muy tranquila. Tampoco es muy bulliciosa, pero es el ambiente, ese sabor cubano que se encuentra en todas las esquinas... (INF# 008U)
‘My neighborhood is not very quiet. It is not very bustling either, but it is the atmosphere, that Cuban flavor that is found in all corners...’

While this means of determining what constitutes ‘emotional’ or ‘non-emotional’
discourse stands in need of verification through triangulation with at least one other objective measure (e.g. through the use of phonetic indicators like pitch or volume; or a high level of correspondence with additional evaluators), time constraints did not allow this additional verification of the interpretation of discourse to occur. To account for the subjectivity of
determining emotional valence of a discursive topic, a survey was distributed to five participants to test interrater reliability. The participants in the survey had an understanding, to varying degrees, of both English and Hispanic culture. The survey\(^9\) listed each of the 14 discursive topics along with a three-point Likert scale from ‘non-emotional’ to ‘moderately emotional’ to ‘emotional.’

2.4 Linguistic variables

There was a single principle independent variable in this study: emotional valence. The single independent variable had two factors: ‘emotional’ and ‘non-emotional.’

The three dependent variables for the study were ‘Codeswitch Presence,’ ‘Codeswitch Segments’ and ‘Codeswitch Words.’ Codeswitch Presence is a categorical variable that says whether codeswitching is present in a segment of discourse or not. Codeswitch Segments is a scalar variable that counts the number of syntactically unique phrases (or “dips”) into English an informant makes divided by the number of words uttered in that discursive unit. Codeswitch Words counts the number of individual words of English used in a discursive unit and divides it by the number of words in the discursive unit itself.

2.5. Analysis

Analysis was performed using chi-squared tests of association between the dependent variables and the independent variable via the statistical software SPSS.

\(^9\) The results of the survey support the categorization of emotional valence of a discursive topic used in this study and can be found under Rater Reliability Survey.
3. Results

3.1 Relationship between codeswitching and emotion

A chi-square analysis was performed to examine the relationship between presence of codeswitch and presence of emotion. A significant interaction was found, $\chi^2(1, N = 869) = 39.8$, $p < .001$. These results of analysis are presented in Table 1.

Table 1
Number and proportion of codeswitched utterances in emotional and non-emotional segments of discourse.

<table>
<thead>
<tr>
<th></th>
<th>No CS</th>
<th>CS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>No Emotion</td>
<td>290</td>
<td>45.1</td>
<td>353</td>
</tr>
<tr>
<td>Emotion</td>
<td>157</td>
<td>69.5</td>
<td>69</td>
</tr>
<tr>
<td>Total</td>
<td>447</td>
<td>51.4</td>
<td>422</td>
</tr>
</tbody>
</table>

$\chi^2 (1, N = 869) = 39.8, p < .001$

Of all discourse extracted from 10 informants, there was a total of 869 segments of discourse. Codeswitching occurred in 422 segments of discourse. Of the 869 segments of discourse, 226 segments of discourse were considered affect-invoking contexts (i.e. ‘emotional’), while 643 were non-emotional. In other words, a quarter (26.0%) of discourse topics were emotional.

Of the 643 non-emotional segments of discourse, 353 contained a codeswitch, representing a rate of 54.9%, while 290 did not contain a codeswitch (45.1%). Of the 226 emotional segments of discourse, 69 contained a codeswitch, representing a rate of 30.5%, while 157 did not contain a codeswitch (69.5%). In other words, codeswitching occurred at a lesser rate in emotional than in non-emotional segments of discourse. Thus, in response to the question of this investigation, does the presence of emotion effect the tendency for bilingual
speakers to engage in codeswitching, the data from Table 1 suggests that emotion does, in fact, influence codeswitching; however, emotion does not affect codeswitching in the direction proposed by the hypothesis (that emotion would lead to more codeswitching).

In other words, the results of analysis in Table 1 suggest that what leads to more codeswitching is not emotion-provoking discourse, but rather discourse that is not strongly associated with affect-producing topics of conversation. This is demonstrated by codeswitching occurring in only 30.5% of emotional discourse while 54.9% of non-emotional discourse contained a codeswitch. These differences in codeswitching tendencies were significant (p<.001). The fact that the tendency to codeswitch was strongly related to what were considered ‘non-emotional’ contexts motivated a closer examination of codeswitching by individual discourse topics (i.e. by disaggregating the variable ‘Emotional Valence’).

3.2 Relationship between codeswitching and discursive topic

In order to provide additional insight into codeswitching patterns, a chi-square analysis was used to examine the relationship between presence of codeswitch and individual discursive topics. A significant interaction was found, $X^2(1, N = 859) = 181.6, p < .001$. The presence of codeswitching by discursive topic is displayed in Table 2.
Table 2
Number and proportion of codeswitched utterances in discursive topics.

<table>
<thead>
<tr>
<th></th>
<th>No CS</th>
<th></th>
<th>CS</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Emotional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family, Significant Other</td>
<td>72</td>
<td>79.1</td>
<td>19</td>
<td>20.9</td>
<td>91</td>
<td>100</td>
</tr>
<tr>
<td>Major Life Events</td>
<td>17</td>
<td>58.6</td>
<td>12</td>
<td>41.4</td>
<td>29</td>
<td>100</td>
</tr>
<tr>
<td>Passions</td>
<td>5</td>
<td>35.7</td>
<td>9</td>
<td>64.3</td>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>Culture, Holidays</td>
<td>11</td>
<td>91.7</td>
<td>1</td>
<td>8.3</td>
<td>12</td>
<td>100</td>
</tr>
<tr>
<td>Danger</td>
<td>5</td>
<td>100</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>Non-emotional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>24</td>
<td>15.7</td>
<td>129</td>
<td>84.3</td>
<td>153</td>
<td>100</td>
</tr>
<tr>
<td>Facts/Statements</td>
<td>114</td>
<td>47.1</td>
<td>128</td>
<td>52.9</td>
<td>242</td>
<td>100</td>
</tr>
<tr>
<td>Daily Routine</td>
<td>36</td>
<td>48.0</td>
<td>39</td>
<td>52.0</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>Work</td>
<td>45</td>
<td>57.0</td>
<td>34</td>
<td>43.0</td>
<td>79</td>
<td>100</td>
</tr>
<tr>
<td>Hobbies</td>
<td>7</td>
<td>25.0</td>
<td>21</td>
<td>75.0</td>
<td>28</td>
<td>100</td>
</tr>
<tr>
<td>Yes/No, Questions</td>
<td>52</td>
<td>92.9</td>
<td>4</td>
<td>7.1</td>
<td>56</td>
<td>100</td>
</tr>
<tr>
<td>Totals</td>
<td>388</td>
<td></td>
<td>396</td>
<td></td>
<td>784</td>
<td></td>
</tr>
</tbody>
</table>

$X^2 (1, N = 859) = 181.6, p < .001 = 181.6$

The first five discourse topics in the table were those originally classified as ‘emotional’ while the last six were considered ‘non-emotional.’ Within these categories, discourse topics

10 The totals in this row are the actual total number of discourse segments in the study, but the amount of discourse segments that have codeswitching and which do not, do not add up to these totals because some data was excluded from Table 2; namely, repetition, key words and back-channeling. These three categorizes have been combined and going forward will be referred to as ‘linguistic indicators.’ The linguistic indicators accounted for 75 segments of discourse, of which 50 did not contain a codeswitch (representing 11.5% of the total discourse) and 25 did contain a codeswitch (representing 6.0% of the total discourse). These linguistic indicators were excluded from Table 2 as they were not discourse topics evoking emotion; as mentioned in section 2.3.2., they were rather used to consider an otherwise ‘non-emotional’ segment of discourse as ‘emotional’ for a given speaker at a point in conversation.
are listed in descending order of number of codeswitches that occurred in each individual discourse topic.

The analysis revealed that more codeswitching than not occurred when the segment of discourse described passions (9 versus 5), school (129 versus 24), facts/statements (128 versus 114), daily routine (39 versus 36) and hobbies (21 versus 7). A relatively equal split between codeswitching being present or not occurred (with less occurrence of codeswitching than without codeswitch) when the segment of discourse contained described major life events (17 versus 12) and work (45 versus 34).

While the table was significant, meaning at least one cell is significantly different than the expected results, this analysis does not go as far as to interpret which cells are significant; that would require another test beyond the scope of the current study. It is noted that discursive topic appears to be linked to codeswitching with respect to action and environment associated with the topic. In other words, language has a linked memory between action or activity. In summary, codeswitching appears to be more closely linked to discursive topic than emotion.
4. Discussion and conclusion

The current study was devised to investigate suggestion in the literature that an ‘emotional’ context would lead to more codeswitching (Aycicegi & Harris, 2004; Ferreira, 2017; Ladegaard, 2018; Panayiotou, 2004; Williams, Srinivasan, Liu, Lee & Zhou, 2019). While results of the investigation did show that discourse context (the criteria for operationalization of the variable “emotion”) was significantly related to an individual’s tendency to codeswitch, the results were not in the expected direction. Instead, it was found that ‘non-emotional’ discourse was significantly correlated with more codeswitching.

4.1 Methodological considerations

It is widely attested that one and the same stimuli might provoke emotional responses in some individuals but not in others (or one type of emotional response in one person and a different type of response in another). Given this, the identification of ‘emotional’ versus ‘non-emotional’ discourse would have more ideally been accomplished by relying on cues that are both idiosyncratic to individuals and not under an individual’s conscious control. For instance, and considering the physiological reflects that often accompany some emotional experiences (such as fear, anxiety, sadness), emotive discourse could have been located and identified on the basis of individuals can be highly idiosyncratic, a more reliable way of identifying emotional and non-emotional segments of discourse could have been to rely on suprasegmental features of speech, such as intonation, pitch and volume. The availability of such data, attuned to the idiosyncratic emotional experience and linguistic performance of each individual, may have yielded a more precise and nuanced identification of emotional contexts. Unfortunately, time
constraints of this study prevented a detailed examination of each speaker’s suprasegmental
indicators of emotional expression; however, this would be an advantageous analysis to pursue
for a replication of this study and further research.

One reason for results not turning out as expected could have been the methodology of
the current study. The categorization of discourse topics as ‘emotional’ versus ‘non-emotional’
is one factor that could have impacted the results. Considering those time limitations, this study
opted to use discourse topic as a means to operationalize the concept of emotion. Indeed, the
literature suggests that certain discourse topics evoke emotional responses in individuals
(Ferreira, 2017; Ladegaard, 2018). Nonetheless, it may be that the precise categorization of
which discourse topics were classified as ‘emotional’ and ‘non-emotional’ would not
correspond to the participant’s own individual experiences of emotional and non-emotional
topics of conversation. Nonetheless, results of a mini-survey (reported in section 2.3.2)
indicated that independent raters tended to classify discourse topics as ‘emotional’ or ‘non-
emotional’ with a high degree of interrater reliability and similarly to the researcher. It was
further speculated that, given that the Spanish-speaking participants of this study were all U.S.-
born and raised (as was the researcher), they would also share the researcher (and
independent raters’) intuitions about discourse topics that provoke emotional responses. These
facts suggest that the classification of ‘emotion’ and ‘non-emotional’ discourse topics may not
be primary factor in accounting for the unexpected results of this study.

Finally, another methodological explanation for the unexpected results may be related
to the fact that there is no clearly defined L1 or L2 (in the sense of ‘language dominance’ or
‘order of acquisition’) for all participants in the current study. Previous research reported
frequent codeswitching from L1 to L2 in emotional contexts among participants that had a distinctly dominant L1 and less dominant L2. It could perhaps be the case that highly proficient bilingual speakers do not execute codeswitching in the same way as bilingual speakers who a) learned one language later in life or b) use one language significantly more or less than the other. Indeed, the function of codeswitching in such a community may, as was suggested in section 3.2, respond primarily and more powerfully to other motivations.

On the other hand, the directionality implicit in the design of the study might also be a factor in the results of this study. Previous research, as mentioned above, suggested that speakers would make recourse into their less dominant language (L2) in emotion-evoking contexts. Although the speakers of this study were all highly proficient in Spanish and English, they nonetheless live and work in the United States (specifically in New York), which is an English-dominant context. The dominant social language for these speakers is English; the language in which they were educated and in which the majority of life around them occurs. If this language of social dominance (English) were taken as the L1 of the participants instead of operating under the assumption of Spanish being the L1, a different outcome may be possible. If this were the case, the research design (in which participants are speaking the socially subordinate language, Spanish) would have essentially stymied the expected direction of codeswitching behavior. Participants were already speaking in the social L2 (Spanish), so if an emotionally-laden topic arose in conversation, they were already speaking in a language that provided them a ‘safe’ emotional distance, thus making it unnecessary to change to another language (see again section 1.3.1).
4.2 Alternate explanation: participants

The hypothesis that emotion will lead to more codeswitching perhaps only applies to individuals speaking in their L2 when they “get emotional,” prompting a codeswitch back into their L1. This is under the assumption that emotion somehow inhibits access to the speaker’s L2 or their feelings are more intimately associated with one language than the other. If this were the case, and the participants were L1 Spanish speakers conversing in English, we might expect more codeswitching into Spanish from English in emotional contexts than in non-emotional segments of discourse. With this inclination and the data from the current study, a new direction for future research could be that the theory that more emotion leads to more codeswitching only works in one direction, specifically from the speaker’s L2 to their L1. This idea relies heavily on the question stated above about whether highly proficient bilingual speakers execute codeswitching in the same way as bilingual speakers who learned one language later in life, use one language significantly more/less than the other, or are not second-generation speakers. While no previous research supporting this hypothesis has been cited in this research, this could be a byproduct of the majority of studies have conducted interviews primarily in the participant’s L1. Perhaps if a study implemented the methodology of conducting the sociolinguistic interviews in the participant’s L2, support for this alternate explanation would be demonstrated; this would also be an interesting point for future research.

Unlike the studies presented in the introduction, the participants in the present study were highly balanced bilinguals; thus, directionality was not a part of this investigation. It would

\[\text{It is important to note here that this goes against the findings of previous literature (specifically Aycicegi & Harris, 2004 and Ladegaard, 2018) that codeswitching is more likely to occur from a speaker’s L1 to L2.}\]
stand to reason that higher balance would lead to a smaller dominance differential (i.e. the difference in the dominance of a speaker in either language), thus lacking a directionality effect. Perhaps then emotion is less driving of codeswitching because emotion may not effect this very balanced population in the same way that it would a population of bilingual speakers with a larger dominance differential.

4.3 Alternate explanation: discourse topic

While emotion (operationalized as the unification of several individual discourse topics) did not appear to influence codeswitching in this study, discourse topic was a significant indicator of codeswitching. In eight of the 14 categories of discourse topic, codeswitching either occurred more often than not or in a near-equal split between being present or not. It was simply the case that this did not consistently occur for all discourse topics classified as ‘emotional’ in this study.

Discursive topic appears to be an “intervening variable” that is more impactful than emotion. Consider the term community of practice, which is defined as the connection between being and doing, i.e. the relationship between identity (being) and social action (doing) in groups (De Fina, 2007). The concept of a community of practice as a group identity defined by a shared repertoire of resources allows us to express intragroup practices and associations between socially relevant traits and actions. By analyzing codeswitching through this lens, we can operate under the assumption that the participants in this study comprised a community of practice. Under this supposition, we can also assume that the participants in this study had similar experiences with both the discursive topics discussed as well as language.
Discourse topic relates to circumstances of learning and living in each language; this suggests that communities of practice determine codeswitching behavior. This further indicates that discourse topics determine codeswitching behavior.

This does not mean that emotion does not play a role in the tendency for a bilingual speaker to engage in codeswitching; however, it does not seem to be the strongest factor. Emotion appears to be overshadowed by stronger, more decisive variables. In this case, discourse topic serves as a more powerful indicator of codeswitching than emotion.

4.4. Conclusion

This study analyzed the relationship between emotion and codeswitching in 10 second-generation bilingual speakers from the Otheguy-Zentella Corpus (OZC) of Spanish in New York City. The results rejected both a) the hypothesis that the presence of emotion will result in more codeswitching by bilingual speakers, and b) the null hypothesis that the presence of emotion will have no effect on codeswitching. Conversely, the results suggest that codeswitching occurs more frequently in non-emotional segments of discourse than in emotional contexts.

A chi-square analysis was performed to examine the relationship between presence of codeswitch and presence of emotion. A significant interaction indicated that codeswitching occurred less often in emotional than in non-emotional segments of discourse. In response to the research question of whether the presence of emotion affects the tendency for bilingual speakers to engage in codeswitching, the data suggests that emotion does, in fact, influence codeswitching; however, both the main and null hypotheses were rejected, with the results
indicating that discourse that is not strongly associated with affect-producing topics of conversation leads to more codeswitching than in emotional contexts.
References


# Coding Manual

**Item (Item Number)**  
This column refers to the order in which an item was coded. Primarily for purpose of keeping track of items.

**Inf (Informant Number)**  
This column provides the anonymized identifying number for each participant. It consists of three numbers and a letter. The letter stands for the ethnolinguistic identity of the speaker (C=Colombian, D=Dominican, E=Ecuadorian, M=Mexican, P=Puerto Rican, U=Cuban).

**Disc (Discourse Pulled)**  
Has all discourse been pulled from the interview?  
0 = all but non-emotional, non-CS  
1 = all

**CS_Item**  
This column provides the codeswitch into English from a discursive unit.

**Emotion_Item**  
This column provides the emotional discourse from a discursive unit.

**Excerpt**  
This column provides the discursive unit.

**CS_pres**  
Is there a codeswitch to English present in the discursive unit of the interview?  
0 = No  
1 = Yes

**Emotion_pres**  
Is there emotion present in the discursive unit of the interview?  
N=0  
Y=1

**CS_switchpt**  
This column contains the number of dips into English within a discursive unit. For example, if there are two separate instances of codeswitching in a discursive unit, this column would contain “2”.

**CS_WC**  
This column is the sum word count of codeswitches in a discursive unit.

**Emotion_WC**
This column is the sum word count of emotion in a discursive unit.

**DiscTopic (Discursive Topic)**
This column contains the coding for discursive topic. See below for coding procedures of emotional and non-emotional text.

**Tot_WC_CS**
This column is the sum word count of all codeswitches in an interview.

**Tot_WC_Emot**
This column is the sum word count of all emotional discourse in an interview.

**Intwords**
This column contains the total number of words in an interview.

**DiscTopic**

**Emotional**

- **11 Repeated words**
  - Ex. *Me gusta, me gusta* mucho Michael Jacksons
  - Ex. Sí, sí. Sí es familia, es familia. A mí no me interesa si tienen plata o no tienen plata

- **12 Key words**
  - Ex. Bueno, sí, tengo cosas muy *trágicas* pero no quiero hablar de ellas.
  - Ex. Bueno esa es una pregunta bien *heavy*...

- **13 Major Life Events**
  - Divorce
    - Ex. *El divorcio de mis padres*... uno, como uno no sabe dónde ir que hacer, ve. Uno tiene que estar a un lado y al otro. ...
  - Death
    - Ex. Bueno quizá lo que ahora.. completamente distinto de.. de.. de la respuesta que iba a contestar, es lo.. una cosa bien trágica lo que me pasó en.. en julio cuando mi primo *se murió*.

- **14 Family/Significant Others**
  - Ex. mi *esposo* él adora el boxeo
  - Ex. Yo tenía *una novia* aquella.. que era.. parte del grupo

- **15 Danger**
  - Ex. y.. pero yo sinceramente vivo tranquila en el.. en el barrio aunque yo sé que tiene su *peligro* y su.. y su.. Tú sabes su.. su situación, sí...

- **16 Passions**
  - Ex. Bueno sí, esa pregunta *es muy importante* porque es una cosa que.. dentro del *programa donde yo enseño*...
  - Ex. todos los papelitos pudiéramos reciclar, *well that’s basically like our favorite thing to do. We always go to the movies, we always go to the movies*, si no vamos al *movies* vamos *bowling*

- **17 Culture/Holidays**
  - Ex. A mí me parece que *la Navidad* es muy diferente. ...*la Navidad en Colombia es muy alegre.* ...

**Non-Emotional**

- **21 back-channeling, laughter**
22 yes/no responses, questions
  o Ex. Pero yo sé lo que significa Roberto Clemente para los puertorriqueños y para el ... el buen deportista. No lo sabía. ¿De qué año? ¿Este año? ¿Sí?
  o Ex. ¿Tú conoces Silohé?
23 work (general)
  o Ex. Me fue bien, pero después tuve que liquidarlo.
  o Ex. No, tuvimos pérdidas, porque tenía que liquidar el xxx y deudas que había, entonces, deudas que se habían adquirido como a largo plazo.
24 hobbies (non-passionate)
  o Ex. Bueno, mi de ... de deportes deportes, de lo que más te puedo hablar es del boxeo. Y entonces... Y yo no, pero por estar con él. Sí. Lo veo con el xxx el que más me gusta xxx. ¿Qué me gusta de Durán? Como no sé tanto de boxeo... No te puedo decir exactamente qué me gusta de Durán. Pero me gusta que e ... él se ha destacado dentro de los demás boxeadores. Quizás por su personalidad, que pelea, que habla muchas cosas y protesta y ... Se sale un poco de ... de lo normal.
25 facts/statements
  o ex. Se trata de dos muchachas que viven con un muchacho. ... Y todas las vi... situaciones que...
26 school (general)
  o Ex. Diferente, pero fácil para adaptarme, porque no... no... no había nadie que hablara español en mi clase, y a los pocos meses ya estaba hablando y defendiéndome en mi clasE.
27 daily routine
  o ex. Mi barriada no es muy tranquila. Tampoco es muy bulliciosa, pero es el ambiente, ese sabor cubano que se encuentra en todas las esquinas, los cubanos conversando de ... del presidente, porque a éste es al que hay que elegir, porque éste es que va a defendernos, y este viejo es el que sabe y el que se pone los pantalones y todo eso ... ésta es una barriada típica cubana

Other
77 = undecided
88 = variable N/A
99 = data unavailable
## Rater Reliability Survey

<table>
<thead>
<tr>
<th>Field</th>
<th>Unemotional</th>
<th>Moderately Emotional</th>
<th>Very emotional</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition of words</td>
<td>1 (20%)</td>
<td>4 (80%)</td>
<td>0 (0%)</td>
<td>5</td>
</tr>
<tr>
<td>Key Words (ex. tragic, sadness)</td>
<td>1 (20%)</td>
<td>3 (60%)</td>
<td>1 (20%)</td>
<td>5</td>
</tr>
<tr>
<td>Major life events (ex. marriage, death)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>5 (100%)</td>
<td>5</td>
</tr>
<tr>
<td>Danger</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>5 (100%)</td>
<td>5</td>
</tr>
<tr>
<td>Passions</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>5 (100%)</td>
<td>5</td>
</tr>
<tr>
<td>Culture, Holidays</td>
<td>0 (0%)</td>
<td>4 (80%)</td>
<td>1 (20%)</td>
<td>5</td>
</tr>
<tr>
<td>Back-channeling (ex. mhmm, yeah)</td>
<td>4 (80%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>5</td>
</tr>
<tr>
<td>A yes or no response, or asking a question</td>
<td>4 (80%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>5</td>
</tr>
<tr>
<td>Work/job</td>
<td>1 (20%)</td>
<td>4 (80%)</td>
<td>0 (0%)</td>
<td>5</td>
</tr>
<tr>
<td>Hobbies (not passions)</td>
<td>3 (60%)</td>
<td>2 (40%)</td>
<td>0 (0%)</td>
<td>5</td>
</tr>
<tr>
<td>Making a statement or stating a fact</td>
<td>4 (80%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>5</td>
</tr>
<tr>
<td>School</td>
<td>0 (0%)</td>
<td>5 (100%)</td>
<td>0 (0%)</td>
<td>5</td>
</tr>
<tr>
<td>Daily routine</td>
<td>3 (60%)</td>
<td>2 (40%)</td>
<td>0 (0%)</td>
<td>5</td>
</tr>
<tr>
<td>Family or significant other</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>4 (80%)</td>
<td>5</td>
</tr>
</tbody>
</table>