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# **The Bilingual Code-Switching Profile (BCSP): Assessing the reliability and validity of the BCSP questionnaire**

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**Abstract:** Significant variation exists in bilinguals' experiences with code-switching, from dense code-switching in multiple interactional contexts to minimal switching. Although recent research has demonstrated that a bilingual's experience with code-switching is a crucial factor for determining both linguistic and cognitive behaviors, there currently is no commonly accepted method of measuring of a bilingual's code-switching practices. Responding to this need, this paper presents a new tool to assess a bilingual's experience and engagement with code-switching — the Bilingual Code-Switching Profile (BCSP) — and assesses its validity and reliability. The BCSP incorporates a multifaceted conceptualization of code-switching experience, drawing on previous research in bilingual proficiency, and addresses a bilingual's code-switching history, use, proficiency, and attitudes. To assess the validity and reliability of the BCSP, Spanish–English bilinguals ( $N = 454$ ) from a wide range of ages, ethnic backgrounds, national origins, and language dominance profiles completed the questionnaire. Results of an exploratory factor analysis and intraclass correlation on test-retest data ( $N = 248$ ) demonstrate that the BCSP is a valid and reliable method of assessing a bilingual's code-switching profile. The BCSP can be easily and practically incorporated into future research on bilinguals to provide a systematic measure of an individual's code-switching profile.

**Keywords:** code-switching, bilingualism, bilingual experience, self-assessment, questionnaire development

## 1. Introduction

Code-switching (CS) can be defined as the alternation between two languages or language varieties in a single conversation or interaction. Research shows that CS is socially motivated (e.g., Myers-Scotton, 1993), subject to syntactic and grammatical constraints (e.g., MacSwan, 2014), and employed for pragmatic and communicative functions (e.g., Zentella, 1997).<sup>1</sup> While bilingualism is a prerequisite for CS, not all communities or individuals engage in CS with the same frequency or qualitative patterns. Some communities may be considered “dense code-switching contexts” (Green & Abutalebi, 2013, p. 518), in which bilinguals engage in CS in a variety of settings (e.g., work, home) and with a variety of interlocutors (e.g., friends, family). In contrast, code-switching in other communities may be stigmatized and avoided (Montes-Alcalá, 2000), often referred to as separate “dual language context[s]” (Green & Abutalebi, 2013, p. 518). As such, experience with language switching encompasses both the degree to which participants engage in CS in a given context, as well as their experience shifting between different types of environments requiring different degrees of language switching (Beatty-Martínez & Titone, 2021). For example, the intensity of CS in a similar interactional context (e.g., in a bilingual context, some bilinguals engage in more CS than others) and the frequency of shifts between different communicative

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<sup>1</sup> Code-switching, taken here to refer to changes in language within a larger discourse, should be distinguished from the psycholinguistic term *language switching*, which may refer to switches “occurring without such discursive contexts, often in experimental paradigms” (Olson, 2013, p. 409). This study is concerned with naturalistic code-switching phenomena, although the term “language switching” is used in the BCSP materials as “code-switching” is not commonly used by the general public.

environments (e.g., some bilinguals move between Language A-only, Language B-only and bilingual environments frequently, while others may predominately experience only one type of environment) may differ between bilinguals. Moreover, even within a given community, individuals' attitudes towards CS and use of CS are impacted by a variety of social and biographical variables, as well as personality traits (Dewaele & Wei, 2014).

As such, while part of a bilingual's multifaceted code-switching practices are driven by their language pairing and community, other aspects of a bilingual's engagement with CS are driven by idiosyncratic characteristics, experiences, and attitudes. Furthermore, previous research has shown that a given speaker's engagement with CS potentially impacts both linguistic outcomes and cognitive control mechanisms (e.g., Verreyt et al., 2016). As such, a sensitive and reliable metric of a speaker's CS profile or practices is crucial for research dealing with bilingual participants. The current paper presents a new tool — the Bilingual Code-Switching Profile (BCSP) — to gauge a bilingual's experience and engagement with CS and seeks to assess the questionnaire's validity and reliability.

### *1.1 The Impact of CS Experience*

While a large body of research has shown that CS can impact linguistic outcomes at the point of switch (e.g., Meuter & Allport, 1999; Olson, 2016), more recent theoretical (e.g., Green, 2011) and empirical research has begun to demonstrate that a bilingual's long-term use and engagement with CS may also impact non-linguistic outcomes. For example, Verreyt et al. (2016) examined the performance on two executive control tasks in two groups of bilinguals: bilinguals who reported frequently engaging in CS and bilinguals who did not engage in CS. Results showed that

the frequent switchers outperformed the non-switchers in both executive control tasks. Verreyt et al. (2016) concluded that “language switching experience in daily life is a key determinant for the development of a stronger executive control system” (p. 189; see also de Bruin et al., 2015; Yim & Bialystok, 2012). While not all studies have supported the finding that experience with CS impacts cognitive control (Jylkkä et al., 2017; Paap et al., 2017), and others have provided mixed results (Lai & O’Brien, 2020), it is clear that a bilingual’s experience or engagement with CS is a complex topic that will continue to be the focus of a growing body of literature. Inherent in this line of research is a significant need for systematic, reliable, and validated methods of assessing a given bilingual’s CS behaviors. Although CS practices are key in shaping both linguistic and non-linguistic outcomes, this factor is often ignored in bilingualism research more broadly and, when included, there is no methodological consensus, which limits comparisons across paradigms.

### *1.2 Failure to Measure CS in Bilingualism Research*

When considering the measurement of CS practices in the broader field of bilingualism, a recent systematic review of empirical studies ( $N = 140$ ) highlighted the failure to systematically include CS practices in current research (Olson et al., 2021). While this review originally focused on the assessment of proficiency or language dominance, the same data set can be used to examine if and how current research on bilinguals measures a bilingual’s CS practices. The data set was compiled by examining the aims and scope of the top 100 journals in the category of *Language and Linguistics* in the 2018 Scimago Journal Rankings (SJR) (Scimago, n.d.) and identifying any journal that included pre-determined keywords relevant for the field of bilingualism (e.g., *bilingualism*, *multilingualism*, *code-switching*, *language switching*, etc.). A total of 17 journals were identified that used one (or more) of these keywords. Within those 17 journals (478 total

research articles), 140 articles were identified as having bilingual (or language learner) participants \$ (for full methodology see Olson et al., 2021). The resulting data set included a wide range of methodological approaches, language pairings, and linguistic subfields. Results of this review found that 84% of studies measured language proficiency, although trends were dependent on both the type of study and the linguistic subfield (Olson et al., 2021). Using the same dataset, a new analysis was performed, with each of the 140 studies tagged for the presence (or absence) of a measure of participants' CS experience. In contrast to the results for proficiency, only 2.9% of studies ( $n = 4$ ) measured participant CS behaviors. This review suggests that few studies control for this important variable.

### *1.3 Lack of Accepted Measure of CS Practices*

When considering the measurement of CS practices in studies that assess do this key variable, it is clear that there is no commonly accepted measure of bilingual CS practices. Considering the studies that have assessed a bilingual's experience with CS, existing approaches may be divided into direct and indirect measures of one's CS practices.

Direct measures are those that provide an external, observational assessment of CS practices. For example, Yim and Bialystok (2012) characterized participants engagement with CS through a semi-structured conversation, with topics selected to promote CS. A participant's CS score was taken by computing the number of CSs produced relative to the duration of the conversation. Similarly, Hofweber et al. (2019) employed two tasks as a measure of CS engagement: a bilingual discourse completion task (DCT) and a code-switching frequency judgement task (CSFT). The discourse completion task, consisting of a writing or providing a bilingual email, was considered

to be a “conservative estimate of their code-switching in real speech,” given the somewhat more formal medium (p. 190). The CS frequency task, considered a direct perceptual measure of CS, consisted of having participants rate the frequency with which they “encountered” given types of switches (Treffers-Daller et al., 2020). Providing a greater range of observational contexts, Lai and O’Brien (2020) assessed CS frequencies in a cued-switching task (i.e., semantic listing), a semi-cued task (i.e., story retell), and a naturalistic task (i.e., spontaneous conversation).

Important to note, observational tasks included both a basic frequency approach, which considered the number of switches in a given period (e.g., Yim & Bialystok, 2012), and those that focused on the relative usage of different types of CS. For example, frequency judgment tasks (e.g., Hofweber et al., 2019) examined the usage of different types of code-switches, from the least to the most integrated types of CS (i.e., insertional CS to congruent lexicalization). This relative rating served to approximate the relative frequency of different types of CS, rather than the overall frequency with which participants used CS. Correlations between frequency judgments and productive CS provide a degree of external validity for these measures.

In contrast, indirect measures rely on participant self-reporting, usually quantitative in nature, about some aspect or aspects of their engagement with CS. While this approach is among the most popular found in the literature, no methodological consensus has emerged. For example, Hartanto and Yang (2016), used two Likert-scale items addressing “the extent to which they [participants] used two languages in the same context and in different contexts” (p. 11). Similarly, Verreyt et al. (2016) used a single item Likert-scale asking participants how often they switched languages (see also Paap et al., 2017; Valdés Kroff et al., 2017). De Bruin et al. (2015) employed three Likert-

scale questions, asking how often participants switched languages on a daily basis, how often they switched in a conversation, and how often they switched in a single sentence. These more holistic methods often fail to account for variance both within and across communicative contexts, as well as engagement with CS over time.

As a subcomponent of a more extensive language background questionnaire, and accounting for some degree of contextual variance, Li et al. (2020) asked participants to rate the frequency with which they mix languages with four different interlocutor groups (e.g., family, friends). A similar structure is employed by the Language and Social Background Questionnaire (Anderson et al., 2018). Finally, it is worth acknowledging the Bilingual Switching Questionnaire (BSWQ, Rodriguez-Fornells et al., 2012). The BSWQ consists of 12 Likert-scale questions, grouped into four factors: (1) the tendency to switch into the L1, (2) tendency to switch into the L2, (3) frequency of switching in a particular situation, and (4) awareness (or unawareness) of language switching. While these questionnaires address different interactional contexts, they do not incorporate notions of long-term engagement, proficiency, or attitudes. These previous methods also implicitly distinguish between overall CS engagement (i.e., how much CS a participant uses) and the nature of CS (e.g., direction of switch: Rodriguez-Fornells et al., 2012; e.g., insertional vs. dense CS: Hofweber et al., 2019).

While these studies most commonly assess the frequency of a bilingual's use of CS, they fail to account for several key variables that shape language switching behaviors (for review see de Bruin, 2019). First, long-term experience with CS over the course of a bilingual's life should be taken into account. CS practices may change as a function of age (e.g., onset of bilingualism) or life



changes (e.g., moving regions, changing family structure) (e.g., Genesee, 2016). As such, two bilinguals may have similar current usage of CS, but different long-term CS engagement patterns. Second, as noted by Muysken (2000), the “interactional setting” (e.g., classroom interactions, marketplace transactions) is a key micro-level variable that influences CS behavior (p. 222). For example, participants may engage in switching in the home but not at school/work, or vice versa (Gullifer & Titone, 2020). In asking participants to report on frequency of switching, most studies have failed to account for the context-dependent nature of this experience. Third, as proficiency in each of a bilingual’s languages has been a crucial variable in the field, few studies have accounted for CS proficiency. A significant body of work has shown that CS is rule-governed and can be assessed through the lens of grammaticality (for review see, MacSwan, 2014). For example, previous research has shown that as proficiency increases in a bilingual’s languages, so too does their sensitivity to CS norms (Toribio, 2001). As such, a bilingual’s ability to successfully produce and perceive instances of CS within expected norms may be a sensitive marker of their CS experience, parallel to the dimension of proficiency for non-switched language use. Finally, Muysken (2000) notes that sociolinguistic considerations, such as the “degree of acceptance” of code switching (p. 222) in the community and attitudes towards bilingualism are key in determining CS practices (see also MacSwan, 2016). Dewaele and Wei (2014) further note that such attitudes should be considered at the level of the individual bilingual. Those with more positive attitudes towards CS may engage more significantly in CS practices. A comprehensive approach to a bilingual’s CS profile or experience should incorporate each of these key variables: long-term engagement with CS (i.e., CS History), the frequency of CS across different interactional contexts (CS Use), the ability to perform and perceive CS in a normative/grammatical manner (CS Proficiency), and a bilingual’s attitudes towards CS (i.e., CS Attitudes). Moreover,

measures should be available to distinguish between the different types of bilingual switching experiences (e.g., Beatty-Martínez & Titone, 2021). To date, no self-reported measure of CS engagement accounts for all of these key variables.

#### *1.4 Study Aims*

Given the growing evidence that a bilingual's long-term experience with CS shapes both linguistic and non-linguistic behaviors, and acknowledging the lack of a comprehensive, systematic measure of CS experience, the current study presents a new tool for measuring a bilingual's CS profile. The Bilingual Code-Switching Profile (BCSP) is a comprehensive, self-reported questionnaire for the systematic assessment of bilingual CS experiences. The BCSP focuses on experience and engagement with CS, rather than the types of CS. This questionnaire and study respond directly to recent calls for more detailed and systematic assessments of bilingual experiences, specifically language switching practices (e.g., de Bruin, 2019). Seeking to evaluate the design of the questionnaire, this study had two specific aims: to assess the BCSP in terms of its validity and reliability.

To assess the validity and reliability of the BCSP, a large-scale online survey was conducted with Spanish–English bilinguals. Effort was made to recruit bilinguals from across a range of ages, origins and ethnic backgrounds, language dominance profiles, and geographic locations. Internal validity was assessed using a principal components analysis and a factor analysis. Reliability was assessed using a test-retest design. Finally, preliminary data were analyzed comparing the responses between the two largest populations by current residence in the data set, as a measure of external validity.

## **2. Instrument Design, Translation, and Pretesting**

### *2.1 The Bilingual Code-Switching Profile Framework*

The BCSP addresses the subcategories of CS History, CS Use, CS Proficiency, and CS Attitudes. These four theoretically-motivated subcategories were modeled closely after the Bilingual Language Profile (Birdsong et al., 2012). These subcomponents were chosen to acknowledge that a bilingual's engagement with CS can be reflected in both long-term (CS History) and current or recent usage across multiple interactional contexts (CS Use). Previous research on bilingual language dominance has relied on usage, both historical and current, to begin to define a bilingual's language dominance (Harris et al., 2006; Heredia, 1997). Similarly, just as non-switched languages can be assessed with respect to proficiency (for review see Hulstijn, 2011), CS can also be assessed with respect to proficiency. As proficiency in CS is outside the traditional notions of proficiency and may be difficult for speakers to conceptualize, the BCSP asked how easy it is for bilinguals to engage in CS across the four linguistic skills: speaking, listening, reading, and writing. Finally, given the often-stigmatized position of CS (for Spanish–English CS see Montes-Alcalá, 2000) and individual variation in attitudes towards CS (e.g., Badiola et al., 2018), participant attitudes toward CS were also evaluated. Previous research has shown the importance of attitudes towards CS in determining a bilingual's use of CS (Dewaele & Wei, 2014). The final BCSP consisted of an introduction and four to six questions in each of the four subcomponents.

Returning to the dual nature of language switching experience, in which both the intensity of CS in a given bilingual interactional context and the frequency of shifts between different types of communicative environments may vary for individual bilinguals (Beatty-Martínez & Titone,

2021), the BCSP is sensitive to such differences. With respect to the frequency of CS in a given context, the BCSP permits comparison between individuals in a single interactional context. For example, some bilinguals may report frequent switching in traditionally bilingual contexts (e.g., with friends or family), while others report less frequent switching in these interactional contexts. With respect to shifts between different types of communicative environments, the BCSP provides a measure of both long-term (CS History) and current (CS Use) experience with such shifts. For example, while one bilingual may engage in CS frequently across many common interactional contexts, others may evidence frequent shifts between different types of communicative environments (e.g., interaction with family and friends involves significant CS while interaction at work or in the community involves little to no CS). Given the multiple subcomponents and interactional contexts, fine-grained analyses of different types of switching experiences are possible with the BCSP.

The BCSP relies on a self-reporting methodology, in which participants provide evaluations of their own language practices. While self-reported measures should be further validated with external observations, and specifically compared with other methods of measuring CS behaviors (e.g., for switching in conversational tasks Lai & O'Brien, 2020; Yim & Bialystok, 2012), this methodology was chosen for the current study for several key reasons. First, previous research in the area of language proficiency has shown that bilinguals are effectively able to evaluate their own (non-switched) language abilities and that participant ratings correlate with external behaviors (e.g., Flege et al., 2002; Marian et al., 2007). Moreover, some evidence has suggested that self-reporting of recent switching frequencies may be reliable (Cox et al., 2020; Jevtović et al., 2020), although some such methodologies were limited in scope (i.e., assessing recent rather than long-

term behaviors) and others have failed to find correlations between self-reporting and measures such as CS frequency tasks (Treffers-Daller et al., 2020). Second, as noted by Gertken et al. (2014), self-reporting allows for the analysis of “non-linguistic factors, such as language attitudes” (p. 213), which form a crucial component of a participant’s CS profile and would be unavailable in observational methodologies. Finally, from a practical perspective, self-reporting provides an easy-to-administer format, allowing for use in a wide range of contexts and requiring a minimal amount of time to complete.

It should be noted that self-ratings are, by nature, a measure of a participant’s subjective perspective of their own abilities or behaviors, and may be shaped by both group and individual cultural and linguistic constraints. For example, Tomoschuk et al. (2019) highlighted proficiency self-rating differences between groups of different language pairings and backgrounds (for rating accuracies in a bilingual’s two languages see Delgado et al., 1999). While self-ratings were chosen for the BCSP for a variety of theoretical and practical reasons, researchers should be aware of the potential for differences between objective (i.e., external) and subjective measures.

### *2.1.1 BCSP Introduction*

The introduction to the BCSP contained a brief description of the phenomenon of CS, a variety of examples of CS, and questions to confirm that participants understood the terminology. The brief description of language switching was included to ensure that all participants had a shared understanding of the terminology and to minimize the possible social stigma associated with CS. The term *language switching*, rather than code-switching, was chosen to be more intuitive to the general public. The introduction included the following statement:

Throughout the world, where people and communities use two different languages, there is an opportunity for language switching. For this questionnaire, language switching is understood as moving between two languages in the same interaction or conversation. We are specifically interested in language switches involving both English and Spanish. Language switching is a common phenomenon, although not all people or communities do it. (BCSP, Introduction)

Several examples of CS were also provided (Example 1), including both intra-sentential (1a and 1b) and inter-sentential (1c) switches, as well as insertional (1b) and alternational (1a) code-switches. Examples provided in this section should reflect the range of types of CS for a given language-pairing and community.<sup>2</sup>

(1) a. I'm going to the store *para comprar unos zapatos*.

‘to buy some shoes.’

b. She went to the *entierro* with her mother. \$

‘burial’ \$

c. *Tuvimos un examen en la clase de matemáticas*. I think I did pretty well. \$

‘We had a test in math class.’

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<sup>2</sup> As noted by a reviewer, Spanish–English bilinguals may also employ congruent lexicalization and backflagging (e.g., Muysken, 2013) types of switches. Examples of these types of switches have been added to an updated version of the BCSP. \$

Finally, participants were given five utterances and asked to choose those that included language switching. These utterances included a variety of types of CS. Participants were unable to proceed unless they correctly selected the utterances that included CS. CS utterances, in examples and confirmation questions, were taken in part from Pérez Casas (2008) and Zentella (1997).

### *2.1.2 BCSP Items*

The final BCSP questionnaire includes 20 questions across the four subcomponents. The CS History subcomponent includes six questions. The first two questions ask participants at what age they began switching languages and at what age they felt comfortable switching languages (scale: since birth/as early as I can remember–20+ years/ I don't switch languages). These questions were reverse scored when calculating the final CS Profile Score (for scoring see below). Recognizing the importance of long-term engagement with CS across different interactional contexts (e.g., Muysken, 2000), the other four questions in the history subcomponent ask how many years participants had spent in a variety of contexts (i.e., region/community, family, educational environment, work environment) where language switching was common (scale: 0–20+ years).

The CS Use subcomponent contains six questions reflecting the important role of communicative context in determining language use practices and asks how common it is for participants currently to switch languages in a variety of settings (i.e., with friends, with family, at work/school, in the community, when talking to oneself, when counting) (scale: 0–6; 0 = never switch, 6 = very common). While five of these contexts were drawn from the BLP (Birdsong et al., 2012), language

switching in the community was added to reflect the significant amount of time many people spend in commercial, civic, and religious contexts (e.g., Bureau of Labor Statistics, 2020).<sup>3</sup>

The CS Proficiency subcomponent consists of four questions regarding how easily participants produce (speaking, writing) and comprehend (listening, reading) language switches (scale: 0–6; 0 = not at all, 6 = very easy). These questions cover the four main linguistic skills of speaking, listening, reading and writing. Questions specifically address the ease with which participants produce and comprehend code-switches, as traditional questions about proficiency (e.g., “how well do you...”, Birdsong et al., 2012) may not adapt well to the phenomenon of CS. These questions aim to assess broad abilities in CS and differ from the CS History and CS Use subcomponents in that they are independent of the interactional context.

The final section, CS Attitudes, directly reflects findings that show that attitudes represent a key factor in determining CS practices. This section consists of four questions and asks participants to respond to statements about their own identity (e.g., “I feel like myself when I switch languages”) and how they want to be perceived by others (e.g., “I want others to think that I switch languages in a natural way”) (scale: 0–6; 0 = agree, 6 = disagree). These questions seek to examine language attitudes via both internally-motivated factors, such as identity, and externally-motivated factors,

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<sup>3</sup> While the interactional contexts in the BCSP represent the most common places/interactions where people spend their time (e.g., Bureau of Labor Statistics, 2020), other studies may benefit from including additional contexts or granularity depending on the study aims (e.g., Anderson et al., 2018). \$



such as the evaluation of the participant's CS by their community.<sup>4</sup> The full BCSP (English Version) is available in Appendix A.

## *2.2 Questionnaire Translation*

As the questionnaire was originally prepared in English, it was subsequently translated into Spanish, following recommendations by the World Health Organization (n.d.) and Tsang et al. (2017). The English questionnaire was given to two independent translators, native speakers of Spanish, for forward translation. The translators were informed that this questionnaire would be used by speakers from a variety of dialects. The two translators subsequently met to discuss any discrepancies and produce a harmonized Spanish version. The Spanish version was then given to a third (native English-speaking) translator for back-translation. Finally, an “expert committee”, consisting of one of the forward translators, the back-translator, and the author, examined the original and translated versions to ensure conceptual equivalence and resolve any final discrepancies (Tsang et al., 2017, p. S84).

## *2.3 Pretesting of the BCSP via Cognitive Interview*

The resulting English and Spanish versions were subjected to pretesting (World Health Organization, n.d.). The questionnaire was administered to a small sample of participants ( $N = 10$ ) and individual, post-response cognitive interviews were conducted. Spanish-dominant participants ( $n = 5$ ) were provided with the Spanish version of the questionnaire, and English-dominant

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<sup>4</sup> Given the often-stigmatized view of CS, the attitude questions take a neutral to positive approach to CS, so as to not perpetuate negative attitudes. \$

participants ( $n = 5$ ) were provided with the English version. Participants (6 male, 4 female) were drawn from a wide range of ages (range = 21–70,  $M = 35.8$ ,  $SD = 14.6$ ) and backgrounds. To ensure uniform understanding of each item, the participants were systematically debriefed on each individual question and asked to explain their response or restate the question in their own words. The cognitive interview process resulted in minor changes to several items. Following these changes, the modified questionnaire was given to an additional translator to ensure conceptual equivalency.

#### *2.4 BCSP Scoring*

To create a CS profile score for each participant, a subcategory score is calculated by summing the raw response for each item in the subcategory.<sup>5</sup> The subcategory score is then multiplied by a weighting coefficient to provide equal weight to each subcategory score. Table 1 illustrates the weighting coefficient for each category. Finally, the weighted subcategory scores are summed, resulting in a CS Profile score, ranging from 0–100. The subcomponent weighting approach follows that employed by the BLP (Birdsong et al., 2012). In the resulting continuous CS Profile measure, lower scores indicate less engagement and experience with CS and higher scores indicate more engagement and experience with CS. The final BCSP questionnaire consists of 20 questions.

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<sup>5</sup> Questions regarding the age at which participants began code-switching and felt comfortable code-switching were reverse scored. Responses of “since birth” and “as early as I can remember” were worth 20 points. Responses of “I don’t ever switch” and “I don’t feel comfortable switching” received 0 points. \$

Table 1. BCSP Subcategories and Weighting Coefficients \$

Subcategory	Scale	Number of Questions	Weighting Coefficient	Total Weight (%)
CS History	0–20	6	0.2083	25
CS Use	0–6	6	0.6944	25
CS Proficiency	0–6	4	1.0417	25
CS Attitudes	0–6	4	1.0417	25

### 3. Methods for Validity and Reliability Assessment

#### 3.1 Participants

A total of 454 participants successfully completed the initial questionnaire. As the goal was to assess the validity and reliability of the BCSP, participants were recruited from a wide range of ages, ethnic backgrounds and origins, dominance profiles, and geographic regions. Participants (female = 301, male = 147, non-binary, other, or no response = 6) ranged in age from 18–75 years old ( $M = 29.2$ ,  $SD = 10.9$ ). Tables 2 and 3 show the distribution of self-identified ethnic background for all participants and the origin for participants who selected Hispanic, Latino, or Spanish origin, highlighting the wide variety of ethnic backgrounds and origins in the participant population. Participant language dominance was assessed using the Bilingual Language Profile (Birdsong et al., 2012). The BLP is a self-reported questionnaire that provides a continuous language dominance score (Birdsong et al., 2012). Figure 1 illustrates the distribution of participants across the dominance continuum (range:  $-117.8$ – $162.9$ ,  $M = 20.3$ ,  $SD = 57.6$ ), confirming a wide range of language dominance profiles. Finally, considering geographic distribution, as recruitment specifically targeted Spanish–English bilinguals in the United States, the majority of participants resided in the United States at the time of participation ( $n = 443$ ). Figure 2 shows the geographic distribution of participants in the United States. Worth noting, most of the major Hispanic population centers are well-represented in the dataset (U.S. Census, 2020).

Table 2. Participant Ethnic Background. \$

<b>Ethnic Background</b>	<b><i>n</i></b>
Hispanic, Latino, or Spanish Origin	375
White	120
American Indian or Native Alaskan	15
No response	9
Asian	8
Black or African American	8

Table 3. Origin for Participants Identifying as Hispanic, Latino, or Spanish ( $n > 10$ ).

<b>Hispanic, Latino, or Spanish Origin (please specify)</b>	<b><i>n</i></b>
Mexican	186
Colombian	28
Peruvian	21
Puerto Rican	21
Spanish	18
Dominican	16
Venezuelan	14
Argentine	11
Salvadoran	11
Cuban	10
Guatemalan	10

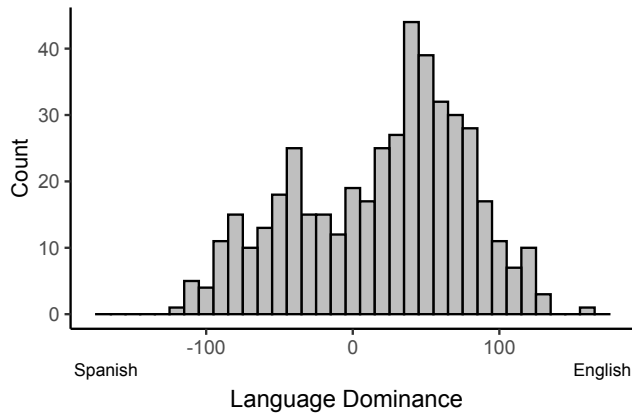


Figure 1. Histogram of participant dominance profile.

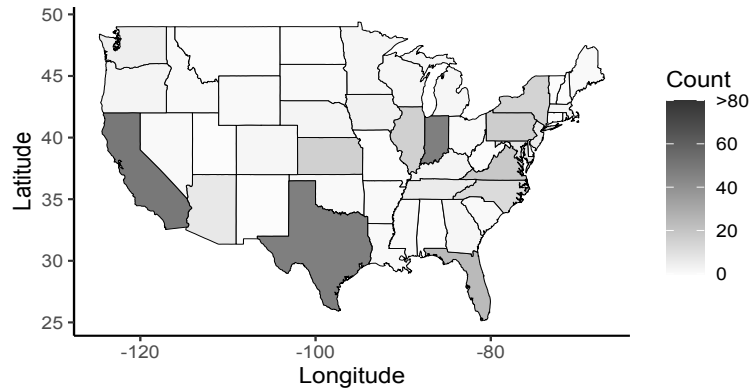


Figure 2. Choropleth map of US-based participants location.

For the test-retest measure of reliability, of the original 454 participants, 422 consented to be contacted for a follow-up survey and 283 completed the second survey (67.1%). Of those 283, 35 responded affirmatively to a question that asked if they had “experienced any important change in your life that could impact your language use (e.g., moving to a new city, changing jobs, changing family through a new relationship, divorce, death, etc.)” and were removed from the analysis. A total of 248 participants were retained for the test-retest analysis.

### 3.2 Procedure

Recruitment targeted Spanish–English bilinguals, defined as “anyone who can comfortably carry out daily conversations in English or Spanish”.<sup>6</sup> Participants were recruited online through snowball sampling ( $n = 303$ ) and the crowd-source platform Prolific ( $n = 151$ ). Online crowd-

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<sup>6</sup> Given the English-dominant skew of the snowball sampling, recruitment in Prolific was limited to those identifying as native speakers of Spanish who also spoke English. Approval rate and previous submission criteria were also specified, ensuring high-quality responses (e.g., Peer et al., 2014). \$

source platforms have been shown to be a reliable method of high-quality data collection (e.g., Hauser & Schwarz, 2016) and useful for collecting Spanish language data for research in linguistics (Nagle, 2019; Ortega-Santos, 2019). All participants consented to participate in the survey and received compensation for their participation.

Participants first selected the language of their choice to answer the questionnaire (English  $n = 349$ ; Spanish = 105). Although research has suggested that proficiency ratings by bilingual participants are not significantly impacted by the language in which the assessment is conducted (Delgado et al., 1999), participants completed the questionnaire in the language in which they felt most comfortable. Participants then filled out both the Bilingual Language Profile (Birdsong et al., 2012) and the Bilingual Code-Switching Profile.<sup>7</sup> The median time to complete all surveys was 18.2 minutes. The estimated time to complete the BCSP is between 5–8 minutes.

Throughout the two surveys, four quality check questions were included to ensure high-quality responses. Two questions were standard attention checks, asking participants to fill in a specific response (e.g., ‘please mark 7 for your answer’). Two questions were language-oriented quality checks, with the same questions given in both languages (e.g., *age/ edad*), and responses were correlated between the two questions. Responses that failed more than two attention checks ( $n = 1$ ) were removed from analysis (see Berinsky et al., 2013).

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<sup>7</sup> A third survey, with several open-ended questions, was also completed by participants within this timeframe.

For the test-retest measure of reliability, consenting participants were contacted by email a minimum of four weeks after they completed the original questionnaire. The mean delay between completion of the first and second survey was 32.4 days ( $SD = 8.8$ ).

### 3.3 Analysis

Two levels of the main analysis were conducted: internal validity and test-retest reliability. The validity of the BCSP was assessed using a principal components analysis (PCA) and an exploratory factor analysis. Analysis was conducted using R (R Core Team, 2020) and the psych package (Revelle, 2021). Following Marian et al. (2007), the factor analysis was not explicitly used to combine items into unique factors. The questions in the BCSP are considered single-construct items, which were grouped *a priori* into the subcategories of CS History, CS Use, CS Proficiency, and CS Attitudes. They were not intended to inherently group into multi-item constructs. For example, a participant who has spent many years using CS in their community but working in an environment in which only one language is spoken may provide significantly different ratings for these items, although both items are representative of the CS History subcategory. As such, the factor analysis was conducted to assess whether the BCSP items “contributed to underlying constructs... and [were] therefore valid” (Marian et al., 2007, p. 947). Test-retest reliability was evaluated via a Pearson’s correlation and an Intraclass Correlation (ICC) with a single-measurement, absolute agreement, two way mixed-effects model. Complementary to the main analyses of internal validity and reliability, preliminary analysis was done comparing participants from the two most represented geographic areas, providing a degree of external validity to the BCSP.

## 4. Results §

### 4.1 Factor Analysis

The principal components analysis identified six components (Table 4), which accounted for more than 90% of the total variation (for determining the number of components see Phan, 2016). The resulting eigenvalues of the six components were all greater than 3.0.

Subsequently, a factor analysis was conducted with six factors and varimax rotation. In the factor analysis, a minimum loading value of  $|0.5|$  was selected, which permitted each of the 20 questionnaire items to load onto a single factor, and no question loaded on to more than one factor (Watkins, 2018). Cronbach's alpha was calculated for each factor, as a measure of internal consistency. Moreover, additional alpha measures were computed for each factor if a given item was dropped. For each factor, removing any individual item degraded the Cronbach's alpha value. The resulting factors were assigned names that corresponded to the underlying constructs. It should be noted that the item loadings closely parallel the initially identified sub-categories, with two exceptions: Factor 2 (i.e., CS Age) and Factor 6 (CS in the Family).

Table 4. Factor Analysis Results

	Loading Value		Loading Value		Loading Value
<b>Factor 1: CS Attitudes</b>		<b>Factor 2: CS Age</b>		<b>Factor 3: CS Use</b>	
Importance of Switching Naturally	0.851	Age Started CS	-0.933	Commonly CS with Friends	0.645
Other's Perceptions of Switching	0.783	Age Felt Comfortable with CS	-0.843	Commonly CS with Self	0.643
Identify as a Switcher	0.564			Commonly CS when Counting	0.541
Identify with a Community of Switchers	0.531			Commonly CS in Community	0.477
Proportion of Variance	0.476		0.173		0.101
Cumulative Variance	0.476		0.649		0.75
	Loading Value		Loading Value		Loading Value
<b>Factor 4: CS Proficiency</b>		<b>Factor 5: CS History</b>		<b>Factor 6: CS in the Family</b>	
Ease of CS when Reading	0.777	Years of CS at Work	0.584	Years of CS in Family	0.733
Ease of CS when Writing	0.619	Years of CS in School	0.580	Commonly CS with Family	0.662
Ease of CS when Listening	0.589	Commonly CS at Work	0.525		
Ease of CS when Speaking	0.515	Years of CS in Community	0.521		
Proportion of Variance	0.079		0.048		0.039



The first factor, which accounted for the most variance, was indexed the underlying construct of attitudes towards code-switching (CS Attitudes). The CS Attitudes factor included how important participants deem switching languages naturally, how important others' perceptions of their switching abilities are, and to what degree they identify as a language switcher and as a member of a community of language switchers. These items were all in the CS Attitudes subcategory in the original survey. All items were positively loaded. The Cronbach's alpha was 0.88 [95% CI: 0.86, 0.90] (standardized alpha = 0.88), suggesting strong internal consistency.

The second factor was labeled CS Age (Cronbach's alpha: raw alpha = 0.95 [95% CI: 0.94, 0.96]; standardized alpha = 0.95) and corresponded to the age at which participants began switching languages and the age at which they felt comfortable switching languages. All items loaded negatively, such that participants with greater engagement with CS began using CS at an earlier age. These were the only two items that are reverse-scored when calculating the CS Profile score. In the BCSP, these two items belong to the CS History category.

The third factor indexed a participant's daily use of CS (CS Use) (Cronbach's alpha: raw alpha = 0.75 [95% CI: 0.71, 0.79]; standardized alpha = 0.75), and corresponded to how commonly participants currently used CS with friends, when talking to themselves, when counting, and when out in their communities. All items loaded positively. In the original questionnaire, these items represent four of the six items in the subcategory of CS Use.

The fourth factor is taken to indicate a speaker's proficiency in CS (CS Proficiency) (Cronbach's  $\alpha$ : raw  $\alpha = 0.74$  [95% CI: 0.71, 0.78]; standardized  $\alpha = 0.74$ ) and included items corresponding to how easy participants find it to produce code-switches when writing and speaking and how easy it is to comprehend code-switches when reading and listening. All items loaded positively. In the initial questionnaire, these were all of the items in the CS Proficiency subcategory.

The fifth factor was labeled as CS History (Cronbach's  $\alpha$ : raw  $\alpha = 0.61$  [95% CI: 0.56, 0.66]; standardized  $\alpha = 0.67$ ). This factor included questions regarding how many years participants had used CS at work, in an educational setting, and in their community. These items were all in the subcategory of CS History. One additional item was included in Factor 5, how common it is for participants to use CS at work, from the category of CS Use. All items loaded positively.

The final factor, labeled CS in the Family (Cronbach's  $\alpha$ : raw  $\alpha = 0.49$  [95% CI: 0.45, 0.53]; standardized  $\alpha = 0.79$ ), included two questions: how many years participants had engaged in CS with their families and how common it is for participants to currently use CS with their families. These questions pertained to the CS History and CS Use subcategories, respectively. Both items loaded positively.

It is worth noting that, while questions were considered single-item constructs, there were clear parallels between the pre-defined subcategories (i.e., CS History, CS Use, CS Proficiency, and CS Attitudes) and the results of the factor analysis. Each of these subcategories was clearly evident in

the resulting factors. The two exceptions were also logically consistent, with the first referring to the ages at which a participant began to use and feel comfortable with CS and the second considering a participant's CS practices with their family. The unique role of the family component parallels recent findings considering language entropy — the proportion of each language used in a given context (Gullifer & Titone, 2020). As a whole, the results of the factor analysis have shown that the BCSP corresponds to theoretically-motivated underlying constructs of CS experience, and as such, is an internally valid measure of a participant's CS profile.

#### 4.2 Test-retest Reliability

To initially examine the correlation between the first and second survey results, a Pearson's correlation was conducted comparing the composite CS Profile score from Time 1 (T1) to the CS Profile score at Time 2 (T2) for each participant. Results of the correlation suggested a strong correlation between the scores at T1 and T2 ( $r(248) = 0.914, p < .001$ ) and overall excellent reliability of the BCSP. The comparison of scores at T1 and T2 is illustrated in Figure 3.

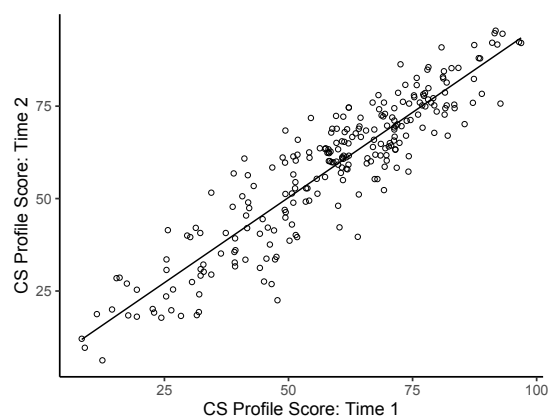


Figure 3. Comparison of CS Profile Score at T1 and T2 by participant.

Reliability was further assessed using an intra-class correlation (ICC) with a single-measurement, absolute agreement, two way mixed-effects model. Results of the intra-class correlation (ICC(A,1) = 0.914, 95% CI: 0.89, 0.932) demonstrated “excellent” reliability (Koo & Li, 2016). Illustrating the test-retest reliability, Figure 4 shows the Bland-Altman plot (Bland & Altman, 1986), which depicts the differences between a participant’s two CS Profile scores (i.e., T1 and T2) relative to their average CS Profile score. As shown in Figure 4, the overall mean difference was close to zero ( $M = 0.40$ ;  $SD = 7.98$ ) and the variation in the CS Profile difference scores was largely uniform across the continuum of average CS Profile scores. This suggests that there were no systematic differences between the T1 and T2 results. Results of the ICC and visual analysis of the Bland-Altman plot suggest that the BCSP is a highly reliable instrument for measuring the CS Profile of participants from across the entire continuum of CS Profile scores.

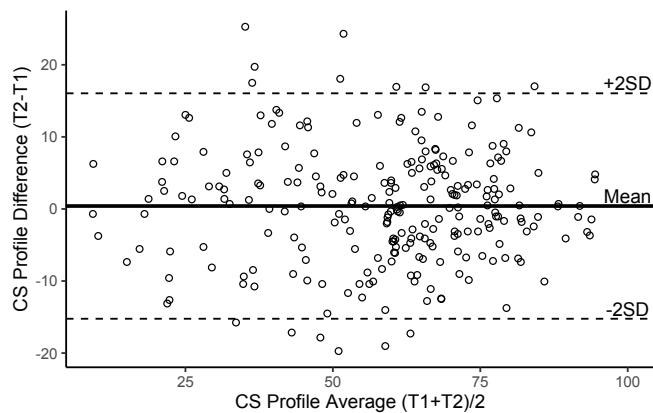


Figure 4. Bland-Altman plot, illustrating the differences in the CS Profile score vs. average CS Profile score by participant.

It should be noted that there was a significant spread in the participants' CS Profile scores (range \$ at T1 = 8.3–96.9,  $M = 58.7$ ,  $SD = 19.2$ ), as is visible in Figures 3 and 4. This distribution suggests that a bilingual's engagement with CS may be best represented as a continuous variable.

Finally, reliability was assessed at the level of the subcomponent. Reliability results of individual ICCs (single-measurement, absolute agreement, two-way mixed effects model) are shown in Table 5. Broadly, while there is some variability in the reliability by subcomponent, with the CS Proficiency component showing somewhat lower reliability than the other subcategories, the reliability of each subcategory can be classified as “good” (Koo & Li, 2016). These results suggest that, while collectively the global BCSP score is a highly reliable measure, each subcomponent of the BCSP evidences a strong degree of reliability.

Table 5. ICC Results by Subcategory

Subcategory	ICC(A,1)	Left CI (95%)	Right CI (95%)
CS History	0.879	0.847	0.904
CS Use	0.845	0.806	0.878
CS Proficiency	0.754	0.694	0.803
CS Attitudes	0.850	0.811	0.881

#### *4.3 Analysis by Community Characteristics*

While the original goal was to assess the BCSP for both internal validity and test-retest reliability, some preliminary analysis by community characteristics lends further external validity to the BCSP. Considering the participants' current region of residence indicated on the questionnaire, a comparison was made between participants who reported living in Texas ( $n = 81$ ) and Indiana ( $n = 108$ ), the two states most represented in the current data. While prior cross-community comparative quantitative studies of CS are rare (Gardner-Chloros, 2009) and none have

specifically addressed these two target communities, several hypotheses are reasonable \$ considering the community characteristics. These two regions differ with respect to their overall density of bilingual populations (percentage of populations speaking Spanish at home: Indiana = 4.4%, Texas = 29.5%; U.S. Census Bureau, 2015).<sup>8</sup> As such, differences may be expected between the communities with respect to BCSP subcomponents that address interactional contexts (e.g., CS History). Specifically, participants in Texas may report overall higher CS History scores than those in Indiana. Moreover, given that previous research has suggested more negative attitudes towards CS in regions with greater presence of Spanish (e.g., Uribe, 2021), we may anticipate differences in CS Attitudes between the two communities, with more positive attitudes in the Indiana group than the Texas group.

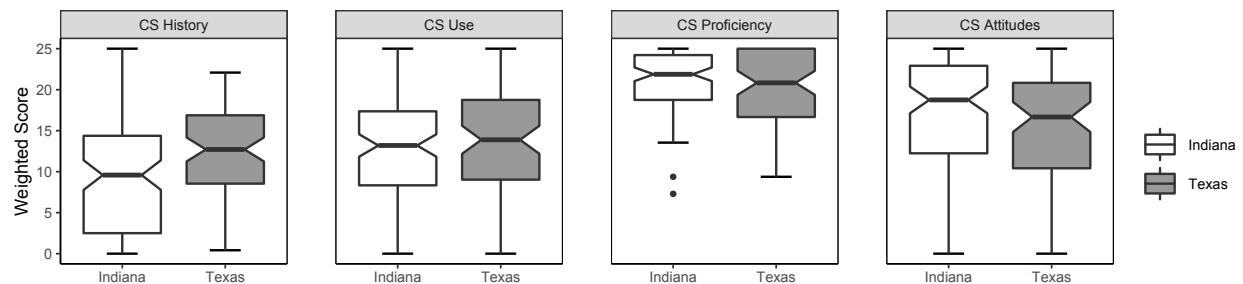


Figure 5. Weighted BCSP subcategory score by participant region.

Supporting the comparability of the two groups, a comparison of the BLP composite dominance score (Birdsong et al., 2012) showed no difference between participants residing in Texas ( $M =$

<sup>8</sup> Current state of residence is being used as an approximation for a given participant's community, as data were not available for more fine-grained analysis. Variability in the linguistic norms of local communities should be expected.

12.8,  $SD = 59.3$ ) and Indiana ( $M = 13.4$ ,  $SD = 61.6$ ). In addition, an overall analysis of the CS Profile Score showed no significant difference between the Texas ( $M = 61.6$ ,  $SD = 20.2$ ) and Indiana ( $M = 60.2$ ,  $SD = 18.7$ ) participants ( $t(197) = -0.483$ ,  $p < .630$ ). However, of particular interest in the current case is the difference between the subcomponents of the BCSP that serve to distinguish the CS practices and experiences of these two groups. As illustrated in Figure 5, differences can be observed in both the CS History and CS Attitudes subcomponents. A series of by-subcategory comparisons were conducted, with Bonferroni adjustment (significance criterion of  $p < .01$ ). Significant differences were found between the Texas and Indiana participant groups with respect to CS History ( $t(197) = -2.89$ ,  $p = .004$ ). As expected, participants residing in Texas, the environment with a higher proportion of bilingualism, showed greater CS History scores. Differences between the two groups with respect to CS Attitudes did not reach statistical significance, but trended in the expected direction ( $p = .19$ ), with more positive attitudes found in the Indiana group. Finally, the lack of difference between the two groups with respect to the CS Proficiency subcomponent may be explained by the targeted recruitment of participants who can “comfortably” engage in conversation in both languages, resulting in overall high levels of proficiency. Broadly, this preliminary analysis suggests that the BCSP reflects community differences and provides a degree of external validity, although further research should confirm these findings across more refined participant categories (e.g., age, educational attainment).

## **5. Discussion**

Previous research has begun to establish that a bilingual’s experience and use of CS may play an important role in both linguistic and non-linguistic behaviors (e.g., Verreyt et al., 2016). Yet, a speaker’s engagement or experience with CS has been largely ignored in previous research, and

when CS experience is assessed, there is no consensus as to how such experience may be quantitatively measured. Addressing this gap, the current paper presented a novel tool for assessing a bilingual's CS experience: the Bilingual Code-Switching Profile. In the current approach, a bilingual's CS profile is conceptualized as a multifaceted construct, accounting for both their long-term (CS History) and current (CS Use) use of CS across a variety of interactional settings, as well as their proficiency (CS Proficiency) and attitudes towards CS (CS Attitudes). These subcomponents, motivated by previous research, parallel the multifaceted approach to bilingual language dominance (for review see Montrul, 2016). Importantly, this framework moves beyond the current approaches to assessing CS, which have largely ignored the role of long-term engagement with CS, the variety of interactional contexts (e.g., Muysken, 2000), and an individual's attitudes towards CS (Dewaele & Wei, 2014).

Drawing on a wide-ranging participant pool, the BCSP was assessed for both validity and reliability (i.e., test-retest reliability). The results of a principal components analysis and exploratory factor analysis demonstrated that the BCSP is an internally valid measure of a participant's CS experience. Moreover, the factor analysis highlighted the general cohesiveness of the four BCSP subcomponents. In addition, an analysis of reliability, demonstrated that the BCSP produced excellent reliability. Finally, preliminary results comparing two subgroups of bilinguals suggests a degree of external validity. Collectively, these results suggest that the BCSP is a valid and reliable measure of a bilingual's CS profile.

### *5.1 Using the BCSP*



Several features of the BCSP make it a practical tool. First, the questionnaire relies on participant self-reporting, which has been shown to be reliable for the assessment of proficiency in both monolinguals and bilinguals (e.g., Flege et al., 2002) and for determining CS frequency (Cox et al., 2020; Jevtović et al., 2020; although see Treffers-Daller et al., 2020). The use of self-reporting makes the BCSP practical to use in many research settings, and it can be completed without the direct assistance of the researcher. Second, although more comprehensive (and longer) than many of the currently available methods of measuring bilingual's use or experience with CS, the BCSP remains short enough to be practical and does not represent a significant burden on the participant's time. The questionnaire takes between 5–8 minutes to complete, providing a valid and reliable measure in a short period of time. The inherent trade-off between questionnaire length and degree of specificity should be acknowledged. For example, while the contexts addressed in the language use section include many daily activities, specific study goals may require adaptation of the BCSP to include greater levels of specificity (for example, see Anderson et al., 2018). Finally, and of particular use to quantitatively-oriented research, the scoring procedure allows researchers to calculate a single continuous measure of a participant's CS Profile, an approach specifically advocated for in previous literature (e.g., de Bruin, 2019). The quantitative measure facilitates statistical analysis and cross-comparison between different study populations. Moreover, the use of a continuous variable represents the continuum of bilingual experiences, and “may do more justice to the often fine-grained differences between bilinguals” (de Bruin, 2019, p. 10).

While the BCSP is designed to provide a single continuous measure, researchers may choose to report on each component individually, which were shown to be reliable in their own right, should their study goals motivate such approaches. A by-subcomponent or by-question analysis may

provide a nuanced view of the multifaceted nature of experience with language switching, allowing researchers to distinguish between the degree of CS engagement within a single interactional context (i.e., how much a bilingual switches with family), as well as how they move through different communicative environments (e.g., Beatty-Martínez & Titone, 2021).

Compared to previous self-reported measures of the degree of engagement or frequency of CS (e.g., de Bruin et al., 2015; Hartanto & Yang, 2016; Paap et al., 2017; Valdés Kroff et al., 2017; Verreyt et al., 2016), the BCSP represents a more comprehensive approach and the first to include all of the theoretically motivated subcategories of CS History, CS Use, CS Proficiency, and CS Attitudes. Considering other established questionnaires of bilingual language use, the BCSP can be used to complement results from traditional language history questionnaires that do not include language switching practices (e.g., Birdsong et al., 2012), as well as previous methods that gauge the types of CS behaviors (e.g., the BSWQ, Rodriguez-Fornells et al., 2012; the CSFT, Hofweber et al., 2019). Collectively, these measures provide a holistic view of a bilingual's dominance, CS engagement, and types of CS employed.

The BCSP is currently available for several language pairings free of charge (for English–Spanish version see Appendix A, other versions are available at [osf.io/amupf](https://osf.io/amupf)).

### *5.2 Limitations and Future Work*

There are several limitations of the current study and opportunities for future research with the BCSP questionnaire. First, to date, the BCSP has been validated for a specific population, which serves both as a limitation and an avenue for future research. Future work may expand beyond this

limited population, including a variety of language pairings and expanding the socioeconomic diversity of the target population. Considering different language pairings, CS examples included in the questionnaire should reflect the range of possible CS types in a given community, and the lack of backflagging and congruent lexicalization (Muysken, 2013) examples was an oversight that has been corrected for future iterations of the English–Spanish version of the BCSP. Second, although the current results highlighted the internal validity of the questionnaire, future research on the BCSP may seek to further establish the external validity of the instrument, correlating the self-reported BCSP scores with a variety of behavioral measures of CS practices, including observational measures of CS usage, grammaticality judgments, and psycholinguistic measures. While the BCSP clearly provides a relative measure to compare across bilinguals, with participants reporting a spectrum of engagement with CS (from minimal to high CS engagement), the stigmatized position of CS in many communities may result in a degree of underreporting (see Treffers-Daller et al., 2020). Thus, while the relative measure may be useful for a variety of research paradigms, further external validation will provide additional contextualization for BCSP scores.

Finally, as one of the main goals of the BCSP was to provide a quantitative assessment of a bilingual's engagement with CS, this questionnaire does not incorporate key qualitative differences in a bilingual's switching practices. While examples of different types of switches were included (e.g., alternational, insertional, etc.), participants did not provide assessments of their own qualitative switching patterns. Depending on the research aims, a more complete account of a bilingual's switching engagement and qualitative patterns may be achieved by combining the BCSP with other approaches, such as Hofweber et al.'s (2019) CS frequency task. Similarly, the

BCSP focuses specifically on CS engagement and does not account for bilingual language choice in general. For example, as participants may select “never switch” across a range of interactional contexts in the BCSP history and use subcategories, it does not specify which language they prefer in such contexts. Thus, the BCSP may interface well with other questionnaires that focus on issues of language choice, such as the BLP (Birdsong et al., 2012), to provide a holistic picture of CS engagement and language choice.

It is clear that future research on CS, and bilingualism in general, should systematically account for a speaker’s engagement with CS. The BCSP provides a method to control for and compare variable CS engagement in bilingual populations that was previously unaccounted for, and as such, may be of use to researchers across a broad range of fields. Moreover, given the complexity of the bilingual experience, with different levels of CS engagement, different qualitative CS patterns, and different language choices, future research should focus on which kinds of outcomes are impacted by different facets of a bilingual’s experience. The BCSP, in conjunction with other descriptive tools, may serve to disentangle the effects of these different variables on bilingual performance.

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Appendix A. The Bilingual Code-Switching Profile (English Version)<sup>9</sup>

**Introduction: Language Switching Practices**

Throughout the world, where people and communities use two different languages, there is an opportunity for language switching. For this questionnaire, language switching is understood as moving between two languages in the same interaction or conversation. We are specifically interested in language switches involving both English and Spanish. Language switching is a common phenomenon, although not all people or communities do it.<sup>10</sup>

Examples:

"I'm going to the store para comprar unos zapatos."

"She went to the entierro with her mother."

"Tuvimos un examen en la clase de matemáticas. I think I did pretty well."

**Introduction: Comprehension Check<sup>11</sup>**

To ensure that you understand what we mean by "language switching", please choose/check all of the options that include language switching.

- I'm going to visit my family *este fin de semana*.
- Mi abuela está muy feliz hoy.*
- Fue un challenge para mí.*
- That's why they should do it. *Van a perder negocio si no lo hacen.*
- It's so cold out today. I'm freezing.

**Section 1. History of Language Switching**

*In this section, we would like you to respond to some factual questions about your history with language switching. Please circle your response.*

At what age did you start switching languages?

Since birth	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+	I don't ever switch
-------------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	-----	---------------------

At what age did you start feeling comfortable switching languages?

As early as I can remember	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+	I don't feel comfortable switching
----------------------------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	-----	------------------------------------

<sup>9</sup> The online version of the BCSP employed drop-down selection options for items with more than six response options (i.e., CS History subcomponent) and horizontal sliders for items with six options (i.e., CS Use, CS Proficiency, CS Attitudes). For a digital version of the BCSP, please contact the author.

<sup>10</sup> Examples used here should reflect the range of types of code-switching used by the target community. The English–Spanish version of the BCSP has been subsequently updated to include examples of congruent lexicalization and backflagging.

<sup>11</sup> Correct responses included the first, third, and fourth responses.

How many years have you spent in a region/community where switching languages is common?

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	-----

How many years have you spent in a family where switching languages is common?

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	-----

How many years have you spent in an educational environment (for example: school, university, etc.) where switching languages is common?

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	-----

How many years have you spent in a work environment where switching languages is common?

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	-----

## Section 2. Use of Language Switching

*In this section, we would like you to answer some questions about your use of language switching. Please circle your response.*

How common is it for you to switch languages with friends? Consider all your friends, bilingual or not

Never switch Very common

0	1	2	3	4	5	6
---	---	---	---	---	---	---

How common is it for you to switch languages with family?

Never switch Very common

0	1	2	3	4	5	6
---	---	---	---	---	---	---

How common is it for you to switch languages at school or work?

Never switch Very common

0	1	2	3	4	5	6
---	---	---	---	---	---	---

How common is it for you to switch languages in your community (for example: grocery store, mall, church, community center)?

Never switch Very common

0	1	2	3	4	5	6
---	---	---	---	---	---	---

How common is it for you to switch languages when talking to yourself?

Never switch Very common

0	1	2	3	4	5	6
---	---	---	---	---	---	---

How common is it for you to switch languages when counting?

Never switch Very common

0	1	2	3	4	5	6
---	---	---	---	---	---	---

## Section 3. Ease of Language Switching

*In this section, we would like you to rate how easy switching languages is for you in the following situations. Please circle your response.*

How easy is it for you to switch languages while speaking?

Not at all Very easy

0	1	2	3	4	5	6
---	---	---	---	---	---	---

How easy is it for you to understand when other people switch languages in spoken conversation?

Not at all Very easy

0	1	2	3	4	5	6
---	---	---	---	---	---	---

How easy is it for you to switch languages while writing (for example: literature, text messages, social media)?

Not at all Very easy

0	1	2	3	4	5	6
---	---	---	---	---	---	---

How easy is it for you to understand language switches in written text (for example: literature, text messages, social media)?

Not at all Very easy

0	1	2	3	4	5	6
---	---	---	---	---	---	---

#### **Section 4. Attitudes towards Language Switching**

*In this section, we would like you to respond to some statements about your attitudes towards language switching. Please circle your response.*

I feel like myself when I switch languages.

Disagree Agree

0	1	2	3	4	5	6
---	---	---	---	---	---	---

I identify with a community/culture that switches languages.

Disagree Agree

0	1	2	3	4	5	6
---	---	---	---	---	---	---

It is important to me to switch languages in a natural way.

Disagree Agree

0	1	2	3	4	5	6
---	---	---	---	---	---	---

I want others to think that I switch languages in a natural way.

Disagree Agree

0	1	2	3	4	5	6
---	---	---	---	---	---	---