

Original Research Article

## Associations between L2 Engagement and Emotional Perception: A Study of Arabic-English Bilinguals

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**Abstract:** This study examined associations between dimensions of bilingual engagement and emotional perception among Arabic–English bilinguals. Recent research has increasingly challenged categorical approaches to bilingualism, arguing instead that bilingual experience is multidimensional and shaped by variation in language use, proficiency, and attitudes. Building on this perspective, the present study investigated whether individual differences in bilingual engagement were associated with variation in emotional perception performance. A total of 143 Arabic–English bilinguals completed the Bilingual Language Profile (BLP) and a non-verbal Emotional Perception Task (EPT) consisting of short audiovisual clips depicting basic emotional expressions. Spearman’s rho correlations were conducted to examine associations between dimensions of bilingual engagement and emotional perception outcomes. The findings revealed modest but significant positive associations between emotional perception accuracy and several dimensions of L2 engagement, particularly language use and attitudinal orientation toward English. Language history showed comparatively weaker relationships with emotional perception performance. These findings support experience-based approaches to bilingualism by suggesting that emotional perception varies alongside patterns of language engagement rather than bilingual status itself. The study also contributes methodologically by operationalizing bilingualism through continuous multidimensional measures rather than categorical groupings and by employing a non-verbal emotional perception task that minimizes linguistic confounds. Overall, the results suggest that variation within bilingual populations may be more informative than bilingual versus monolingual comparisons when examining emotional processing outcomes.

**Keywords:** Bilingual Engagement, Emotional Perception, Bilingualism, Language Experience, Bilingual Language Profile, Arabic–English Bilinguals, Emotional Processing, Multilingualism.

## INTRODUCTION

Research on bilingualism has traditionally been dominated by investigations into cognitive outcomes, particularly in relation to executive control and attentional processes (Bialystok, 2009; Luk & Bialystok, 2013). More recently, however, attention has shifted toward domains that extend beyond cognition, including emotional processing and metalinguistic awareness. This shift reflects a broader recognition that bilingual experience is not confined to structural language knowledge but is embedded within social interaction, cultural practice, and affective engagement. Within this emerging line of inquiry, it has been suggested that navigating multiple linguistic systems may be associated with differences in how individuals perceive and interpret emotional information (Dewaele & Alqarni, 2018; Chen & Zhang, 2022). At the same time, such associations are rarely uniform, and there is increasing reluctance to attribute them to bilingualism as a categorical trait.

One source of this hesitation lies in the observation that bilingual speakers do not constitute a homogeneous group. Individuals who identify as bilingual often differ substantially in their language histories, patterns of use, proficiency levels, and sociocultural environments. These differences are not peripheral; rather, they are likely to shape how languages are experienced and, by extension, how emotional meaning is processed across contexts. As De Bruin (2019) notes, while

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categorical classifications may offer an initial point of comparison, they risk obscuring the variability inherent in bilingual experience. Two speakers may both be described as bilingual, yet their engagement with each language may differ in frequency, domain, and emotional salience. In many cases, the first language is embedded in family interaction and early socialization, whereas the additional language is associated with formal education or professional activity. Such distinctions are not merely descriptive; they may influence how emotional cues are perceived and interpreted.

These considerations have prompted a gradual shift toward experience-based models of bilingualism. Rather than treating bilingualism as a binary variable, recent work has sought to examine how specific dimensions of language experience relate to cognitive and affective outcomes (Cenoz, 2013; Hirosh & Degani, 2018). Within this perspective, emotional processing is understood as contingent on factors such as frequency of language use, context of acquisition, and the extent to which a language is integrated into everyday interaction. Empirical findings lend some support to this view. Emotional responses appear to vary depending on exposure and socialization, suggesting that affective meaning is, at least in part, shaped through repeated engagement with language in context (Hayakawa *et al.*, 2022). Yet the extent to which these experiential factors relate specifically to emotional perception, particularly in non-verbal tasks, remains insufficiently explored.

The present study is situated within this line of inquiry. It examines whether variation in second language engagement, operationalized through self-reported use, proficiency, and attitudes, is associated with performance on a non-verbal emotional perception task. Rather than assuming that bilingualism confers a generalized advantage in emotion recognition, the study adopts a more cautious position, considering whether differences in perceptual accuracy may correspond to the extent and nature of engagement with the additional language. This approach aligns with calls to move beyond static comparisons and toward models that account for within-group variability (Pavlenko, 2012; Pliatsikas *et al.*, 2019).

To capture this variability, the study employs the Bilingual Language Profile (BLP), a multidimensional instrument that assesses language history, use, proficiency, and attitudes. Compared to vocabulary-based measures such as LexTALE, which primarily index receptive knowledge, the BLP provides a broader account of how languages are used and experienced across domains. This distinction is not trivial. While lexical tests may offer efficient estimates of proficiency, they are less suited to capturing the experiential and attitudinal dimensions that are central to the present research questions. By contrast, the BLP allows for the examination of language engagement as a composite of interrelated yet distinct dimensions, each of which may contribute differently to emotional perception.

The empirical context of Arabic–English bilingualism in Jordan provides a particularly relevant setting for this investigation. In this context, Arabic typically functions as the language of early socialization and emotional expression, whereas English is more closely associated with education, professional advancement, and media exposure. Although English is widely encountered and used, its role is often domain-specific rather than uniformly distributed across daily life. This functional differentiation offers an opportunity to examine how patterns of use and self-perceived proficiency relate to performance on tasks that do not rely on verbal input.

Emotional perception in the present study is assessed through a non-verbal task involving short, silent video clips depicting basic emotional expressions. By removing linguistic content from the stimuli, the task allows for a focus on visual emotional cues while still permitting individual differences in language experience to emerge as potential correlates of performance. The central question is therefore not whether bilinguals outperform monolinguals, but whether variation within a bilingual population is associated with differences in the accuracy and intensity of emotional perception.

More specifically, the study examines whether frequency of L2 use, self-reported L2 proficiency, and attitudinal orientation toward the L2 are associated with accuracy in identifying non-verbal emotional expressions. In doing so, it seeks to contribute to ongoing discussions regarding the role of experiential factors in bilingual emotional processing, while maintaining a correlational and non-causal framework.

## 2. LITERATURE REVIEW

### 2.1 Bilingualism beyond Categorical Distinctions

Bilingualism has long been treated as a categorical variable, typically contrasting monolingual and bilingual speakers to identify cognitive or linguistic differences. While this approach has generated a substantial body of empirical findings, it has also been increasingly questioned on theoretical and methodological grounds. One of the central concerns is that such classifications obscure the considerable variability that exists within bilingual populations. Recent theoretical work has increasingly conceptualized bilingualism as a multidimensional and experience-dependent phenomenon rather than a fixed categorical condition. Dimensions such as frequency of use, interactional diversity, proficiency, and contextual exposure appear to vary independently across individuals, suggesting that bilingual experience is better understood as a continuum than as a binary distinction (Gullifer *et al.*, 2020; Kalamala *et al.*, 2021). This perspective also aligns with

dynamic models of multilingualism, which view language development as nonlinear, adaptive, and continuously shaped through interaction across linguistic systems (Jessner, 2008, 2018).

Recent work in applied linguistics has moved toward a more nuanced conceptualization, treating bilingualism as a multidimensional phenomenon shaped by patterns of language experience. Cenoz (2013) argues that multilingual competence should be understood through interacting dimensions, including proficiency, use, and sociocultural context, rather than through rigid boundaries between languages. This perspective aligns with broader shifts in the field that emphasize fluidity and interaction between linguistic systems. Within this framework, the effects associated with bilingualism are not assumed to arise from bilingual status itself but from the ways in which languages are used and experienced over time.

Such approaches challenge the assumption that bilingual speakers can be meaningfully classified into rigid categories, particularly when the underlying dimensions of engagement remain continuous and context-sensitive (Berthele, 2021), if bilingualism is not a uniform condition, then any relationship between language and emotion is unlikely to be captured through group comparisons alone. Instead, it becomes necessary to examine how specific dimensions of language engagement relate to emotional outcomes. This shift from categorical to experiential models provides the conceptual foundation for the present study, which focuses on language use, proficiency, and attitudes as continuous predictors.

## 2.2 Language, Emotion, and Conceptualization

The relationship between language and emotion has been widely explored across psycholinguistic and sociocultural perspectives. A central argument emerging from this literature is that emotional experience is, at least in part, mediated by language. From a constructionist standpoint, emotions are not treated as a fixed biological entity but as conceptual constructions shaped through knowledge that is acquired and refined over time (Barrett, 2017). Emotional perception, in this view, involves the interpretation of sensory cues through categories that are themselves linguistically and culturally informed.

This perspective implies that differences in linguistic repertoires may influence how individuals perceive and interpret emotional stimuli. Languages vary in the range and granularity of emotion-related vocabulary, and these differences can affect the conceptual distinctions available to speakers. For bilingual individuals, access to multiple linguistic systems may expand the range of available emotion concepts. However, this does not necessarily lead to uniform enhancements in emotional perception. Instead, the influence of language is likely to depend on the extent to which each language is actively used and integrated into everyday interaction.

Emotional meaning is not acquired through language alone but through the contexts in which language is embedded. Early language acquisition typically occurs in emotionally rich environments, where linguistic forms are closely tied to affective experiences. Later-acquired languages, by contrast, are often learned in more formal or instructional settings, where emotional engagement may be limited. These differences suggest that the emotional resonance of a language is shaped by patterns of use and socialization rather than by linguistic structure alone. Consequently, emotional meaning may become differentially associated with specific languages depending on the sociocultural and affective contexts in which those languages are acquired and used (Pavlenko, 2012; Harris *et al.*, 2006).

## 2.3 Emotional Asymmetries across Languages

A substantial body of empirical research has documented asymmetries in emotional processing across languages. First languages are often associated with stronger emotional responses, both in terms of subjective intensity and physiological reactivity. These findings have been interpreted through what is commonly referred to as the reduced emotionality hypothesis, which proposes that additional languages, particularly those acquired later in life, are less emotionally grounded due to differences in learning context.

Evidence for this pattern comes from a range of methodological approaches. Studies using self-report measures have consistently found that individuals report stronger emotional reactions when using their first language compared to an additional language. Experimental work has extended these findings by examining how language context influences decision-making. In research on moral judgment, for example, participants have been shown to evaluate transgressions less harshly when scenarios are processed in a second language. In one study employing ecologically valid audiovisual stimuli, bilingual participants watched videos depicting real-life moral violations and rated their severity and emotional impact. The results indicated that judgments were less severe and emotional responses weaker when the stimuli were processed in an additional language, with emotional intensity acting as a mediating factor in the relationship between language context and moral evaluation (Dewaele *et al.*, 2023).

While these findings suggest a systematic pattern, they also highlight the importance of methodological considerations. The use of audiovisual stimuli, as opposed to written scenarios, introduces a higher degree of ecological

validity and allows for the assessment of emotional responses in more naturalistic contexts. At the same time, the observed effects are not uniform across all conditions, indicating that language-related differences in emotional processing may be contingent on factors such as task type and stimulus characteristics.

Crucially, the asymmetry between languages appears to be modulated by experience. Increased exposure to and use of an additional language has been associated with stronger emotional resonance, suggesting that the distinction between L1 and L2 is not fixed but evolves over time. This suggests that emotional resonance may be influenced by ongoing engagement with the L2 rather than by language status itself.

#### **2.4 Reconsidering the Bilingual Emotional Advantage**

Within this broader context, the notion of a bilingual emotional advantage has been proposed as a possible extension of bilingual effects into the emotional domain. Some studies have reported that bilingual individuals outperform monolinguals in tasks involving emotional perception or exhibit higher levels of emotional awareness. For instance, research using audiovisual emotion recognition tasks has shown that bilingual participants may demonstrate higher accuracy in identifying emotional expressions in their additional language compared to monolingual counterparts. (Alqarni & Dewaele, 2018)

However, the evidence for such an advantage remains mixed. In the same study, bilingual participants did not outperform monolinguals in their first language, suggesting that any observed benefit may be context-dependent rather than generalizable. Moreover, the magnitude of the reported effects is often modest, and findings vary across populations and methodological designs. These inconsistencies have led to increasing skepticism regarding claims of a generalized bilingual advantage in emotional domains.

A more cautious interpretation is that differences often attributed to bilingualism may instead reflect variation in language experience, patterns of engagement, and contextual exposure rather than bilingual status itself. Factors such as frequency of use, proficiency, and attitudes toward the language appear to play a more consistent role in shaping emotional outcomes. From this perspective, the concept of a bilingual emotional advantage is better understood as a set of conditional effects that emerge under specific experiential configurations. This position is increasingly consistent with critiques of categorical bilingual grouping, which argue that discretizing continuous dimensions of language experience may obscure meaningful variability within bilingual populations (Altman & Royston, 2006; Rucker *et al.*, 2015).

#### **2.5 Operationalizing Language Experience: The BLP Framework**

In response to these limitations, recent research has sought to operationalize bilingualism through multidimensional measures that capture variation in language experience. The Bilingual Language Profile (BLP) reflects this multidimensional approach by incorporating language history, use, proficiency, and attitudes into a unified engagement framework. Importantly, research examining the psychometric properties of the BLP has reported strong reliability and meaningful associations with objective proficiency measures, supporting its use as a theoretically grounded measure of bilingual experience (Olson, 2023; Bonvin *et al.*, 2021).

The distinction between these dimensions is theoretically significant. Language use reflects the frequency and context of engagement, capturing how often a language is employed across different domains. Proficiency indexes perceived competence, which may influence the ease with which emotional cues are processed. Attitudes, in turn, capture affective orientation toward the language, potentially shaping motivation and emotional investment. These dimensions are interrelated but not interchangeable, and their contributions to emotional processing may differ.

Empirical evidence suggests that experiential variables such as use and exposure are particularly relevant for emotional outcomes. Studies examining emotional responses across languages have found that increased engagement with an additional language is associated with greater emotional resonance, supporting the view that emotional processing is shaped by interactional experience rather than by structural properties of the language (Pavlenko, 2012; Dewaele *et al.*, 2023). This provides a strong methodological rationale for focusing on these dimensions in the present study.

#### **2.6 Emotional Perception and Non-Verbal Assessment**

Emotional perception is typically defined as the ability to infer others' emotional states from observable cues. While many studies have relied on verbal stimuli, such as emotion-laden words or narratives, non-verbal approaches offer a distinct advantage in bilingual research. By removing linguistic content from the stimuli, non-verbal tasks reduce the confounding influence of language processing and allow for a more direct assessment of perceptual abilities. The use of non-verbal stimuli is particularly relevant in bilingualism research because it minimizes the confounding influence of lexical access and linguistic decoding during emotional evaluation.

Audiovisual emotion recognition tasks have been widely used to examine emotional perception in ecologically valid settings. In one study, participants were presented with short video clips depicting everyday emotional interactions and were required to identify the emotions expressed. The use of such stimuli allows for the integration of facial expressions, gestures, and contextual cues, providing a richer basis for emotional inference. Findings from this line of research indicate that performance in emotion perception tasks may vary across individuals, with differences linked to both linguistic and psychological factors (Alqarni & Dewaele, 2018).

At the same time, the relationship between language experience and non-verbal emotional perception remains underexplored. Much of the existing literature has focused on comparisons between bilingual and monolingual groups or on tasks that incorporate verbal elements. As a result, it is not yet clear to what extent variation in language engagement influences performance in purely non-verbal contexts.

## 2.7 Summary and Research Gap

Taken together, the literature suggests that language and emotion are closely intertwined, but the mechanisms underlying this relationship remain complex and context dependent. While differences in emotional processing across languages have been consistently observed, their interpretation has shifted from categorical explanations toward experience-based accounts. At the same time, claims of a bilingual emotional advantage remain tentative, with evidence pointing toward modest and conditional effects.

A key limitation in existing research is the reliance on group-based comparisons, which overlook variability within bilingual populations. Additionally, the use of verbal stimuli complicates the interpretation of findings by introducing language processing as a confounding factor. There is therefore a need for studies that (a) operationalize bilingualism through multidimensional measures of language experience and (b) assess emotional perception using non-verbal tasks.

The present study addresses this gap by examining whether variation in language use, proficiency, and attitudes is associated with differences in emotional perception accuracy and intensity among Arabic–English bilinguals. By focusing on continuous measures of engagement and employing a non-verbal assessment, the study seeks to provide a more precise account of how language experience relates to emotional perception.

## 3. METHODOLOGY

### 3.1 Participants

One hundred and forty-three university students, Arabic-English bilingual participants living in Jordan participated in this study. Participants age ranged between 18 to 35 years ( $M = 21.48$ ,  $SD = 2.31$ ). The gender of the sample included 108 females (75.5%) and 35 males (24.5%). All participants reported Arabic being their first language and indicated that they had learned English primarily through formal education, and they reported extended contact with English through university study, media consumption, or everyday communication reflecting the frequent presence of English within higher education in Jordan.

All participants could be described as bilingual speakers of Arabic and English, yet their language experiences were different, as some reported frequent use of English in academic settings, while others used it mainly for reading, online communication, or media consumption. These differences were captured through the Bilingual Language Profile questionnaire rather than through categorical grouping of participants.

### 3.2 Data Collection Procedures

Participants were invited to complete an online survey that examined their language experience and emotional perception. Recruitment was conducted through university networks and social media platforms, where a link to the questionnaire was shared among students and recent graduates.

The questionnaire was administered online using Qualtrics and required approximately 20-25 minutes to complete. The first part contained questions from the Bilingual Language Profile (BLP) questionnaire, which gathered information about participants' language background, proficiency, and patterns of use. The second part consisted of an Emotional Perception Task in which participants watched short video clips and responded to questions about the emotions portrayed in the videos.

To ensure clarity and usability of the survey, a pilot test was conducted with ten bilingual individuals before the main data collection began. Minor adjustments were made to the wording of several instructions and to the layout of the survey interface. Instructions throughout the survey were presented in both Arabic and English so that participants could choose the language they found easier to follow. The order of the video clips in the emotional perception task was randomized to reduce possible order effects.

All responses were collected anonymously and at the beginning of the survey, participants read a short description of the study and provided informed consent. Participants were able to complete the questionnaire in the setting of their choice, which allowed them to respond at their own pace and without time pressure.

### 3.3 Instruments

The present study used two instruments for collecting the data: the Bilingual Language Profile (BLP) questionnaire and an Emotional Perception Task (EPT).

#### 3.3.1 Bilingual Language Profile

Participants' language experience was measured using the Bilingual Language Profile (BLP; Birdsong, Gertken, & Amengual, 2012). The BLP is a self-report questionnaire designed to document multiple aspects of bilingual language experience across several domains.

The questionnaire consists of items addressing language history, patterns of language use across communicative contexts, attitudes toward each language, and self-reported proficiency in speaking, listening, reading, and writing. Responses are provided on structured numerical scales, allowing quantitative scores to be calculated for each dimension.

Scoring followed the standard BLP procedure (Birdsong *et al.*, 2012). Raw module totals were multiplied by adjustment coefficients to equalize the contribution of each dimension in the overall bilingual profile (History  $\times 0.454$ , Use  $\times 1.09$ , Proficiency  $\times 2.27$ , Attitudes  $\times 2.27$ ). The Language Use module consists of five percentage-based items reported on a 0–10 scale that are converted to proportional values during scoring, resulting in item scores ranging from 0–100 before weighting.

In the present study, particular attention was given to participants' reported use of English and self-perceived proficiency in English, as these variables capture how actively participants engage with the language in everyday contexts. The BLP therefore served to document variation in bilingual experience within the participant group.

#### 3.3.2 Emotional Perception Task

Emotional perception was examined using a non-verbal emotion recognition task. The task consisted of 12 short silent video clips, each lasting approximately five to seven seconds. The clips depicted actors expressing six basic emotions identified in Ekman and Friesen's (1971) classification: happiness, sadness, anger, fear, disgust, and surprise.

After watching each clip, participants completed two responses. First, they selected the emotion they believed was being expressed from a list of six options. Second, they rated how strongly the emotion was expressed using a 7-point scale ranging from very weak to very strong.

The use of silent video clips allowed the task to focus on visual emotional cues rather than language comprehension. This type of task has been widely used in research on emotion perception (Matsumoto & Hwang, 2010; Dewaele *et al.*, 2021).

### 3.4 Data analysis procedures

The collected data were analyzed using SPSS (Version 28) and R. Initial analyses involved calculating descriptive statistics for the bilingual experience measures and the emotional perception task results. These statistics provided an overview of the distribution of the main variables in the dataset.

Before conducting the main analyses, the distribution of the variables was examined using Shapiro–Wilk and Kolmogorov–Smirnov tests. Several variables showed deviations from normality, which led to the use of non-parametric statistical procedures.

The primary analyses therefore relied on Spearman's rho correlations to examine associations between bilingual experience variables and emotional perception outcomes. Pearson correlations were also computed as an additional check, and the overall pattern of results remained similar. Missing responses occurred at the item level and were handled using pairwise deletion. The significance level for statistical tests was set at  $\alpha = .05$ .

The analysis first reports descriptive patterns in participants' bilingual experience and emotional perception performance, followed by correlation analyses examining the relationships between these variables.

## 4. RESULTS

### 4.1 Descriptive Profile of the Sample

All 143 participants described in Section 3.1 were retained in the analyses. Descriptive statistics for engagement and emotional perception variables are presented in Table 1.

**Table 1: Descriptive Statistics for L2 Engagement and Emotional Perception Variables**

Variable	M	SD	Min	Max
L2 History	34.21	9.62	0.00	49.49
L2 Use	391.06	107.61	0.00	545.00
L2 Proficiency	46.46	8.76	0.00	54.48
L2 Attitudes	38.25	11.80	0.00	54.48
EPT Accuracy	7.29	3.65	0.00	12.00
EPT intensity	36.95	16.67	0.00	60.00

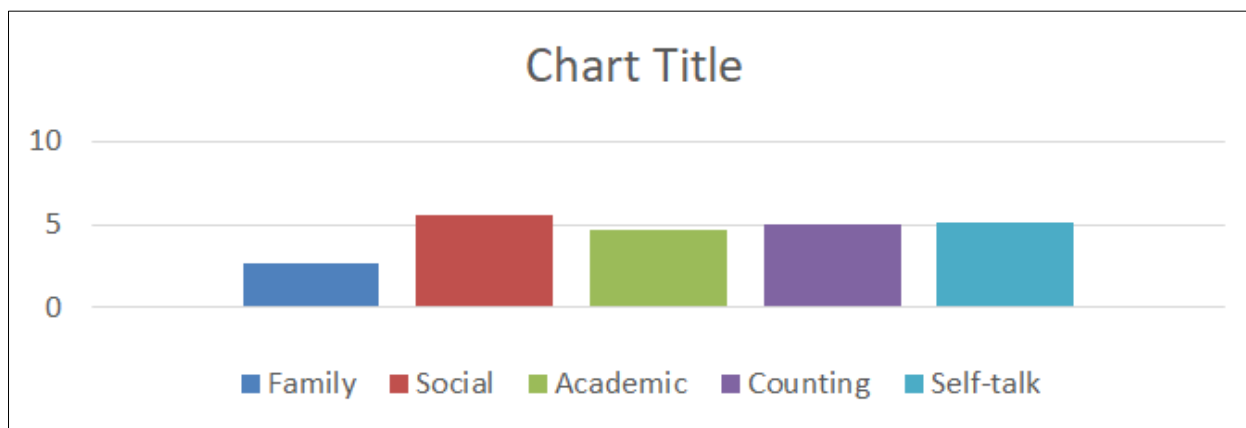
Overall, L2 engagement variables exhibited substantial variability across participants. L2 Use showed the widest dispersion (SD = 107.61), indicating differences in frequency of engagement across contexts. L2 Proficiency scores were relatively high (M = 46.46, SD = 8.76), while L2 Attitudes were generally positive but variable (M = 38.25, SD = 11.80).

Performance on the Emotional Perception Task indicated moderate accuracy (M = 7.29, SD = 3.65 out of 12) and greater dispersion in intensity ratings (M = 36.95, SD = 16.67), suggesting wider variability in subjective emotional evaluation than in recognition accuracy.

### 4.2 Context-Specific Language Use Patterns

Reported English use varied across communicative domains, indicating context-dependent engagement rather than uniform bilingual immersion. English use was lowest in family settings (M = 2.66, SD = 2.36 on a 0–10 scale) and higher in social interactions (M = 5.60, SD = 2.92). Academic use showed moderate levels (M = 4.72, SD = 2.70). Internal use patterns were similar, with moderate engagement in self-talk (M = 5.11, SD = 2.61) and counting (M = 5.01, SD = 2.91).

These patterns indicate variability in L2 use across domains and support the characterization of the sample as exhibiting graded bilingual engagement.



**Figure 1: Mean English Use across Communicative Domains (0–10 scale).**

### 4.3 Distributional Properties

Inspection of skewness, kurtosis, and formal normality tests (Shapiro–Wilk and Kolmogorov–Smirnov) indicated deviations from normality across several variables.

Accordingly, Spearman’s rho was used for inferential analyses. Pearson correlations were computed as a robustness check and yielded comparable patterns.

### 4.4 Interrelations among L2 engagement Dimensions

Intercorrelations among L2 engagement variables are presented in Table 2.

**Table 2: Spearman Correlations between L2 Engagement Dimensions and Emotional Perception Outcomes**

Variable	1	2	3	4	5	6
1. L2 History	—					
2. L2 Use	.49***	—				
3. L2 Proficiency	.41***	.66***	—			
4. L2 Attitudes	.28**	.54***	.52**	—		
5. EPT Accuracy	.13	.20*	.35***	.42***	—	
6. EPT Intensity	.09	.26**	.30***	.24**	.47***	—

**Note.** Values represent Spearman’s rho coefficients.

\*p < .05. \*\*p < .01. \*\*\*p < .001.

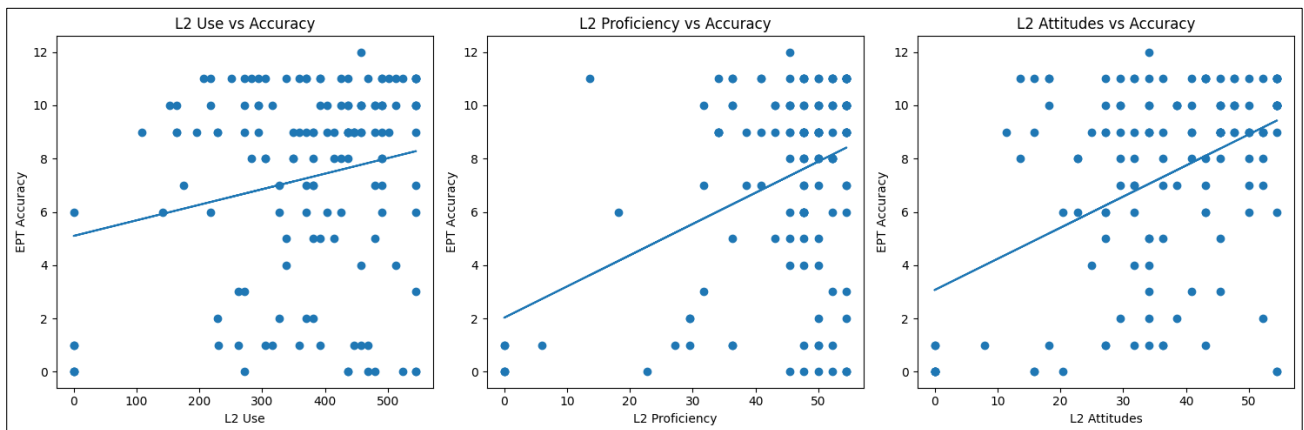
L2 Use was strongly associated with L2 Proficiency ( $\rho = .66, p < .001$ ) and moderately associated with L2 Attitudes ( $\rho = .54, p < .001$ ). L2 Proficiency and L2 Attitudes were also moderately correlated ( $\rho = .52, p < .001$ ). L2 History showed weaker but statistically significant associations with the other engagement variables.

These results indicate that L2 engagement dimensions are related but not redundant.

#### 4.5 L2 Engagement and Emotional Perception Accuracy

Spearman correlations indicated positive associations between L2 engagement dimensions and emotional perception accuracy.

L2 Use was weakly associated with accuracy ( $\rho = .20, p = .016$ ). L2 Proficiency showed a stronger association ( $\rho = .35, p < .001$ ), and L2 Attitudes demonstrated the strongest association ( $\rho = .42, p < .001$ ). L2 History was not significantly associated with accuracy ( $\rho = .13, p = .119$ ).



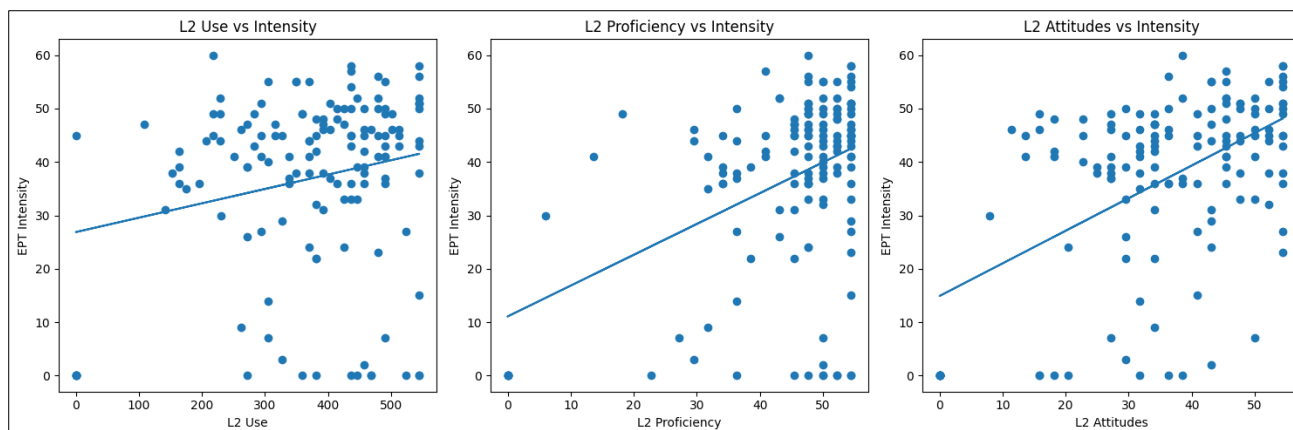
**Figure 2: Associations between L2 Engagement Dimensions (Use, Proficiency, Attitudes) and Emotional Perception Accuracy.**

#### 4.6 L2 Engagement and Emotional Perception Intensity

Associations between L2 engagement and perceived emotional intensity were also observed.

L2 Use ( $\rho = .26, p = .002$ ) and L2 Proficiency ( $\rho = .30, p < .001$ ) were positively associated with intensity. L2 Attitudes showed a smaller but significant association ( $\rho = .24, p = .004$ ). L2 History was not significantly related to intensity.

Emotional perception accuracy and intensity were moderately correlated ( $\rho = .47, p < .001$ ).



**Figure 3: Associations between L2 Engagement Dimensions (Use, Proficiency, Attitudes) and Emotional Perception Intensity.**

#### 4.7 Magnitude and Pattern of Associations

Across outcomes, effect sizes were small to moderate. L2 Attitudes showed the strongest association with accuracy, while L2 Proficiency and L2 Use demonstrated consistent associations with both accuracy and intensity. L2 History did not show systematic relationships with perceptual outcomes.

## 5. DISCUSSION

Having identified graded associations between dimensions of L2 engagement and emotional perception outcomes, the present findings are best interpreted within experience-based models of bilingualism. Rather than indicating a uniform effect attributable to bilingual status, the results suggest that variation in emotional perception occurs within bilingual populations and corresponds to differences in how the additional language is engaged. In this sense, emotional perception appears to be associated with patterns of use, proficiency, and attitudinal orientation, rather than with bilingualism understood as a categorical attribute.

### 5.1 Experience-Based Variation in Emotional Perception

The observed pattern aligns with accounts that emphasize the role of lived linguistic experience in shaping emotional processing. Previous research has suggested that emotional responses across languages are not fixed but depend on factors such as exposure, frequency of use, and contextual embedding (Pavlenko, 2012). In the present study, this variability was reflected in the differential associations between BLP dimensions and emotional perception accuracy.

Indicators of active engagement, particularly L2 use and attitudinal orientation, were more consistently associated with performance than language history. This distinction is theoretically meaningful. While language history captures exposure over time, it does not necessarily reflect current patterns of interaction. By contrast, frequency of use indexes ongoing engagement, capturing how regularly the language is employed across social, academic, and mediated contexts. The stronger associations observed for use suggest that emotional perception may be more closely tied to present engagement than to past exposure.

At the same time, the magnitude of these relationships remained modest. This is consistent with prior findings indicating that emotional processing is shaped by multiple interacting factors, including individual differences and contextual variables, rather than by any single dimension of language experience. The results therefore support a view of emotional perception as a multifactorial construct in which language engagement constitutes one contributing component.

### 5.2 Attitudinal Orientation and Affective Alignment

Among the dimensions examined, attitudinal orientation toward the L2 showed the strongest association with emotional perception accuracy. This finding warrants particular attention, as it points toward an affective component of language engagement that extends beyond behavioral frequency.

Attitudes reflect the degree to which a language is valued, embraced, and integrated into one's sense of self. Positive attitudinal orientation may therefore be associated with greater emotional investment in the language, potentially facilitating more nuanced interpretation of emotional cues. This interpretation is consistent with research suggesting that emotional resonance is influenced not only by exposure but also by subjective identification and affective alignment (Pavlenko, 2012).

It is important, however, to treat this relationship cautiously. Attitudes may co-vary with other unmeasured factors, such as motivation, social networks, or cultural affiliation, which could also influence emotional perception. The present findings do not allow for the disentanglement of these influences but indicate that attitudinal variables merit closer attention in future work.

### **5.3 L2 Use and Proficiency: Distinct but Interrelated Dimensions**

The relationship between L2 use and L2 proficiency further illustrates the multidimensional nature of bilingual engagement. Both variables were positively associated with emotional perception accuracy, yet their roles appear to be partially distinct. Proficiency reflects perceived communicative competence, which may facilitate access to linguistic and conceptual resources, whereas use captures the extent to which the language is embedded in everyday interaction.

The moderate intercorrelation between these variables supports their conceptual relatedness while justifying their analytical separation. Not all participants who reported high proficiency also reported frequent use, and vice versa. This divergence highlights the importance of considering multiple dimensions simultaneously rather than relying on a single proxy for bilingual experience.

The present findings suggest that emotional perception is more consistently aligned with patterns of active engagement than with proficiency alone. This observation is consistent with arguments that emotional meaning is shaped through interactional experience rather than through linguistic knowledge in isolation. Proficiency may provide the necessary conditions for engagement, but it is the extent of actual use that appears to be more closely associated with perceptual outcomes.

### **5.4 Reconsidering the Bilingual Emotional Advantage**

Within the broader literature, these findings can be situated in relation to claims regarding a bilingual emotional advantage. While some studies have reported enhanced emotional perception among bilinguals, such effects are typically modest and context dependent. In the present study, no evidence was found for a generalized advantage; instead, variation in emotional perception was associated with differences in language engagement within the bilingual sample.

This pattern supports a more cautious interpretation of the bilingual emotional advantage. Rather than reflecting an inherent benefit of bilingualism, observed differences may arise from specific experiential configurations, such as frequent use or positive attitudinal orientation. In this sense, the findings align with critiques suggesting that advantages attributed to bilingualism may be better understood as conditional effects shaped by individual experience.

### **5.5 Methodological Implications**

The study also carries methodological implications for research on bilingualism and emotion. First, the use of the Bilingual Language Profile allowed for the operationalization of bilingualism as a multidimensional construct. By distinguishing between use, proficiency, attitudes, and history, the BLP provides a more sensitive measure of language engagement than categorical classifications or single-dimension indices.

Second, the use of a non-verbal emotional perception task minimized the influence of linguistic processing on performance. This is particularly important in bilingual research, where verbal tasks may conflate emotional perception with language comprehension. By relying on visual stimuli, the present design isolates perceptual processes while still allowing for the influence of language experience to emerge indirectly.

Together, these methodological choices contribute to a more precise examination of the relationship between language engagement and emotional perception, addressing limitations in prior work that relied on group comparisons or verbal stimuli.

### **5.6 Limitations**

Several limitations should be considered when interpreting the findings. The reliance on self-reported measures of language engagement introduces the possibility of subjective estimation bias. Although the BLP provides a structured framework, responses may be influenced by participants' perceptions rather than objective measures of use or proficiency.

In addition, the cross-sectional design limits the ability to examine how language engagement and emotional perception evolve over time. Longitudinal approaches would be better suited to capturing dynamic changes in these relationships.

The use of non-verbal stimuli, while methodologically advantageous, also constrains the scope of the findings. Emotional perception in real-world contexts often involves both verbal and non-verbal cues. Future research could integrate tasks that incorporate linguistic content or physiological measures to provide a more comprehensive account.

Finally, the study is situated within a specific sociolinguistic context in which Arabic and English occupy distinct functional domains. This context may shape patterns of language engagement in ways that are not directly comparable to other bilingual settings. Replication across different populations would therefore be necessary to assess the generalizability of the observed associations.

## 6. CONCLUSION

The present study examined whether variation in bilingual engagement, operationalized through language use, proficiency, and attitudes, is associated with emotional perception outcomes in a non-verbal task. The findings indicate that emotional perception accuracy and intensity are modestly associated with dimensions of L2 engagement, particularly with frequency of use and attitudinal orientation. In contrast, language history showed weaker and largely non-significant relationships, suggesting that exposure alone may be less relevant than ongoing engagement.

These results support an experience-based interpretation of bilingualism in which emotional perception is not treated as a function of bilingual status but as a variable outcome associated with patterns of language use and integration. While the observed associations were consistent, they remained moderate in magnitude, reinforcing the view that emotional processing is shaped by multiple interacting factors rather than by linguistic experience in isolation.

Methodologically, the study highlights the value of combining multidimensional profiling tools with non-verbal assessment tasks. The use of the Bilingual Language Profile enabled a more differentiated account of language engagement, while the non-verbal design of the emotional perception task minimized confounding effects related to language processing. Together, these approaches provide a framework for examining how experiential variables relate to perceptual outcomes without relying on categorical comparisons.

Given the correlational nature of the design, no causal interpretations can be drawn. However, the findings indicate that differences in how bilingual individuals engage with their languages correspond to measurable variation in emotional perception performance. These findings support further investigation of language experience as a relevant factor in the study of emotional processing across multilingual contexts.

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