

# A Child's Guide to Parenting: The Psychological and Neurological Impact of Child Emotional Brokers Across Various Ethnic Backgrounds

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## ABSTRACT

Children are increasingly taking the brunt of their families' hardship and trauma. As the immigrant population skyrockets, child emotional brokers become a commonality, creating an "invisible" neurological and psychological burden placed on current youth who serve as emotional and cultural brokers for their parents. Emotional brokering is the practice of translating between cultural norms and societal structures. While existing literature documents the implications of language translations and on occasion explores the existence of emotional brokering, it does so only in certain ethnic populations. The gap regarding the direct neurological impacts of brokering leads This study addresses that gap by integrating qualitative reports with real-time electroencephalography (EEG) to examine how emotional brokering relates to cognitive load and psychological strain leading to the research question: what are the psychological and specifically neurological tolls of emotional brokering across various ethnic backgrounds?

The study utilized a phenomenological exploratory content analysis design combining psychological surveying of parentification and emotional labor with real-time biometric monitoring via a Muse Electroencephalogram (EEG) headband, tracking a sample of N=40 participants from Lake Travis High School. The EEG employed frontal (AF7–AF8) and temporal (TP9–TP10) electrode sites; artifact removal included the exclusion of eye blink and muscle movement signals. EEG values were computed by comparing a baseline breathing/meditation phase to active task states during the semi-structured interview. Results indicated a positive correlation between emotional labor and Beta wave activity ( $r = 0.8421$ ), suggesting that brokering tasks elicit a state of high cognitive overload and high-alert processing. Conversely, there is a negative correlation between the number of languages spoken at home and psychological stress levels ( $r = -0.8523$ ), indicating that multilingual exposure acts as a high-level training ground for social intelligence and may desensitize brokers to the stressors of constant translation. Additionally, "linguistic softening" correlated with advanced prosocial skills ( $r = 0.6821$ ), suggesting that cultural dexterity translates to emotional maturity. The study concludes by advocating for broker-informed mental health interventions and policies to provide professional interpretation in high-stakes settings to alleviate the burdens associated with brokering within youth demographics.

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Note: Due to the exploratory nature of this study and a sample size of N=40, all correlations should be interpreted as preliminary findings. Replication with larger, more diverse samples is required before causal claims can be made.

**Index Terms:** *Child Language Brokering, Beta Waves, Electroencephalogram, Emotional Labor, Linguistic Softening, Parentification, Prosocial Skills*

## INTRODUCTION

Many children born into immigrant families have to quickly learn to navigate between two worlds. For many families, children become the first members to adapt to the expectations, norms, and emotional landscapes of a new society, often far earlier than their parents. As a result, they frequently assume responsibilities that exceed typical developmental expectations, including mediating family conflict, interpreting emotional subtext, and managing culturally divergent norms. Considering countless families facing life-altering crises and because of certain restrictions (e.g. language barriers, cultural clashes) the children are often the ones forced to interpret critical medical diagnoses, mediate legal disputes or navigate through complicated dynamics. These children assume the role of emotional brokers: “where individuals...help their close family members navigate different cultural norms [and] emotions,”<sup>1</sup> states Dr. Subromoney who holds a PhD in Psychological Sciences. Their cultural dexterity from navigating societies and mediating between family dynamics is not examined enough. The psychological community has looked at many different silent trauma events in childhood. Brokering, however, seems natural or inherent, yet closer inspection reveals that emotional brokering imposes significant cognitive and emotional demands that may persist into adulthood. Such responsibilities may impose measurable cognitive demands, making EEG an appropriate tool for investigating the neural correlates of brokering.

EEG measures electrical activity generated by synchronized neuronal firing, particularly in cortical pyramidal cells. Prior research demonstrates that Theta (4–7 Hz) and Beta (13–30 Hz) oscillations are sensitive to working-memory load, sustained attention, and cognitive control, processes likely engaged during emotional mediation.<sup>3–5</sup> By examining these frequency bands during brokering-related interview prompts, this study seeks to quantify the cognitive effort associated with emotional brokering along with any psychological implications.

Rather than just analyzing the bilingual differences between a child and their family, **this study foregrounds the neurological and psychological mechanisms underlying the *silent translations* that occur between cultures, emotions, and social expectations.** Dr. Subramoney describes “the process of youth interpreting cultural norms for others [and] involves the cultural broker serving as socializing agent.”<sup>2</sup> Subramoney begins to introduce the idea of cultural brokering as a core responsibility for households further demonstrating the outreach of this practice. Despite its outreach, brokering still remains as a dormant research point.

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<sup>1</sup>Subramoney, S., Walle, E. A., Main, A., & Magaña, D. (2025). Cultural brokering in immigrant families. *Child Development Perspectives*.

<sup>2</sup>Subramoney, S., Walle, E. A., Main, A., & Magaña, D. (2025). Cultural brokering in immigrant families. *Child Development Perspectives*.

## 1.0 LITERATURE REVIEW

### 1.1 Translation Between Languages Facilitates Identity and Integration

The phenomenon of language and cultural brokering is a complex, often mandatory role for immigrant youth requiring them to navigate both linguistic and social systems. Brokering is an increasingly common activity that begins early in childhood, and according to a paper published in the *Hispanic Journal of Behavioral Sciences*, “children who [serve] as emotional brokers are expected to assist their parents in complex adult-like situations.”<sup>3</sup> Brokering is a routine for numerous children, with situations varying between a legal, medical or educational setting. In severe cases of child emotional brokering (CEB), the CEB is involved in situations that require a more mature mindset and demands composure that children have not developed. Moreover, the practice is necessary for survival in a new country. Because brokering becomes embedded in daily survival, many youth internalize it as a normative responsibility rather than a burden, which contributes to the lack of recognition of its psychological toll. Dr. Su Yeong Kim from the University of Texas at Austin, describes how many situations of brokering arise from “linguistic acculturation” which is when individuals adopt the languages, behaviors and values of new “differences between immigrant parents and children can also result in adolescents functioning as language brokers.”<sup>4</sup> This specifically highlights the popularity of brokering especially among immigrant households and the linguistic advantage positions children as intermediaries, reinforcing the expectation that they will manage adult-level responsibilities. Children are more likely to adopt language dexterity giving them the role of the broker. Additionally, Sarah Crafter, a professor on Cultural Developmental Psychology, discussed how language brokering is reframed as “a family care practice that bears resemblances to other forms of caring responsibilities such as contributing to household chores.”<sup>5</sup> This normalization obscures the emotional strain brokers experience and highlights the need for research that distinguishes between routine family support and chronic emotional labor.

However, brokers' roles are necessary for the family. Majorie Elaine Faulston, a professor of Education and Information Studies claims “immigrant children’s work as translators opens families access to resources, knowledge, and information.”<sup>6</sup> Oftentimes, youth’s translation and interpretation work is the only access families have to information. Clearly brokers have an interesting role in a domestic setting. This duality, brokering as both necessary and potentially harmful, underscores the importance of examining its emotional and cognitive implications. Their unique position fosters high-levels of parentification and early-stress. Authors can agree upon the importance and complexity of their role. Language brokering is the more apparent form of brokering, acting as this linguistic bridge is a common act necessary for a family's development. To understand the entirety of emotional brokering it is imperative to explore the negative impact of language brokers and later translate those outcomes to CEB.

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<sup>3</sup>Morales, A., & Hanson, W. E. (2005). Language brokering: An integrative review of literature. *Hispanic Journal of Behavioral Sciences*, 27(4), 471-503.

<sup>4</sup>Kim, S. Y., Zhang, M., Hou, Y., & Shen, Y. (2020). Acculturation, parent-child relationships, and mental health of adolescents in Chinese and Mexican immigrant families. *Mental and Behavioral Health of Immigrants in the United States*, 25-44.

<sup>5</sup>Crafter, S., & Iqbal, H. (2021). Child language brokering as a family care practice: Reframing the "parentified child" debate. *Children & Society*, 36(3).

<sup>6</sup>Orellana, M. F., Dorner, L., & Pulido, L. (2003). Accessing assets: Immigrant youth's work as family translators or "para-phrasers." *Social Problems*, 50(4), 505-524.

## **1.2 Detrimental Impacts Synonymous with Brokering**

The link between brokering and depressive symptoms is complex. Although it is difficult to recognize the toll brokering has on the mind, there are still silent notes of its impact. A study published in the *Journal of Youth and Adolescents* argued that “more frequent language brokering was also associated with more parent-child conflict.”<sup>7</sup> The study further delves into East Asian immigrant youth where language brokering is integrated into culture. A child acting as a bridge between their families and outside society is seen as a tribute for the sacrifices their parents made for them. This mindset underlines how certain cultures, specifically in Asian heritages, disguised CEB as retribution for maternal sacrifices or synonymous with household chores.

CEB's disconnect from parents acts as a catalyst to increase psychological distress. Afromentioned, Dr. Su Yeong Kim discloses how “adolescents with a strong sense of alienation from parents...experience more burden.”<sup>8</sup> Parent-child alienation acts as a protective factor that links language brokering and depressive symptoms; its chronic nature can lead to internalized pressure, anxiety, and long-term emotional fatigue. Language brokering is a common practice identified in immigrant households, and is necessary for the families' survival in host countries. However a cultural barrier has fallen, framing it like a tribute to parental sacrifices rather than a psychological disruptor. The authors Kim and Hua seem to agree that there have been increased signs of depression and anxiety. The authors can all together agree that there is a negative cognitive influence emotional brokering has. Conversely, with the negative impacts it's imperative to understand the potential positive consequences of brokering.

## **1.3 Brokering Builds Autonomy and Competence**

There are some gains in brokering ranging from linguistic proficiency to increased emotional intelligence. Brokering can correlate with strong academic profiles. A paper by Su Yeong Kim from UT Austin argues how “improving bilingual language proficiency together with more frequent positive brokering experiences may be an avenue to improve academic competence.”<sup>9</sup> Brokering, if practiced in a positive and educating manner can lead to the children developing increased scholastic capabilities.

Furthermore, in many cases, CEB are often the first ones in their household to become fluent in a foreign language, though it's been previously recognized that that pressure can result in unnecessary burden. It's crucial to realize the burden is a dichotomy. A meta-analytic review published in the *American Psychologist* made a claim that "brokering may act as a cognitive and academic enhancer promoting youths' linguistic dexterity."<sup>10</sup> Brokering acts as a cognitive enhancer that can improve academic skills and self-belief. These findings complicate the narrative that brokering is solely detrimental, instead suggesting a dual-impact model in which brokering can simultaneously cultivate resilience and impose psychological strain.

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<sup>7</sup> Hun, J. M., & Costigan, C. L. (2011). The familial context of adolescent language brokering within immigrant Chinese families in Canada. *Journal of Youth and Adolescence*, 41(7), 894-906.

<sup>8</sup>Kim, S. Y., Hou, Y., & Gonzalez, Y. (2016). Language brokering and depressive symptoms in Mexican-American moderators. *Child Development*, 88(3), 867-881.

<sup>9</sup> Kim, S. Y., Zhang, M., Chen, S., Song, J., Lopez, B. G., Rodriguez, E. M., Calzada, E. J., Hou, Y., Yan, J., & Shen, Y. (2020). Bilingual language broker profiles and academic competence in Mexican-origin adolescents. *Developmental Psychology*, 56(8), 1582-1595.

<sup>10</sup>Shen, Y., Seo, E., Jiles, A. L., Zheng, Y., & Wang, Y. (2022). Language brokering and immigrant-origin youth's well-being: A meta-analytic review. *American Psychologist*, 77(8), 921-939.

The authors of the papers can conversely agree that brokering acts as a cognitive enhancer that can improve academic skills; it also directly argues against the idea that brokering is completely negative. Brokering is not meant to be a punishment to the child or a toxic practice, though there are situations where it can have a negative impact, it can also provide benefits.

#### **1.4 Connection Between Cultural Brokering and Language**

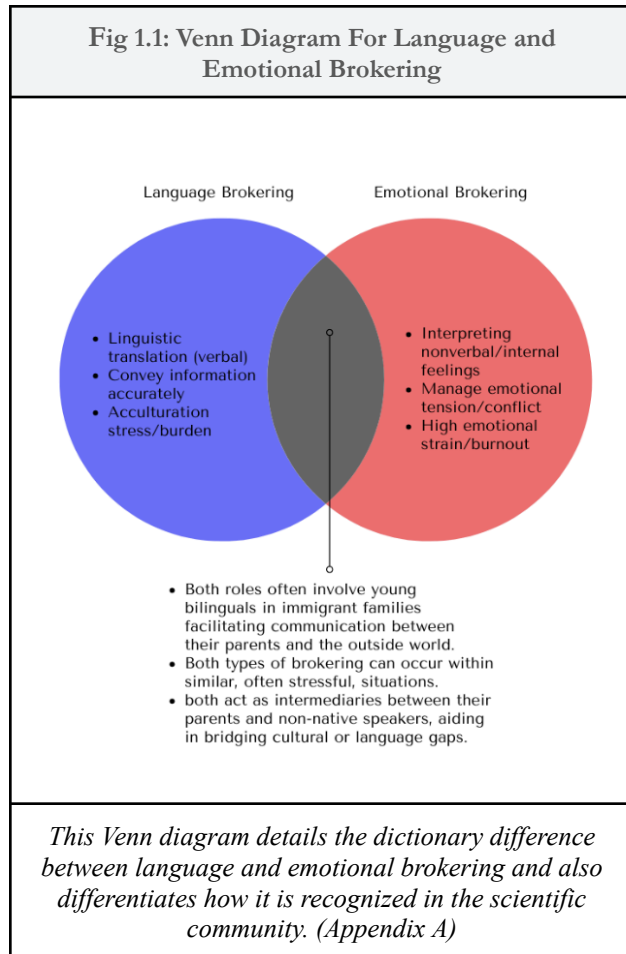
Brokering is a bicultural process but is also explicitly recognized as the more encapsulating process of helping families with the complexities of both a new language and culture. A paper published in the *Journal of Multilingual and Multicultural Development* defined brokering as “when immigrant children help their families negotiate the new culture and language.”<sup>11</sup> Oftentimes language and culture go hand in hand. This further begins to develop a link between the two types of brokering.

Additionally, Judy Mier-Chairez, a professor from the University of Louisville, claimed "culture brokering can be thought of as an umbrella term under which language brokering and emotional brokering exist."<sup>12</sup> Brokering activities are fundamentally a cultural process in which language transition serves as the most common behavioral mechanism. This distinction is critical: while language brokering involves verbal translation, emotional brokering requires interpreting unspoken cues, managing conflict, and mediating emotional tension. (Fig. 1.1).

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<sup>11</sup>Rainey, V. R., et al. (2019). Language brokering and psychological adjustment in emerging adulthood: Exploring cultural values as moderators. *Journal of Multilingual and Multicultural Development*, 41(6), 471-487.

<sup>12</sup>Mier-Chairez, J., et al. (2019). Theoretical, empirical, and practice literature on language brokering: Family, academic, and psychological outcomes. *Journal of Human Behavior in the Social Environment*, 29(7), 840-860.



It is clear there is a bridge between the two however it is crucial to understand that though there are similarities, they are still two different concepts that have their own implications. Understanding this distinction is essential for identifying the specific psychological and neurological mechanisms associated with emotional brokering. Leading to the discussion of the gap.

### 1.5 Knowledge Gap Regarding Emotional Brokering Across Different Ethnicities

The research analyzes specifically how emotional brokering might enhance or damage immigrant youths' emotional intelligence and relational competence. There is little literature around the neurological impact of brokering. The majority of the research focuses on language rather than emotional brokering. A particular instance is with a paper by Marjorie Faulstich Orellana, a professor at UCLA analyzed how language brokering fosters prosocial development by enhancing transcultural perspective-taking and empathic concern. Essentially highlighting how brokering can increase emotional intelligence. Language has the potential to "influence [children's] ability to understand and empathize with others."<sup>13</sup> These findings are directly relevant to the dependent variables of emotional intelligence, empathy, and relational competence. Orellana provides evidence that language brokering is not purely a burden but can also

<sup>13</sup>Guan, S.-S., Greenfield, P., & Orellana, M. (2014). Translating into understanding: Language brokering and prosocial development in emerging adults from immigrant families. *Journal of Adolescent Research*, 29(3), 331-355.

enhance emotional intelligence and social competence. Notably however, the paper is inherently limited because it only focuses on the umbrella term, language brokering.

Another paper by Dr. Weisskirch, with PhD in Human Development, investigated the psychological effect of over four hundred language brokers specifically with the goal of understanding their status following brokering. Language brokering when performed in a healthy relationship can be “less stressful or less burdensome because of the positive relationship established.”<sup>14</sup> Crucially, both Orellana and Weisskirch operate primarily within the field of psychology, neglecting the neurological functions and EEG data that could provide objective evidence of cognitive load and stress.

Another paper published in the *Journal of Cultural Diversity & Ethnic Minority Psychology* “examined the occurrence of emotion brokering for close family members in a sample of Latinx college students.”<sup>15</sup> Across these studies, a consistent gap emerges: the absence of research examining the neurological mechanisms underlying emotional brokering, particularly across diverse ethnic backgrounds. The paper was knowledgeable however the researcher never delved into the psychological impact of the broker and the mere existence of brokering. Moreover, the study is limited because it primarily analyzed the impact in Latinx college students.

The main guiding paper of this study focused on the existence of emotional brokering. Nevertheless, Dr. Subramoney's aforementioned emotional brokering research highlighted a direct flow regarding “the associations between emotion brokering and psychological adjustment yet to be reported.”<sup>16</sup> The lack of research and recognition leads to further investigation leading to the following research question. What are the neurological and psychological impacts of emotional brokering across various ethnic backgrounds?

## METHOD

### 2.1 Framework Synthesizes Social and Technical Perspectives

The research paper's study employs a phenomenological exploratory content analysis design to develop a comprehensive understanding of the topic. An exploratory design encompasses two parts. The first phase focuses on qualitative data collection while, in the second phase, the researcher utilizes quantitative data to aid in solidifying “a role in a researcher's overall findings.”<sup>17</sup> The qualitative phase provides contextual insight into participants' brokering experiences, while the quantitative phase, supported by EEG recordings, captures neural indicators of cognitive load. This sequential mixed-methods structure allows the study to capture both the subjective emotional experiences of brokers and the objective neurological patterns associated with brokering.

The participants are given a questionnaire curated to understand the effects of repeated emotional brokering. Along with the pre-test questionnaire, the participants will also take the professional Big 5 Inventory assessment to determine a psychometric baseline. Essentially this is a psychological composition unique to the participant that is present in common routine. The Big 5 Inventory quiz is

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<sup>14</sup>Weisskirch, R. S., Guan, S.-S. A., & Lazarevic, V. (2020). The role of attachment in language brokering and psychological well-being among college students. *Journal of Family Issues*, 41(8).

<sup>15</sup>Subramoney, S., Walle, E. A., Main, A., & Magaña, D. (2024). Navigating intercultural misunderstandings: An examination of emotion brokering. *Cultural Diversity & Ethnic Minority Psychology*.

<sup>16</sup>Subramoney, S., Walle, E. A., Main, A., & Magaña, D. (2025). Cultural brokering in immigrant families. *Child Development Perspectives*  
Ibid, 296

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industry recognized and is grounded in decades of empirical research, using factor analysis to identify personality traits. Including this measure strengthens construct validity by ensuring that personality traits are accounted for when interpreting EEG and psychological outcomes.

The participants will then take a semi-structured interview, designed to further understand their personal experiences, while being connected to an EEG to record the neural activity associated with active brokering. This approach is appropriate for emotional brokering, which involves complex interpersonal dynamics that cannot be captured through surveys or EEG alone.

## **2.2 Precedents Validate the Procedural Blueprint**

The procedural framework for the approach is significantly influenced by the study conducted by Orellana. Their study provided a clear model for integrating both qualitative and quantitative data to analyze the outcomes of brokering. The present study adopted their approach to participation sampling, the assessment of brokering frequency, and the quantification of prosocial skills. In the Orellana study “all participants were recruited through a large public university... participation was restricted to students who had at least one immigrant parent.”<sup>18</sup> Their sampling practices were the guide that led the study to draw participants from a large public school that has a minority enrollment of 35%.

The pre-test includes demographic inquiries and targeted questions regarding participants' need to maintain perfectionism and order within family dynamics. The guided study's qualitative questionnaire had “separate items that assessed how often (0 = never; 1 = just sometimes; 2 = once a week, 3 = every day) participants have brokered for particular social categories (mother, father, siblings, grandparents).”<sup>19</sup> This alignment ensures methodological consistency with established brokering research while expanding the scope to include neurological data. Similar to the likert scale questions the guiding study implemented, the present method will adopt a synonymous structure. To ensure the qualitative data collected through the pre-interview questionnaire highlights the richness of different human experiences, it will combine both likert scale questions to quantify members emotions and free-response questions to further comprehend their unique brokering experiences.

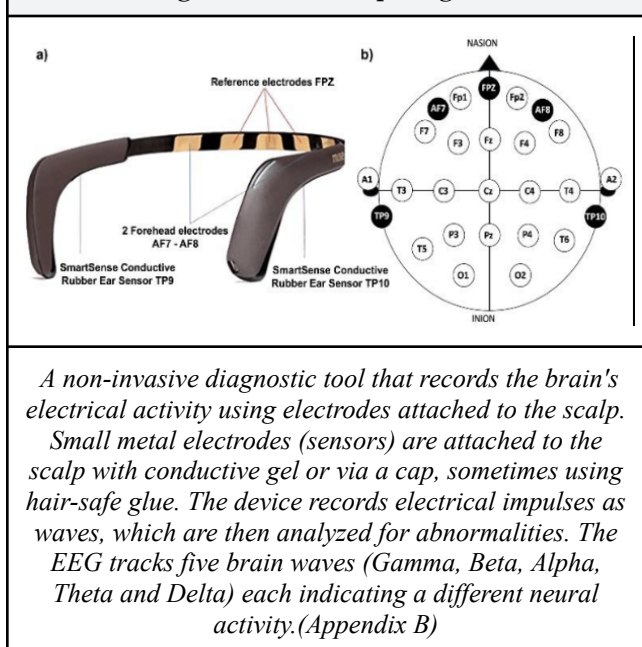
Additionally, the study had an interest in any neurological functions that go into brokering. Thus, the method introduces quantitative data collection. Through an EEG, the research explores the neurological effects of emotional brokering (Fig. 2.1).

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<sup>18</sup>Guan, S.-S., Greenfield, P., & Orellana, M. (2014). Translating into understanding: Language brokering and prosocial development in emerging adults from immigrant families. *Journal of Adolescent Research, 29*(3), 331-355.

<sup>19</sup> Ibid, 337

**Fig 2.1: Electroencephalogram**



The EEG recording is preceded by an intimate 15-20 minute interview designed to prime the participants autobiographical memory. The EEG collects data on anxiety, cognitive functions and any strong electrical activity. Originally, the method for this study was purely qualitative, but became clear that a more versatile approach must be employed. Quantitative research alone was rejected because understanding the subtle context of why the brokering occurred (e.g., parental relation, cultural demands, immigration status) is vital; a simple questionnaire would have an error of reductionism by collapsing complex human experiences into numbers. Ultimately, one type of data alone could not measure neurological functions and deeper cognitive effects. A mixed-method study reduces the likelihood of interpretive error and increases confidence in the conclusions. The qualitative phase "can be quite helpful for addressing exploratory or interpretive research questions."<sup>20</sup> While the quantitative phase with the EEG addresses the unobserved neurological functions making the sequential exploratory approach the only viable option to fully answer the dual nature of the research question. Nevertheless, it is imperative to identify the credibility gaps in the procedure and take precautions to rectify it.

### **2.3 Triangulation Fortifies Validity**

It is crucial to ensure the methodology is rigorous and prioritizes increasing validity. In the study triangulation was employed. Triangulation is defined as the use of multiple data sources to increase the confidence in research findings. Leavy noted that "the use of triangulation has been shown to increase the

<sup>20</sup> Leavy, P. (2017). Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches. *Family and Consumer Sciences Research Journal*, 47(1), 101-102.

validity of the research findings.”<sup>21</sup> By using both qualitative data from interviews and questionnaires as well as quantitative data from EEG readings the error in our conclusions is significantly reduced because data can be supported by multiple sources.

The study employs the sampling and aims to capture a broader demographic that can provide a variety of perspectives and create a commendable representative group of the general population.

The last action the study takes is through inter-rater reliability for qualitative coding. Qualitative data is susceptible to researcher's inherent bias. To minimize confirmation bias, other coders will analyze a subset of the interview data using the pre-defined coding scheme. In addition, “a common procedure for establishing reliability is to calculate the percentage of agreement between two or more independent raters.”<sup>22</sup> The same practice is reinforced in the current methodology to ensure maximum credibility.

#### **2.4 Data Analysis Methods Weaves Comprehensive Understanding**

The interview questions were specifically designed as follow-up questions to the initial survey measures to provide context for the neural findings. To enable correlation with the final EEG data a 1-10 intensity coding chart is employed. The chart allows the qualitative data to be quantified to a numerical variable that links the two phases of the mixed method. Additionally participants will be audio and video recorded; their interview will be coded for any behaviors or prosocial practices that indicate anxiety.

For the quantitative phase of this method, the study specifically analyzes whether there is a correlation between emotional brokering and specific psychological and neurological outcomes. The main independent variable is the frequency and intensity of emotional brokering. The primary dependent variable is the measure of the frontal Beta. Frontal Theta oscillations (13-25 Hz) are recognized biomarkers for working memory load and mental effort, making them the ideal metric for measuring the 'silent' cognitive processing required during emotional mediation

Moreover, the Muse 2 device uses four electrodes positioned at AF7, AF8, TP9, and TP10, sampling at 256 Hz. These frontal and temporal sites are sensitive to cognitive load, working-memory engagement, and emotional processing, making them appropriate for brokering-related tasks. The Muse App (built-in graphs) was used for data acquisition.

#### **2.5 Assumptions Ground the Neurological Hypothesis**

An assumption for the study is that the participants can reliably recall and quantify the frequency and emotional labor of their brokering experiences from childhood. Since memories are error-prone, the researchers assume that the high stakes brokering events are deeply encoded, suggesting a higher likelihood of accurate recall. The assumption is necessary because of the ethical and practical constraints of observing lifetime emotional brokering in a real time sense. Lastly the research assumes that the

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<sup>21</sup>Leavy, P. (2017). Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches. *Family and Consumer Sciences Research Journal*, 47(1), 101-102.

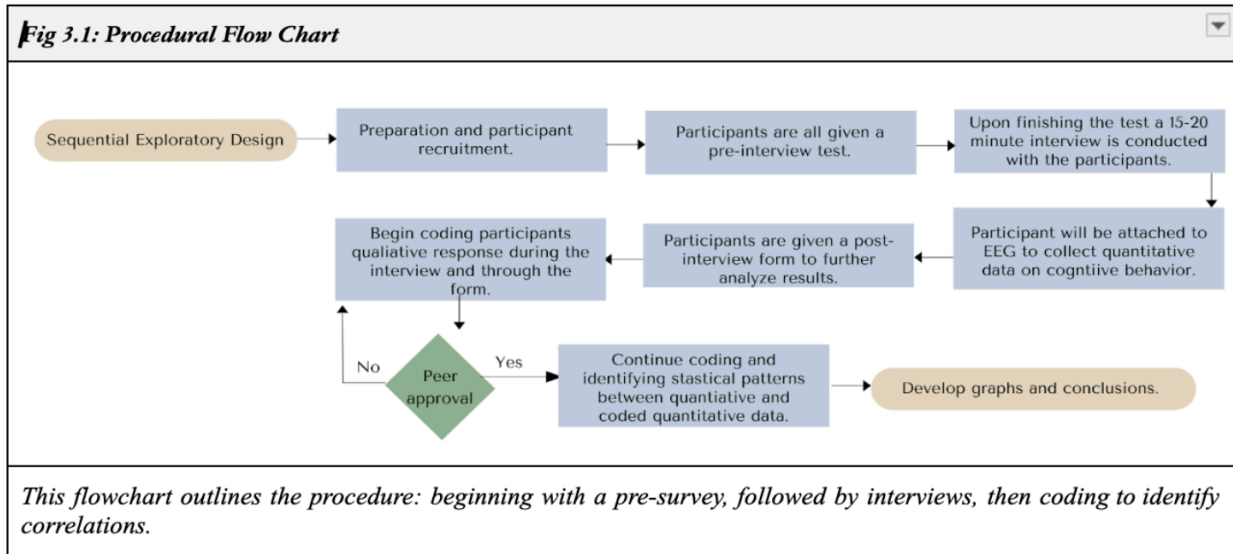
<sup>22</sup>Leavy, P. (2017). Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches. *Family and Consumer Sciences Research Journal*, 47(1), 101-102.

measurable increase in EEG frontal theta power during the standardized simulation task will serve as a valid biological marker for increased cognitive load and working memory effort (Fig. 2.2).



This neurological marker is used because the act of emotional brokering is known to strain mental functions. In the study the hypothesis is that a higher frequency of emotional brokering in immigrant youth will be correlated with both an increased neurological cognitive load and higher scores in prosocial capacity.

### 3.0 PROCEDURE



#### 3.1 Preparation and Participant Recruitment

The first procedural step is finalizing the research instruments. As part of preparations, a pre-test will be created to collect demographic data, assess participants' perceived need to perform in front of their family, act as a mediator, and ultimately get an initial understanding of the participants' role in family dynamics (Fig. 3.2). A standardized pre-test questionnaire was developed to collect demographic information, assess brokering frequency, and evaluate participants' perceived responsibility within family dynamics. These items mirror validated measures used in prior brokering research to ensure comparability across studies.

**Fig 3.2: Participant Pre-Interview Form**

Brokering Frequency & Practice

Purpose of this study we mean "brokering" and "translating" as you helping interpret and navigate different cultural norms for expressing and understanding emotions, especially in cross-cultural interactions to your parents. It involves explaining unspoken emotional and social cues, facial expressions, or cultural emotional responses that a family member (like a parent) might misunderstand.

On a scale of 1-10, how much do you feel a need to perform tasks perfectly for your family? \*

1 2 3 4 5 6 7 8 9 10

Not at all           Very often

What do you think is the main cause of this? \*

Long answer text

On a scale of 1-10, how often did you translate documents or conversations for your parents? \*

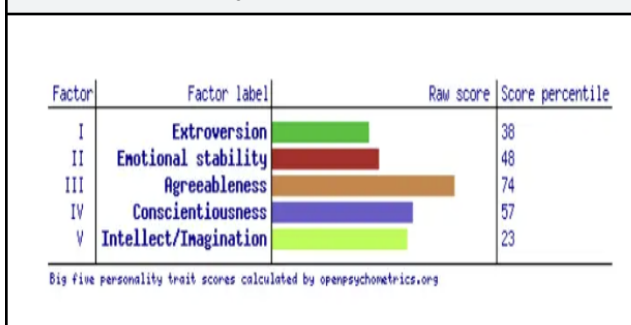
1 2 3 4 5 6 7 8 9 10

Not at all           Very often

*The participants will be asked demographic questions to identify mitigating variables. Then, participants are asked likert scale questions ranging from topics about how often the broker to their role in their family structure (Appendix C).*

At the end, participants will be asked to take part in the Big Five Inventory quiz which is a test developed by Goldberg that compartmentalizes participants' personalities into five categories. (Fig. 3.3).

**Fig 3.3: Example of Big-Five Inventory Quiz**



*The test will analyze the person's personality in five categories: extroversion, neuroticism, agreeableness, conscientiousness and openness to experience. This establishes validity and ensures that all instruments accurately measure the theoretical concepts defined in the literature review. (Appendix D)*

Subsequently, a detailed consent form will be prepared clearly outlining the study's purpose, the anonymous nature of the data collection, and the right to withdraw at any time (Appendix E). **Because** the study involves EEG recording, the consent form also explains the non-invasive nature of the device and the handling of neural data. Finally leading the study to the interview sector.

### 3.2 Qualitative Data Collection

The participants will partake in a semi-structured interview, which is the core of the exploratory qualitative phase. The semi-structured format allows participants to describe their brokering experiences in depth while ensuring consistency across interviews. It aims to capture the nuances of their subjective experience in a way that quantitative scales alone cannot (Fig. 3.4).

<i>Fig 3.4: Example Interview Questions</i>
How good is your relationship with your parents?
Have you ever had to act as the “third parent” for your sibling, and had to explain things to them because your parents weren't able to?
Did explaining things like that upset you, did you get annoyed, did it feel like a chore or was it natural?
Why did you have to do the explaining?
Focus on a time you had to explain your siblings or friends 'side to your parents because she was too angry to see it. How did you translate their teenage frustration into words she would respect?

*The interview is designed using open-ended questions with the intent to learn more about the participants' experiences and outlooks on topics (Appendix F).*

All recorded interviews will be transcribed verbatim and meticulously anonymized immediately after collection by replacing names and unique identifiers (Appendix G). The qualitative transcripts will be coded by two independent researchers to establish inter-rater reliability for the coding scheme. Two independent coders analyze the transcripts using a predefined coding handbook to establish inter-rater reliability. ~~The transcripts will be coded separately.~~ The practice minimizes researcher bias and ensures the codes encapsulate the entirety of the situation (Fig 3.3).

**Fig 3.5: Coding Handbook**

Score	Domain 1: Parentification
1	My parents handle everything; I just translate the occasional word.
2	I help with mail or simple menus, but I never feel like I'm in charge.
3	I explain social things to them, but they still make all the final decisions.
4	I feel like a consultant where they ask me what to do, then they do it.
5	In public or at the doctor, I'm the boss, but at home, I'm just the child.
6	I have to tell my siblings what to do because my parents don't understand.
7	I manage the communication between my parents and siblings to keep things running.
8	I am the one who handles the 'big talks' with my siblings because my parents cannot.
9	I feel responsible for the family's survival and I make adult-level choices daily.
10	I am the third parent and provide the emotional and social structure for the house.

*This coding process specifically uses thematic and narrative coding. The research looks at the overall story and feeling of the participants. The coding chart has four different domains or categories for our coding process: parentification, emotional labor, prosocial skills, performance burden. The chart looks at the participants' verbal responses and open-ended responses in the questionnaire to understand where participants fall in these categories. **Both thematic and narrative coding are used to capture not only the content of participants' responses but also the emotional tone and structure of their experiences.** (Appendix H).*

### 3.3 Quantitative Data Collection

At the start of the EEG recording, all participants will be directed through breathing and mediation exercises to understand where their baseline cognitive function is. That baseline will then be compared to their results when they are actively participating in the interview.

Participants wear a Muse 2 EEG headband, which uses four electrodes (AF7, AF8, TP9, TP10) to measure electrical activity at a 256 Hz sampling rate. The device records neural oscillations across

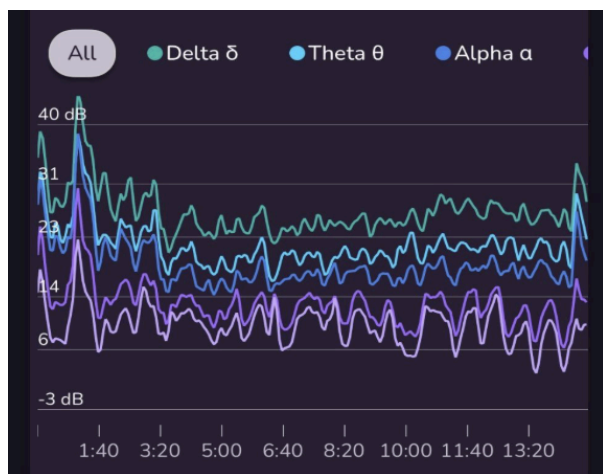
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multiple frequency bands, with the primary focus on frontal Beta power as an indicator of cognitive load and problem-solving effort.

The core quantitative measurement involves fitting participants with an EEG cap and asking personal questions targeted at understanding what the participants' daily life was like. Doing this also invokes the participant to reminisce on past interactions with their families. The EEG monitors the electrical activity of the brain, with the primary focus on frontal Beta power as a physiological measure of cognitive load and problem solving. The Beta wave measure is used to understand if the participant has any large internalized stress (Appendix I and Fig. 3.6).

**Fig 3.6: Snippet of EEG Data**



*This is an example of the EEG data collected. The EEG will graph the different brain waves in real-time as the interview takes place. Using time-stamps the research can pinpoint exact moments of increased stress. The above graph represents high Gamma and Beta waves, indicated by the dark purple and like purple lines. Gamma is associated with drowsiness and typically oscillates 30 hz or above. While Beta is associated with memory retrieval and problem solving, oscillating between 13-30. The graph above is an example of a participant's brain data associated with high stress and memory recall.*

### **3.4 Initial Descriptive Statistics and Graph Creation**

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The EEG graph displays real-time fluctuations in brainwave activity. Time-stamped interview segments allow the researcher to identify moments of heightened cognitive load or emotional stress. Beta waves (13–30 Hz) are associated with working-memory engagement and problem-solving, while Gamma waves (>30 Hz) may reflect heightened cognitive integration. These neural markers help quantify the cognitive demands of emotional brokering.

Once all raw EEG data and survey responses are collected, the data set will undergo a rigorous cleaning process. This includes identifying and removing EEG artifacts (like eye blinks and muscle movements) and checking for missing or inconsistent survey responses. Moreover during this phase the EEG data along with the coded qualitative response will be inputted to create a master spreadsheet of the raw finding (Fig. 3.7)

*Fig. 3.7: Google Sheet with Numeric Values Containing Values Generating from Coding and EEG Data*

Domain 1	Domain 2	Domain 3	Domain 4	BPM	Alpha	Theta	Gamma	Beta	Delta	Stillness Sc
9	10	8	9	82	8.2	4.1	1.8	27.8	2.1	62
3	4	7	9	68	12.4	7.8	0.8	13.5	3.5	85
7	7	8	6	74	10.1	6.2	1.1	19.8	2.8	74
2	2	9	8	65	14.2	8.9	0.5	10.2	4.2	92
8	8	8	7	62	13.8	5.5	0.6	23.4	3.9	88
5	5	6	6	71	11.5	7.1	0.9	16.2	3.1	79
2	2	9	8	88	7.5	8.5	2.4	11.5	1.8	55
6	6	5	3	79	9.2	6.5	1.5	18.4	2.3	68
3	3	7	5	76	10.4	8.2	1.2	12.1	2.5	72
1	1	8	9	70	11.8	9.5	0.7	9.5	3.4	84
9	9	7	7	85	7.8	4.8	2.1	25.4	1.9	58
7	7	8	6	73	10.5	5.9	1	20.2	2.9	76
1	1	5	4	69	12.1	9.4	0.8	9.8	3.6	86
6	6	7	3	77	9.8	6.8	1.3	17.9	2.4	71
9	9	8	8	81	8.5	4.5	1.9	26.1	2	63
8	8	7	7	75	10.2	5.1	1.1	24.2	2.7	73
9	9	9	8	83	8.1	4.6	2	25.8	1.9	60
10	10	7	7	86	7.6	4	2.3	28.5	1.8	56
1	1	7	6	67	13.1	9.3	0.7	10.1	3.8	89
4	4	7	5	72	11.2	7.5	0.9	14.1	3	80
1	1	4	6	66	13.5	9.6	0.6	9.2	4	91
9	9	5	6	78	9.5	4.7	1.4	24.9	2.2	69

*This spreadsheet contains participants data from the pre-survey and interview, all responses are coded and EEG data is documented (Appendix J).*

The cleaned quantitative data will first be subjected to descriptive statistics software. The software will calculate means, medians, standard deviations, and frequency distributions for all primary variables. These initial descriptive calculations provide the foundational quantitative overview of the sample and the measured variables.

A basic correlation analysis will be performed to determine the fundamental relationships between the main independent variable (brokering frequency) and the three dependent variables (neurological function, psychological toll, and prosocial capacities). Advanced inferential statistical analysis will be conducted using XLMiner (Fig. 3.8). Running these complex models allows for the statistical control of confounding variables, which significantly increases the internal validity of the final findings. XLMiner looks at multiple variables simultaneously and identifies the strength of their correlations.

**Fig. 3.8: XL Miner of All Data**

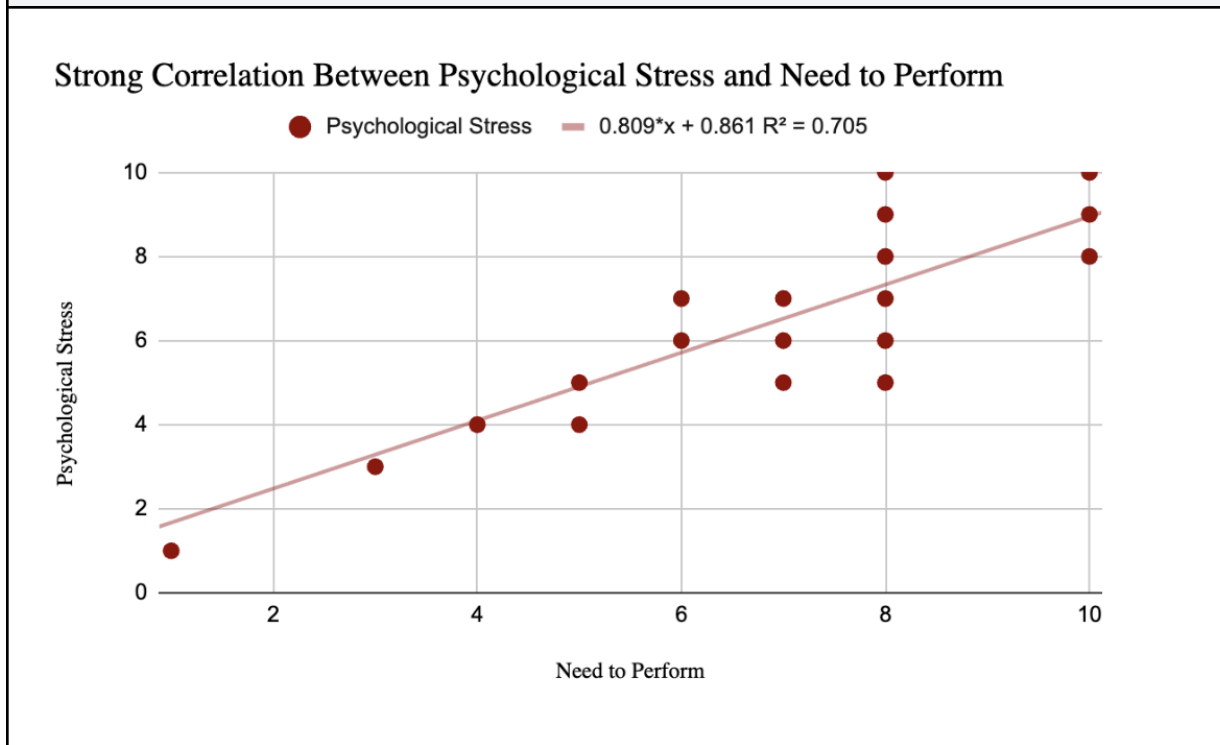
	<i>Need to Perform</i>	<i>On a scale of 1-10, how oft</i>	<i>On a scale of 1-10, how</i>	<i>On a scale of 1-10, how c</i>	<i>Psychological Stress</i>
Need to Perform	1				
On a scale of 1-10	0.1101632186	1			
On a scale of 1-10	0.3085797151	0.4230820845	1		
On a scale of 1-10	0.2602483903	0.8682603043	0.4134434448	1	
Psychological St	0.8395719479	0.6779437869	0.3168180774	0.05467371407	1
On a scale of 1-10	0.2369527283	0.3826520267	0.8682603043	0.3356516874	0.2729759502
On a scale of 1-10	-0.1885120018	0.2250297384	0.3153947502	0.06146556506	-0.1037089429
When translating	0.36590986	0.2658305571	0.290883161	0.4856825539	0.232821174
Extrovertism	0.1143291801	0.2478113361	0.1102618246	0.02034841121	0.09580102122
Emotional Stabili	-0.3714686966	-0.03525903305	0.01401133663	-0.08763920146	-0.3310522086
Agreeableness	0.04398930184	0.1097850142	-0.008106670402	0.07812094331	0.05239012821
Conscientiousne	0.006383757954	0.021207192	0.2809797961	0.09957732517	-0.0661386526
Intellect/Imagina	0.1158698351	-0.06324395128	-0.05478004674	-0.2505311513	0.167731423
Domain 1: Paren	0.08944032363	-0.1813930235	0.8683476805	-0.1574274303	0.1460221817
Domain 2: Emoti	0.3473113815	0.07517784698	0.2045943105	0.1414724505	0.3184007675
Domain 3: Proso	0.1617620322	0.1331341597	0.224472426	0.2015740606	0.2742554513
Domain 4: Perfo	0.4040329798	0.2291762446	0.1182641809	0.2036136076	0.4076913258

*Conducting the XL-Miner will be used to identify correlations between variables in the study (Appendix K).*

By removing the variance explained by these known confounding variables, the remaining variance in theta power can be more confidently attributed to the emotional brokering variable. This step is necessary to demonstrate that the measured neurological effect is unique to the brokering act and not simply a generalized effect of language proficiency or intelligence. These models allow for statistical control of confounding variables such as personality traits or demographic factors, increasing internal validity.

#### 4.0 RESULTS

**Fig 4.1: Strong, Positive Correlation ( $r = 0.8396$ ) Between Broker's Psychological Stress and Need to Perform**



*Participants who reported that they felt needed to be a perfectionist in front of their family also reported to feel a large amount of internal stress. All data was self-reported by the participants during the pre-interview questionnaire and then reinforced by the participants' verbal responses to interview questions all pointing to an r-value of 0.8396.*

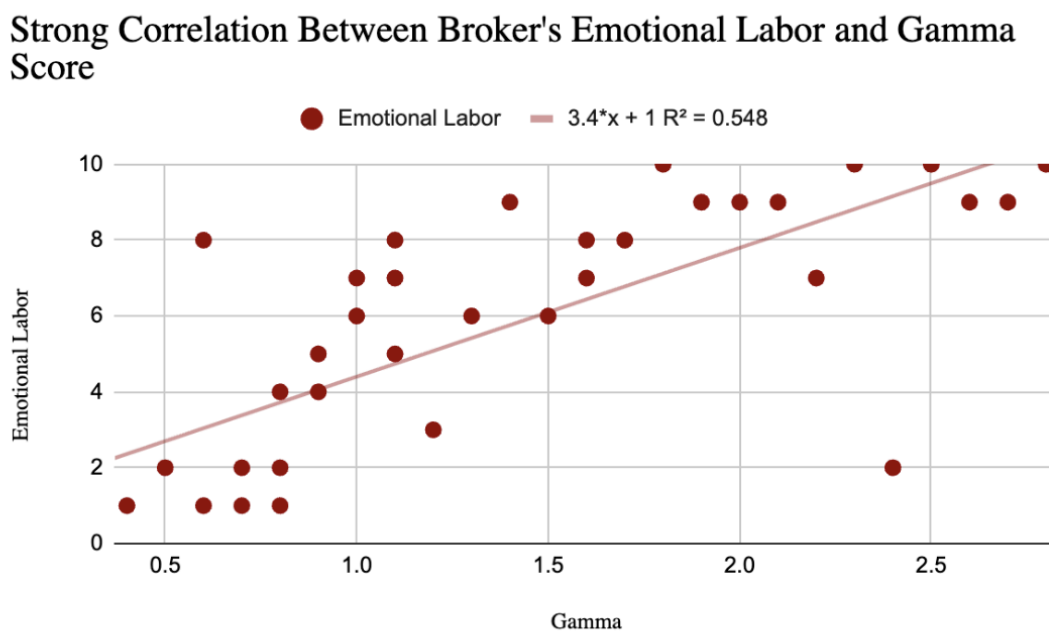
There is a strong correlation ( $r = 0.8396$ ) between brokers' internal stress and need to perform perfectly in front of their family. Many individuals reported feeling the need to be perfect for their family.

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All of the data below was self-reported by the participants. A strong correlation indicates performance burden that was significant enough to result in lasting psychological stress; impactful enough to be visible in the present day (Fig. 4.1).

**Fig 4.2 : Strong, Positive Correlation ( $r = 0.7404$ ) Between Participants Emotional Labor While Brokering and Their Gamma Score**

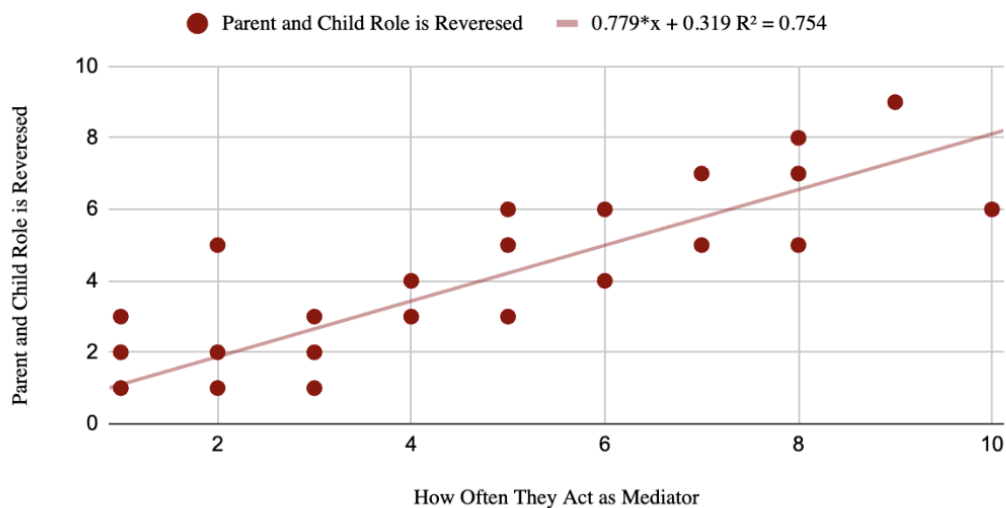


*Participants who felt high emotional labor in household settings especially in broking situations also reported to have a high gamma score contributing to the r-value of 0.7404. Gamma is a quantitative measurement dictated by the EEG which represents high level information processing and cognitive function during the interview. This indicates that the more emotional labor one has the more cognitive function is reported when discussing their situation. The emotional labor column was coded by the researchers and then peer-reviewed by two other independent coders to reduce bias. While the gamma scores were gathered from the quantitative data provided by the EEG during the participants' interview.*

Another particular development can be seen with participants who claim they have to be the mediator in family arguments which strongly correlates ( $r = 0.8396$ ) with their feeling that the child-parent roles are reversed in their homes. Moreover it highlights the idea that the more emotional labor one feels while brokering will result in the participant's high cognitive process and perception ( Fig. 4.2).

**Fig 4.3: Strong, Positive Correlation ( $r = 0.8683$ ) Between Brokers Who Feel They Act as Mediators Often and Parentification**

### Strong Correlation Between Brokers Acting as Mediators and Parentification

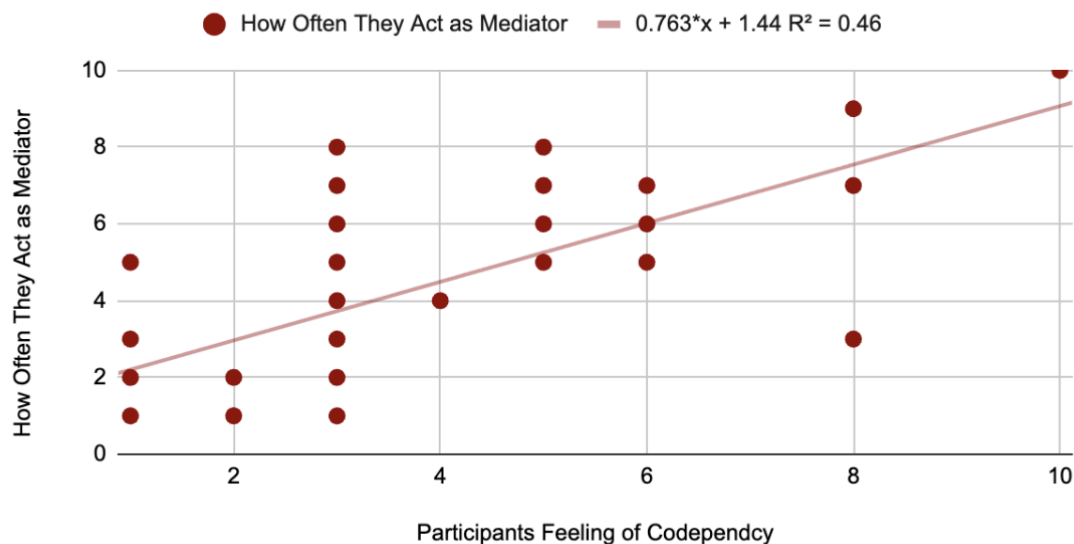


Participants who felt they often have to act as a mediator between their siblings, parents or peers also report to feel they have experienced intense parentification. Meaning that they often felt they had to be the “parent” of the household or the “bigger person” in conversations, often being the person maintaining the peace. All data was reported by the participant during the pre-interview form and moreover showcases a strong correlation with an  $r$ -value of 0.8683.

Another, strong correlation ( $r = 0.8683$ ) can be illustrated between brokers who often act as mediators and high levels of parentification. Essentially, the more a participant had to act as a mediator in home environments also experienced parentification which is essentially when a child reverses roles with their parent and takes on more mature responsibilities (Fig. 4.3).

**Fig 4.4: Strong, Positive Correlation ( $r = 0.6779$ ) Between Brokers Who Feel They Act as Mediators Often and Broker's Feeling That Their Parents Emotional Stability is Reliant on Them**

### Strong Correlation Between How Often They Act as Mediator vs. Participants Feeling of Codependency



*Participants who felt they often had to act as a mediator in their families also felt that their parents relied on them emotionally when out in public and required their children to broker for them. This is different between parentification as the participant isn't necessarily acting as the "stand-in parent" but rather a companion that*

***Fig 4.4: Strong, Positive Correlation ( $r = 0.6779$ ) Between Brokers Who Feel They Act as Mediators Often and Broker's Feeling That Their Parents Emotional Stability is Reliant on Them***

*assists their parents through social settings. All of this data was self reported and were gleaned from the form questions: "On a scale of 1-10, how much do you feel the 'parent-child' roles were reversed when you were translating or mediating for your parents?" and "On a scale of 1-10, how often did you act as a mediator in family arguments or cultural misunderstandings?"*

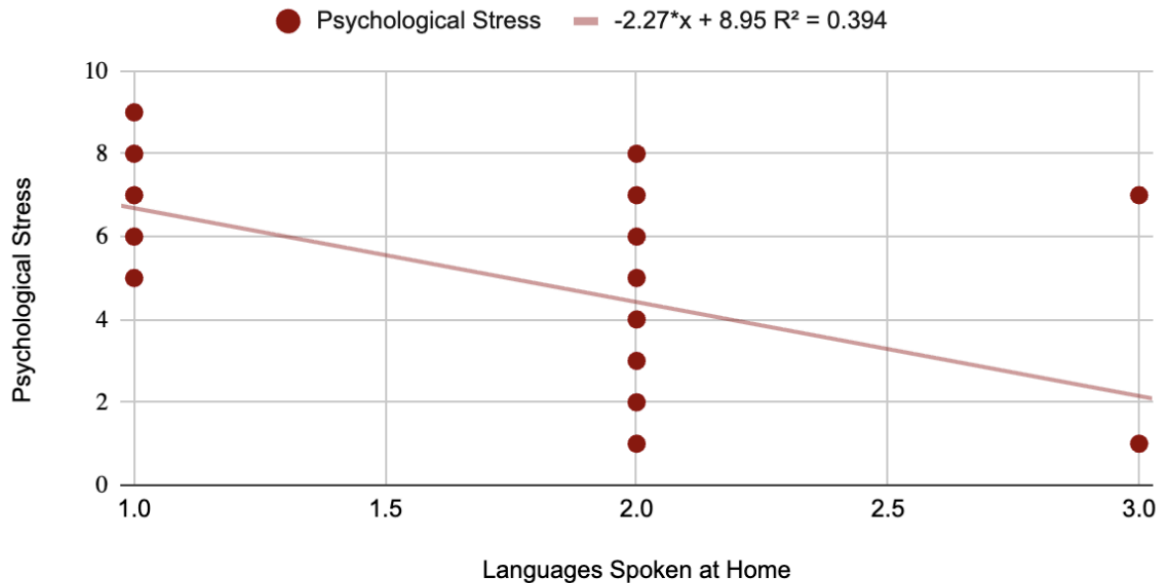
There is a strong correlation ( $r = 0.6779$ ) between participants who act as mediators and who also feel that their parents' emotional well being relies on them and their brokering ability in public settings. The data strengthens the original notion that brokers have an inherent responsibility to provide for their parents and be the bridge between two societies (Fig. 4.4).

## **FURTHER ANALYSIS**

***Fig 5.1: Strong, Negative Correlation ( $r = -0.852$ ) Between How Many Languages Brokers Speaks at Home and Their Psychological Stress***

**Fig 5.1: Strong, Negative Correlation ( $r = -0.852$ ) Between How Many Languages Brokers Speaks at Home and Their Psychological Stress**

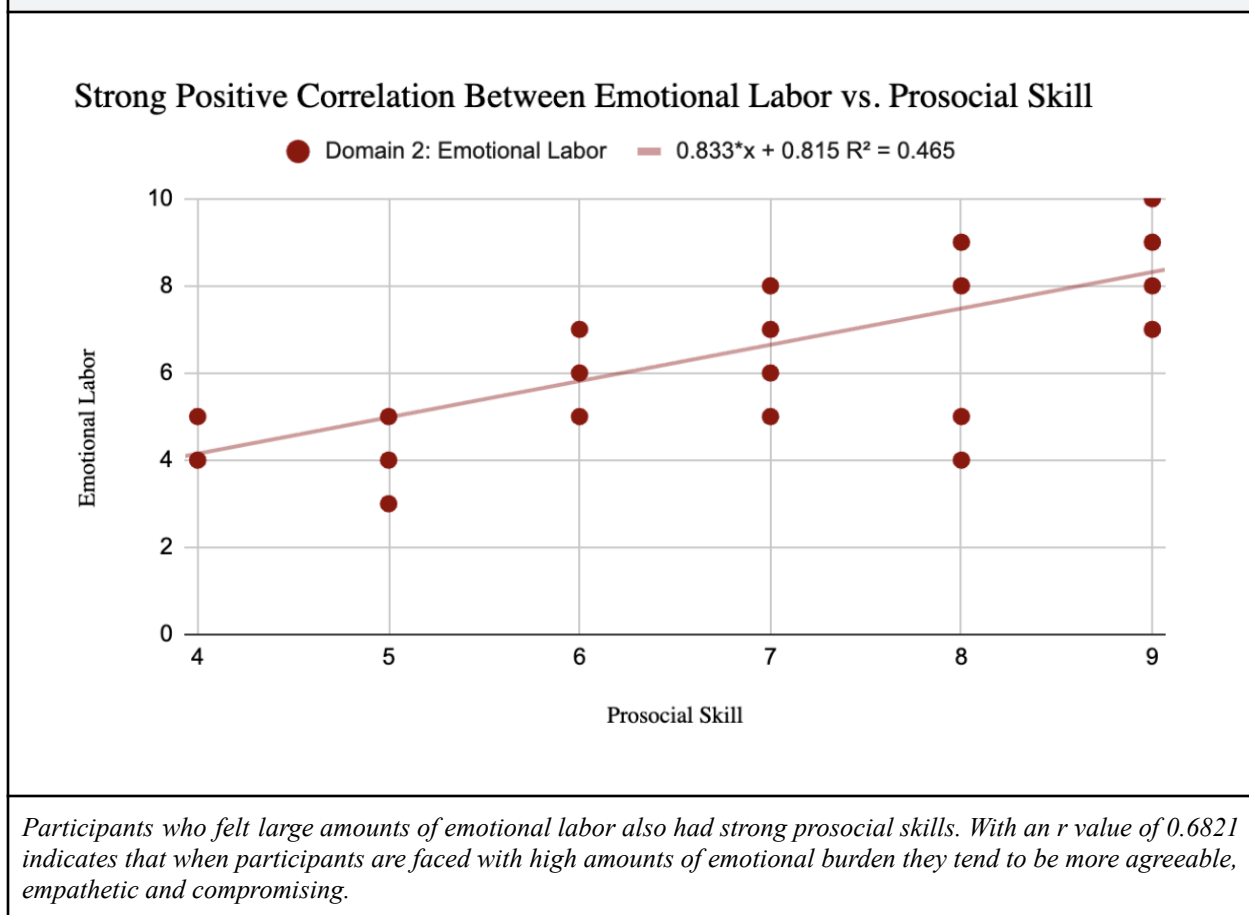
### Correlation Between Languages Spoken at Home and Psychological Stress



*Participants who felt they often had to act as a mediator in their families also felt that their parents relied on them emotionally when out in public and required their children to broker for them. This is different between parentification as the participant isn't necessarily acting as the “stand-in parent” but rather a companion that assists their parents through social settings.*

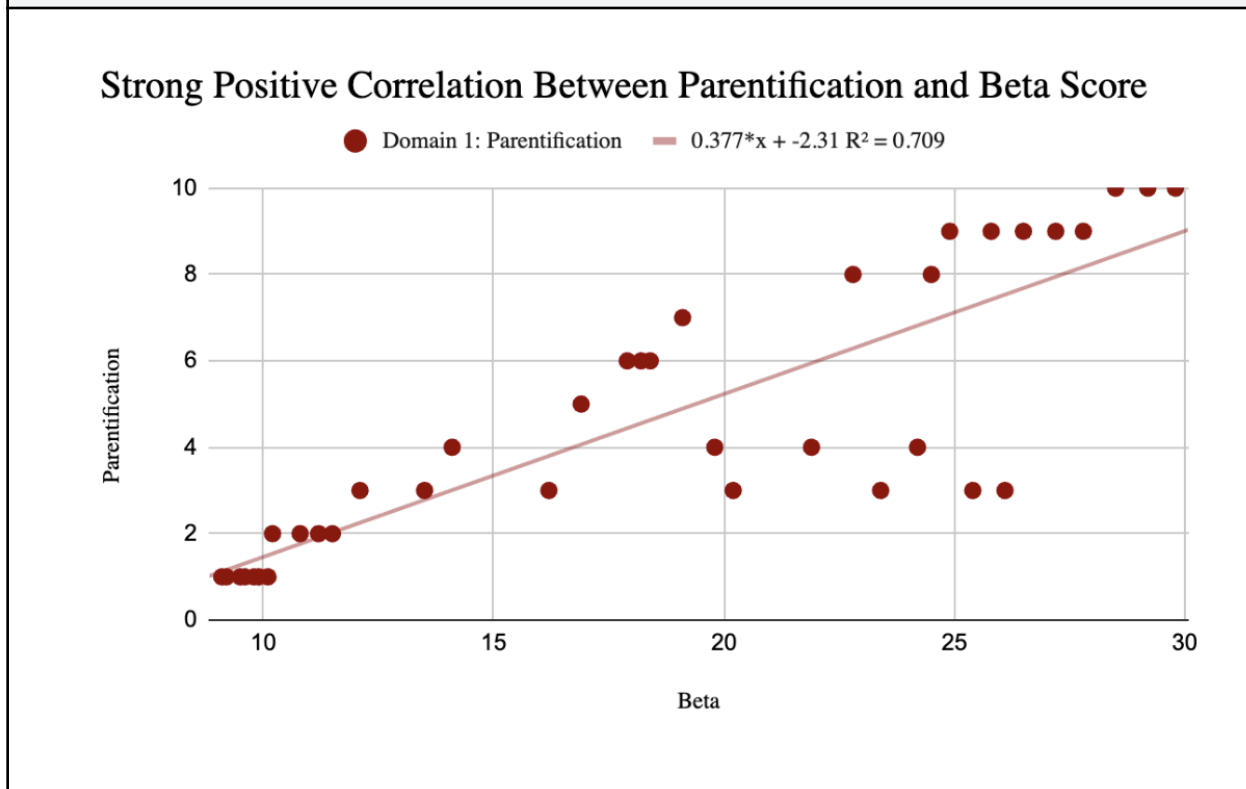
Further points drawn from data are examined in this section, since the investigation extends beyond primary outcomes and into broader interpretation. Below examines how the more languages a broker speaks at home the less psychological stress they tend to have. With a strong negative correlation ( $r = -0.852$ ) hinting at the idea that brokering can be positive through certain lenses (Fig. 5.1).

**Fig 5.2: Strong, Positive Correlation ( $r = 0.6821$ ) Between Broker's Emotional Labor and Prosocial Skill**



Another major result was a moderate correlation ( $r = 0.6821$ ) between participants' emotional burden and prosocial skills. Prosocial skills are defined as participants' involuntary behaviors intended to benefit others and society, such as sharing, cooperating, empathizing, and helping. The participants rating was assigned with a descriptive coding chart. The participants' responses to questions were split into four domains. Below, the participants were assigned a number based on their interview verbal responses and their written responses in the questionnaire (Fig. 5.2).

**Fig 5.3: Strong, Positive Correlation ( $r = 0.8421$ ) Between Parentification and Beta Score**

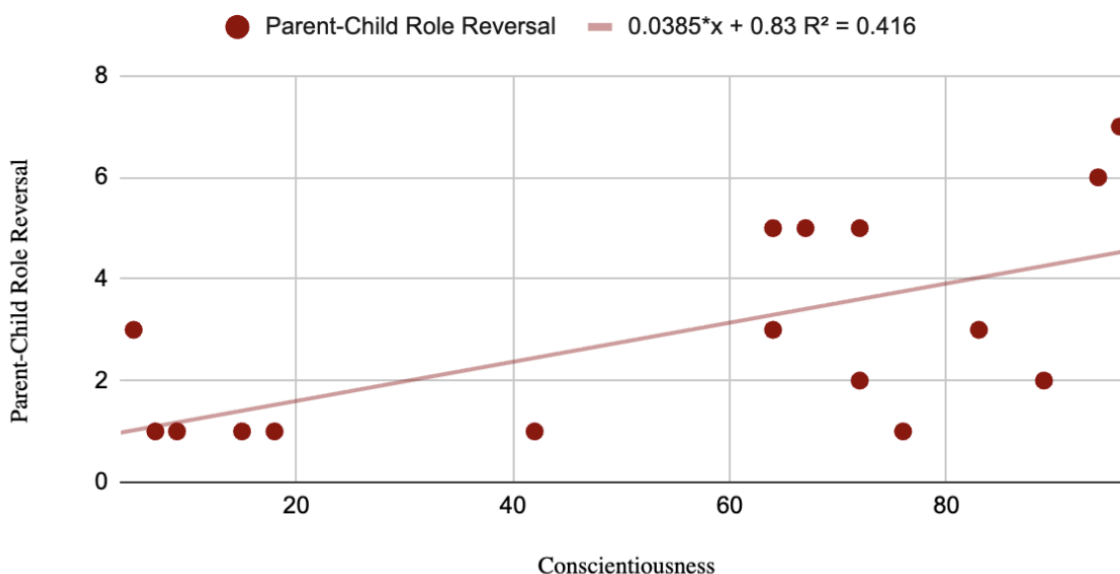


*Participants who felt large amounts of parentification had a direct correlation to a larger frontal beta score. In this graph the parentification was coded and reviewed by two independent coders while the beta score was reported via the EEG during the participants interview which quantified to an r-value of 0.8421.*

Additionally, a strong correlation ( $r = 0.8421$ ) between the parentification and beta score was identified. The more parentification participants feel, which is essentially when the parent-child roles are reversed, the higher their Beta score during the interview. The frontal Beta represents active thinking and high anxiety, signaling high neural activity and distress (Fig. 5.3)

**Fig 5.4: Moderate, Positive Correlation ( $r = 0.6451$ ) Between Asian Broker's Conscientiousness Score and Role Reversal**

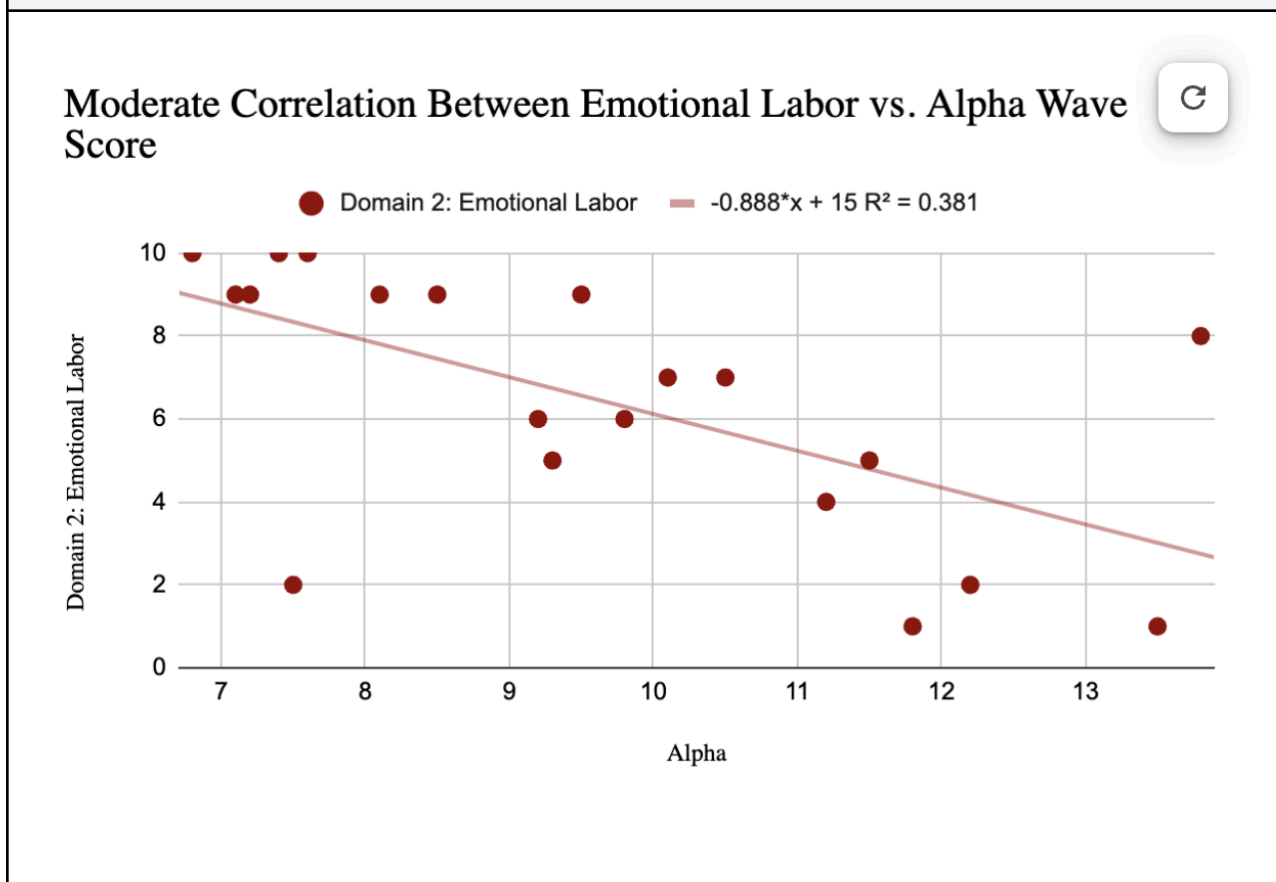
### Strong Positive Correlation Between Asian Participants Conscientiousness and Role Reversal



Participants who felt they often had to act as a mediator in their families also felt that their parents relied on them emotionally when out in public and required their children to broker for them. This is different between parentification as the participant isn't necessarily acting as the "stand-in parent" but rather a companion that assists their parents through social settings. Conscientiousness score was gathered using the Big-5 Inventory quiz which is a credible and scientifically recognized questionnaire. Conscientiousness essentially describes self-discipline, organization, and achievement-striving. While the parent-child role reversal was reported by the participants during the pre-interview questionnaire.

Moreover, an interesting finding discovered during the study was when subgrouping by race revealed that there was a moderate correlation ( $r = 0.6451$ ) between Asian brokers' conscientiousness score and parentification or role reversal (Fig. 5.4).

**Fig 5.5: Moderate Negative Correlation ( $r = -0.6174$ ) Between Asian Broker's Emotional Labor and Alpha Wave Score**



*Specifically the participants that identified as Asian in the sampling pool reported a visible inverse correlation between severity of emotional labor and their reported Alpha scores reported by the EEG. The emotional labor score was reported through the coding process where independent coders utilized the aforementioned codingbook. Alpha waves are usually associated with a calm, peaceful mind, so an inverse relationship with emotional labor and Alpha waves suggest that specifically in Asian households the repeated participation in emotional labor has considerable impacts resulting in loss of Alpha wave scores.*

The last correlation points to the idea that in Asian households specifically, there is a visible neurological burden in children. There is a moderate correlation ( $r = 0.6174$ ) between emotional labor and Alpha wave score highlighting strong levels of stress and alertness (Fig. 5.5).

## 6.0 DISCUSSION

### 6.1 Gap Fulfillment

Findings suggest clear negative effects for immigrant youth who are unaware they are partaking in emotional brokering. While previous literature has only explored the linguistic benefits of bilingualism in immigrant households, it rarely quantified the psychological or even neurological toll of the emotional labor required to navigate the two worlds. By integrating real-time EEG data with psychological surveys and qualitative interviews, this study offers one of the first empirical demonstrations that emotional brokering is associated with elevated cognitive load, heightened stress responses, and complex socioemotional outcomes. By synthesizing real time EEG metrics with psychological surveying, this study filled the gap by providing evidence that the cultural dexterity praised in immigrant youths often comes at a cost. The research aimed to understand the neurological and psychological characterization of emotional brokers.

### 6.2 Key Findings

The research revealed three major themes that relate to experts: Maryam Hejaz, Ellen Bialystock and Su Yeong Kim:

#### **Positive Correlation Between Parentification and Beta Wave Activity Score ( $r=0.8421$ ), Proves Visible Negative Neurological Tolls and Need for Professional Screening**

The study cross-references the frequency of which participants were mediating family arguments and managing parental stress. These emotional labor scores were coded based on participants' responses during the interview and questionnaire. Through the coding process the parentification scores were identified. On the hand the Beta scores were reported by the EEG. The two sources contribute to the results and align with the ideas of Dr. Maryam Hejaz argues that the “cognitive load of mediation is fundamentally different from linguistic translation because it requires constant monitoring of emotional safety.”<sup>23</sup> However, Hejaz’s finding does challenge the perspective of Orellana who highlighted the agency and pride brokers feel. While agency may exist, the data reaffirms that the brain remains in a “fight or flight” state. The Beta state suggests that the pride of the role does not mitigate its psychological

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<sup>23</sup> Hernandez, C. M., Moreno, O., García-Rodríguez, I., Fuentes, L., & Nelson, T. (2022). The Hispanic Paradox: A Moderated Mediation Analysis of Health Conditions, Self-Rated Health, and Mental Health among Mexicans and Mexican Americans. *Health Psychology and Behavioral Medicine*, 10(1), 180–198.  
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stress regardless of the potential “benefit” critics claim it has. **This correlation underscores the need for mental-health screening protocols that account for emotional labor, not just linguistic responsibilities.**

### **Inverse Correlation Between the Number of Languages Spoken at Home and Psychological Stress Levels ( $r = -0.852$ ). Attention to Invisible Burden is Necessary in the Psychological Community**

As the count of languages a broker practices increases their self reported psychological stress decreases. The relationship suggests that higher linguistic complexity may act as a “cognitive buffer” or a source of increased resilience. The observation directly aligns with the findings of Bialystock who found that “bilinguals show a significant advantage in executive control and cognitive flexibility,” which may allow them to navigate the stress of brokering more efficiently.<sup>24</sup> While the initial literature focused on the burden of translation, the finding goes beyond the initial gap to suggest that mastery over multiple languages provides a “protective factor” that helps adolescents manage the emotional weight of their roles. Additionally, the ability to adapt to high intensity environments can be classified as a positive result. The very few studies that touched on emotional brokering never delved into potential benefits of it. However, the nature of performing in arduous settings can be an interesting and even useful skill for the broker to develop. **This result extends the literature by suggesting that multilingualism may not only enhance cognitive control but also mitigate the emotional burden of brokering.**

### **Moderate Correlation Between Act of “Softening” or Editing a Parent’s Words and Prosocial Skill Development ( $r=0.6821$ ), Policy Reform for Support for Emotional Brokers is Required**

While the performance burden is high, the constant act of “softening” conflict-prone language fostered an advanced ability to read social cues. The positive outcome directly supports the idea Kim outlined: “brokering may act as a cognitive and academic enhancer promoting youths’ linguistic dexterity... [and] elevate competence and efficacy.”<sup>25</sup> Essentially, the broker has abetted a mindset that actively attempts to assist the people around them. Brokers are semi-synonymous to the term “people pleasers,” many who have reported a habit of altering languages to benefit the response of their parents have also been cataloged to display high prosocial skills. Prosocial skills are voluntary behaviors intended to benefit others even at the expense of oneself. These prosocial behaviors reinforce the idea of brokers adapting and changing themselves and hints at an underlying psychological burden they face.

## **6.3 Implications**

For too long the psychological community has viewed CEB as a natural outcome of being an immigrant child or belonging to a family practice acculturation. Several critical implications for policymakers, educators, and mental health professionals emerged from this study. First, the high

<sup>24</sup> Bialystock, E. (2011). Reshaping the mind: The benefits of bilingualism. *Canadian Journal of Experimental Psychology*, 65(4), 229–235.

<sup>25</sup> Kim, S. Y., Du, Y., Alvarado, C., Sim, L., Wen, W., Zhang, T., & Shen, J. (2025). Language Brokering Conditions the Indirect Association Between Mexican-Origin Adolescents’ Academic Discrimination and Educational Expectations. *Journal of Community Psychology*, 53(6).

correlation between Psychological Stress and Beta waves ( $r = 0.8421$ ) implies that child emotional brokers may be at a higher risk for long-term anxiety disorders or early-onset burnout. Clinical practitioners should move beyond assessing language barriers and begin screening for emotional labor burdens in first-generation youth. The research was also vital because it provides a voice in the educational sector; these findings suggest that the cultural dexterity seen in children is a dual outcome. While they may appear highly competent and "agreeable" in social settings, their EEG signatures illustrate a lack of relaxation. Schools should consider implementing support programs that prioritize "psychological stillness" for these students. Furthermore, this study contributes to the field of sociology by providing a physiological invisibility index, quantifying the hidden work that keeps immigrant families connected to the American social fabric.

#### **6.4 Limitations**

One major limitation of the study is the sample size ( $n=40$ ). ~~A larger, more diverse sample would be required to generalize these findings across different ethnic groups.~~ **Additionally, EEG data provide only a cross-sectional snapshot; longitudinal research is needed to determine whether elevated Beta activity persists into adulthood or changes as brokers gain autonomy.** However, it was difficult to locate participants from various ethnic backgrounds considering they were all pooled in the greater Austin Area in a predominantly White school. Additionally, finding voluntary participants to commit their time and resources was challenging. Cultural nuances in how parentification is perceived may cause participants to underreport stress due to filial piety or a desire to "save face." Furthermore, the use of self-reported data for the psychological stress domains is a limitation; participants' perceptions of their own agreeableness or emotional stability may differ from their actual social behaviors. Finally, the EEG data provides a momentary cross-sectional snapshot. A longitudinal study would be necessary to determine if a high Beta neural signature persists into adulthood or if the prosocial skills developed during childhood break. Future studies with integration like observational field experiments would help to test these findings based on real world social behaviors.

In sum, while this study provides valuable insight into the internal dynamics of emotional brokering, its findings must be interpreted within the constraints of a small, regionally specific sample, reliance on self-reported psychological measures, and the absence of a non-broker control group. These methodological limitations restrict the generalizability of the results and prevent any causal claims about the relationship between brokering and neural activity. Instead, the study should be understood as an exploratory investigation that illuminates preliminary associations between emotional labor, psychological stress, and cognitive load among immigrant youth. Future research employing larger, more diverse samples, longitudinal tracking, and experimentally controlled comparisons will be essential for determining whether the neural patterns observed here represent transient responses to emotionally charged tasks or enduring markers of chronic stress shaped by the brokering role.

#### **FUTURE DIRECTIONS**

To build upon the foundation of the current study, future research must shift from snapshots to longitudinal and diversified experimental designs. The elevated Beta activity observed among child

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emotional brokers (CEB) suggests the need to examine how brokering-related cognitive load evolves across developmental stages. The first logical step is a longitudinal quantitative study tracking CEB over a ten year period. While this study identified a current state of cognitive function, it remains unknown if these significant Beta waves lead into adulthood. An experiment utilizing an fMRI (functional Magnetic Resonance Imaging) alongside biannual EEG scans would allow researchers to see if there are any long-term markers of chronic stress. The design aligns with the concerns of Dr. Zayas who notes that the “cumulative effects of linguistic demands on immigrant youth are often overlooked in traditional developmental models.”<sup>26</sup> Tracking youth into their adulthoods would determine if their ability to navigate complex conversations is still impactful.

Another experiment that should be employed is a quasi-experimental design which could compare child brokers to professional interpreters. By using the same EEG metrics it is possible to isolate the emotional labor variable. If the vocational students show high linguistic proficiency but significantly lower Beta waves than the family brokers, it would provide definitive proof that the burden and cognitive stress brokers experience is from parentification and family duty. Psychology expert, Claudia Angelelli, supports this direction stating that “the interpreter’s role is never neutral, but when that interpreter is a child, the role becomes a site of intense interpersonal negotiation.”<sup>27</sup> Angelelli accentuates the need to comprehend the impact of brokering specifically inside a family setting.

Finally, to follow the study’s trajectory, an acute response experiment should be conducted in a controlled laboratory setting where child brokers and non-brokering control groups are tasked with translating high stakes simulated scenarios such as a mock legal eviction or a complex medical diagnosis while being actively monitored by an EEG. This would transition the data from showing a general correlation to demonstrating a direct link between the act of brokering and immediate neurological exhaustion, specifically measuring the impact of brokering in various environments (medical, legal, educational). The necessity for this event-based research is supported by Dr. Maria Cristina Morales who emphasizes that “the stressors of brokering are often episodic and intense, requiring a level of cognitive shifting that can lead to significant physiological fatigue.”<sup>28</sup> By isolating these specific moments, the research can truly identify which categories of conversations catalyses the most stress.

Together, these future directions would deepen understanding of the developmental trajectory, contextual variability, and long-term consequences of emotional brokering, ultimately informing interventions, policy decisions, and support systems for immigrant youth.

## ACKNOWLEDGMENTS

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<sup>26</sup> Zayas, L. H., Brabeck, K. M., Heffron, L. C., Dreby, J., Calzada, E. J., Parra-Cardona, J. R., Dettlaff, A. J., Heidbrink, L., Perreira, K. M., & Yoshikawa, H. (2017). Charting Directions for Research on Immigrant Children Affected by Undocumented Status. *Hispanic Journal of Behavioral Sciences*, 39(4), 412–435.

<sup>27</sup> Angelelli, C. V. (2004). *Medical Interpreting and Cross-cultural Communication*. Cambridge University Press.

<sup>28</sup> Morales, M. C. (2026). *Latinos in the United States: Diversity and change*. Retrieved April 13, 2026, from Google.com website: [https://scholar.google.com/citations?view\\_op=view\\_citation&hl=en&user=oT4xReEAAAJ&citation\\_for\\_view=oT4xReEAAAJ:\\_B80troHkn4C](https://scholar.google.com/citations?view_op=view_citation&hl=en&user=oT4xReEAAAJ&citation_for_view=oT4xReEAAAJ:_B80troHkn4C)

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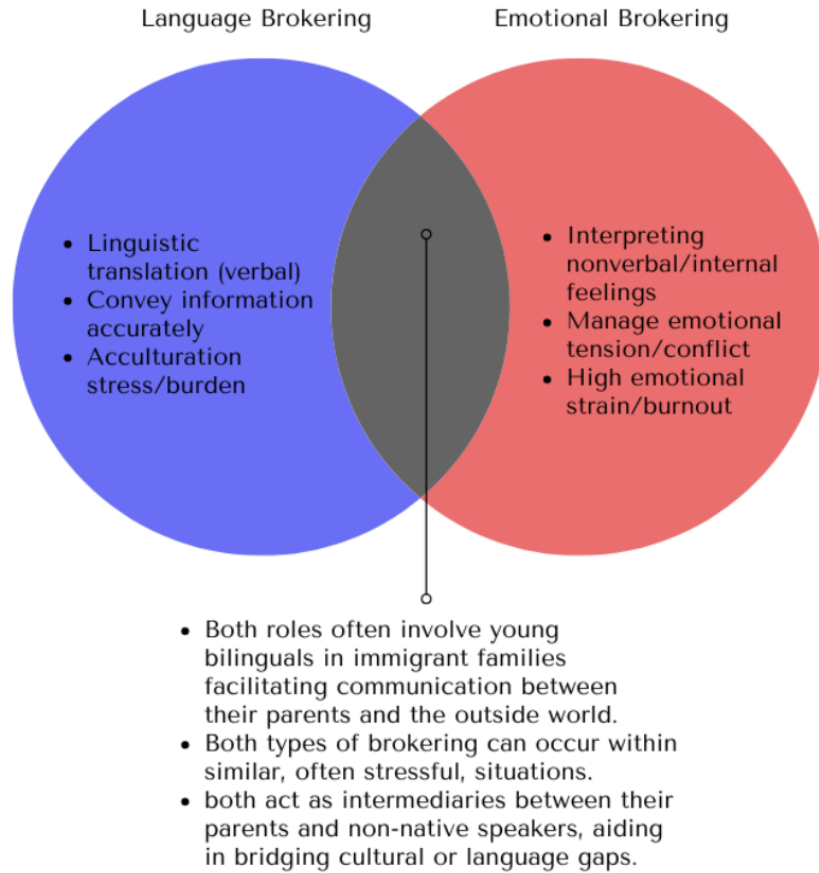
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## 10.0 Appendices

### Appendix A: Brokering Venn Diagram

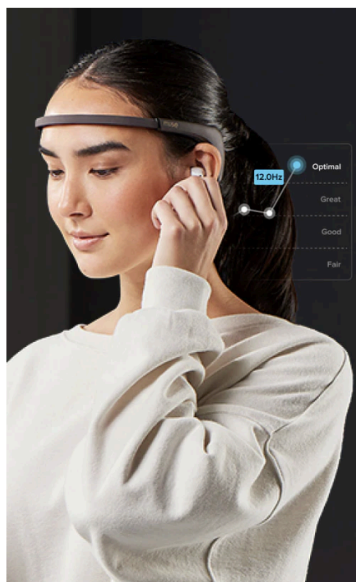
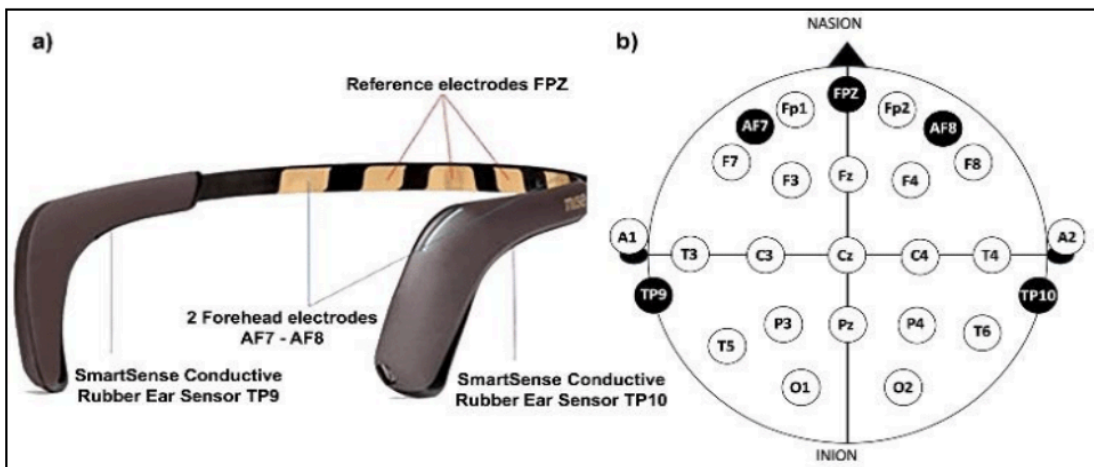
This comparison graph illustrates the difference between language and emotional brokering while also clarifying the main gap.



## **Appendix B: EEG Diagram**

This is a diagram that shows how the EEG works. Specifically the Muse EEG works by placing small metal discs (electrodes) on the scalp to detect tiny electrical impulses generated by neurons.

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### Appendix C: Pre-Interview Questionnaire

These images display the different pre-test questions above as a link to view the questionnaire from a respondent perspective.

[Link to Pre-Test](#)

The image shows a screenshot of a questionnaire interface. It is divided into two sections by a horizontal line. The top section is titled "Gender \*" and contains two radio button options: "Female" and "Male". The bottom section is titled "Age \*" and contains seven radio button options labeled "12", "13", "14", "15", "16", "17", and "18". The entire form is enclosed in a light blue border.

**What is your ethnicity? \***

Hispanic/Latino

White

Black/African American

Asian

American Indian

Other: \_\_\_\_\_

**What generation immigrant are you? \***

Immigrant

1st Generation

2nd Generation

3rd Generation

I am not an immigrant.

Other: \_\_\_\_\_

**How many years have you lived in the United States? \***

Long answer text  
\_\_\_\_\_

What is your approximate annual household income? \*

- Under \$30k
- \$30k - \$60k
- \$60k - \$100k
- \$100k - \$150k
- \$150k - \$200k
- Over \$200k

How many siblings do you have? \*

Short answer text

What is your sibling status? (only child, youngest of five, second born, etc.) \*

Short answer text

What is your primary family structure? (nuclear, extended, single parents, etc.) \*

Short answer text

What languages are spoken at home? \*

Long answer text

What is your cumulative weighted GPA? (on the 100 scale-This information will not be shared with anyone else) \*

- Below 100
- Ranging 100-105
- Ranging 105-110
- Above 110

Section 4 of 6

### Brokering Frequency & Practice

Purpose of this study we mean "**brokering**" and "**translating**" as you helping interpret and **navigate different cultural norms** for expressing and understanding emotions, especially in cross-cultural interactions to your parents. It involves **explaining unspoken emotional and social cues**, facial expressions, or cultural emotional responses that a family member (like a parent) might misunderstand.

On a scale of 1-10, how much do you feel a need to perform tasks perfectly for your family? \*

1 2 3 4 5 6 7 8 9 10

Not at all           Very often

What do you think is the main cause of this? \*

Long answer text

On a scale of 1-10, how often did you translate documents or conversations for your parents? \*

1 2 3 4 5 6 7 8 9 10

Not at all           Very often

On a scale of 1-10, how often did you act as a mediator in family arguments or cultural misunderstandings?

1 2 3 4 5 6 7 8 9 10

Not at all           Very often

What do you think is the main reason for this? \*

Long answer text

On a scale of 1-10, how often were you required to interpret in complex settings (doctor's visits, legal meetings, banks)? \*

1 2 3 4 5 6 7 8 9 10

Not at all           Very often

What do you think is the main reason for this? \*

Long answer text

**Reminder**

Please remember that "**translating**" does not only mean translating languages but it also encompasses translating between social norms. Such as explaining to your parents or peers different slang, or how to act a certain way or even how to respond to certain questions in respectful and clear manner.

On a scale of 1-10, how much psychological stress do you feel when you are mediating between your family members? \*

1 2 3 4 5 6 7 8 9 10

Not a lot           Very much

What do you think is the main reason for this? \*

Long answer text

On a scale of 1-10, how much do you feel the 'parent-child' roles were reversed when you were translating or mediating for your parents? \*

1 2 3 4 5 6 7 8 9 10

Always the child           I felt like the parents

What do you think is the main reason for this? \*

Long answer text

On a scale of 1-10, how much do you feel your parents depend on you for their emotional well-being or connection to society? \*

1 2 3 4 5 6 7 8 9 10

Not at all           Very often

What do you think is the main reason for this? \*

Long answer text

When translating, how often did you 'soften' or change your parents' words to avoid conflict or make them sound more polite? \*

1 2 3 4 5 6 7 8 9 10

Not at all           Very often

If you have siblings, why or why not were **you** chosen as the primary broker? (e.g., birth order, better English, more 'patient' personality). \*

Long answer text

Section 5 of 6

### Big Five Inventory






The Big Five Inventory are questionnaires used to measure the [Big Five personality traits](#) (Extraversion, Agreeableness, Conscientiousness, Negative Emotionality/Neuroticism, and Openness). Please use [this link](#) to complete the Big Five Inventory questionnaire, it should take about 5 - 10 minutes.

Once you complete the survey **please take a screen shot of the results summary and upload it here.**

Example Screenshot

#### Results summary

Your results from the IPIP Big Five Factor Markers are in the table below. The table contains a raw score and also a percentile, what percent of other people who have taken this test that you score higher than.

Factor	Factor label	Raw score	Score percentile
I	<b>Extroversion</b>		31
II	<b>Emotional stability</b>		13
III	<b>Agreeableness</b>		17
IV	<b>Conscientiousness</b>		67
V	<b>Intellect/Imagination</b>		23

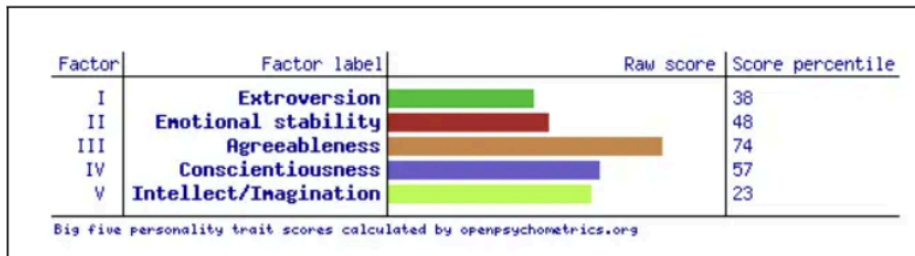
Big five personality trait scores calculated by [openpsychometrics.org](https://openpsychometrics.org)

Please upload your results summary here. \*

[View folder](#)

## **Appendix D: Big Five Inventory Questions**

The Big Five Inventory (BFI) is a personality assessment tool used to measure five broad dimensions of personality: openness, conscientiousness, extraversion, agreeableness, and neuroticism. These items of the BFI were instrumental in assessing the personality traits of participants.



**Test**

Rating	I....	Rating	I....
	1. Am the life of the party.		26. Have little to say.
	2. Feel little concern for others.		27. Have a soft heart.
	3. Am always prepared.		28. Often forget to put things back in their proper place.
	4. Get stressed out easily.		29. Get upset easily.
	5. Have a rich vocabulary.		30. Do not have a good imagination.
	6. Don't talk a lot.		31. Talk to a lot of different people at parties.
	7. Am interested in people.		32. Am not really interested in others.
	8. Leave my belongings around.		33. Like order.
	9. Am relaxed most of the time.		34. Change my mood a lot.
	10. Have difficulty understanding abstract ideas.		35. Am quick to understand things.
	11. Feel comfortable around people.		36. Don't like to draw attention to myself.
	12. Insult people.		37. Take time out for others.
	13. Pay attention to details.		38. Shirk my duties.
	14. Worry about things.		39. Have frequent mood swings.
	15. Have a vivid imagination.		40. Use difficult words.
	16. Keep in the background.		41. Don't mind being the center of attention.
	17. Sympathize with others' feelings.		42. Feel others' emotions.
	18. Make a mess of things.		43. Follow a schedule.
	19. Seldom feel blue.		44. Get irritated easily.
	20. Am not interested in abstract ideas.		45. Spend time reflecting on things.
	21. Start conversations.		46. Am quiet around strangers.
	22. Am not interested in other people's problems.		47. Make people feel at ease.
	23. Get chores done right away.		48. Am exacting in my work.
	24. Am easily disturbed.		49. Often feel blue.
	25. Have excellent ideas.		50. Am full of ideas.

*A Child's Guide to Parenting: The Psychological and Neurological Impact of Child Emotional Brokers  
Across Various Ethnic Backgrounds*

$$\begin{aligned} E &= 20 + (1) \_\_\_ - (6) \_\_\_ + (11) \_\_\_ - (16) \_\_\_ + (21) \_\_\_ - (26) \_\_\_ + (31) \_\_\_ - (36) \_\_\_ + (41) \_\_\_ - (46) \_\_\_ = \_\_\_\_\_\_ \\ A &= 14 - (2) \_\_\_ + (7) \_\_\_ - (12) \_\_\_ + (17) \_\_\_ - (22) \_\_\_ + (27) \_\_\_ - (32) \_\_\_ + (37) \_\_\_ + (42) \_\_\_ + (47) \_\_\_ = \_\_\_\_\_\_ \\ C &= 14 + (3) \_\_\_ - (8) \_\_\_ + (13) \_\_\_ - (18) \_\_\_ + (23) \_\_\_ - (28) \_\_\_ + (33) \_\_\_ - (38) \_\_\_ + (43) \_\_\_ + (48) \_\_\_ = \_\_\_\_\_\_ \\ N &= 38 - (4) \_\_\_ + (9) \_\_\_ - (14) \_\_\_ + (19) \_\_\_ - (24) \_\_\_ - (29) \_\_\_ - (34) \_\_\_ - (39) \_\_\_ - (44) \_\_\_ - (49) \_\_\_ = \_\_\_\_\_\_ \\ O &= 8 + (5) \_\_\_ - (10) \_\_\_ + (15) \_\_\_ - (20) \_\_\_ + (25) \_\_\_ - (30) \_\_\_ + (35) \_\_\_ + (40) \_\_\_ + (45) \_\_\_ + (50) \_\_\_ = \_\_\_\_\_\_ \end{aligned}$$

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Across Various Ethnic Backgrounds*

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## Appendix E: Consent Form

Consent Form



**Disclaimer:** You are not required to be an immigrants to participate in this study. There are no requirements.

**Purpose:**

The purpose of this study is to investigate the psychological and neurological impact of "emotional brokering", the act of mediating cultural and emotional information for immigrant parents. This research aims to understand how this role influences a child's cognitive load, anxiety levels, and the development of prosocial skills such as empathy and relational competence across various ethnic backgrounds.

**Procedure:**

You will first complete this Google Form, which asks for background information and your perception of your brokering experiences. Following this, you may be invited to participate in a second phase. This includes a 15-20 minute interview and a standardized simulation task while wearing an Electroencephalogram (EEG) cap to measure brain activity. You will be asked for verbal consent again before the interview and EEG recording begin.

**Confidentiality:**

Your responses will be kept strictly anonymous. Every effort will be made to preserve your confidentiality, including:

- Excluding names and email addresses from final data sheets.
- Replacing all identifying information with sequential ID numbers (e.g., "Participant 1").
- Participant data will remain confidential except in cases where the researcher is legally obligated to report specific incidents, such as disclosure of abuse or immediate risk of suicide.

**Voluntary Participation:**

Your participation is entirely voluntary. You are free to decide whether or not to take part. If you choose to participate, typing your name below serves as confirmation of your consent. Even after signing, you may withdraw at any time, for any reason, without penalty or impact on your relationship with the researcher. If you withdraw before data collection is complete, your data will be destroyed or returned to you.

**Consent:**

I have read and I understand the information provided above. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I voluntarily agree to take part in this study by typing my name and the date below.

## **Appendix F: Interview Questions**

These are the questions utilized during the interview specifically curated to understand the participants personal experiences and role in family dynamics.

<b>Questions</b>
How good is your relationship with your parents?
Have you ever had to act as the "third parent" for your sibling, and had to explain things to them because your parents weren't able to?
Did explaining things like that upset you, did you get annoyed, did it feel like a chore or was it natural?
Why did you have to do the explaining?
Focus on a time you had to explain your siblings or friends 'side to your parents because she was too angry to see it. How did you translate their teenage frustration into words she would respect?
Did you ever feel that by explaining these things to your parents it allowed you to be more empathetic, gain perspective, be understanding or even gain knowledge on other religions, cultures or backgrounds?
Have you ever accomplished something and felt like you couldn't celebrate it with your parents?
Oldest siblings: Have you ever felt like because you were the oldest sibling you were the one who had to be calm, who had to be in control and understanding?
Youngest sibling: Because you were the youngest sibling did you ever feel like that affected how you communicate with your parents?
Did you ever feel responsible for your parents, siblings or even friends' behavior?
How often do you have to explain things to your parents, whether it's slang, how to act in

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public, explaining or dumbing down a complicated social situation? Can you describe a situation where that happened?
Have you ever felt emotionally drained after talking to your family? Why?
Do you ever feel anger when you have to explain things to your family?
Have you ever felt pressured to act in a different way when around your parents? Why?
Think of a time you translated a menu at a restaurant. What kind of food was it? Was it a happy occasion?
Think of a time when you had to explain to your parents something that was happening in a movie. Why did you have to explain it? Did you ever feel annoyed or embarrassed?
Recall a time you were in the car or at the dinner table and you could feel an argument brewing between parent and your friend or sibling. How did you change your own behavior to try and stop it before it started? Did you feel like you had to be 'the adult' in the room?
Think of a time you chose <i>not</i> to tell someone the full truth because you knew it would cause unnecessary stress or an argument. Describe the feeling of holding that secret while you were still talking to them.

## Appendix G: Interview Transcripts

### Interview Participants: 2960

**Interviewer 0:00** Before we get started I want to say that you have full liberty to omit from answering any questions without repercussions.

**Participant 0:06** Ok.

**Interviewer 0:08** So first question, how good is your relationship with your parents on the scale of one to ten? One being good, ten being bad.

**Participant 0:12** My parents are divorced, so I would say, with my dad, I would say, a six because he's a really good dad, but I feel like sometimes we're a little bit distant. And with my mom, I would say

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probably like a three, because she's lowkey on her evil arc lately. But yeah, I enjoy staying with my dad a lot more.

**Interviewer 1:05** And why did you choose those numbers?

**Participant 1:10** For my mom? She's kind of like your typical Asian parent, if it was multiplied by ten, and it's really intense living with her. So I would say it's a three. Our relationship is a three, because she kind of also knows that I like don't vibe with her and we argue a lot. And my dad, compared to my mom, is like infinitely a better parent, and he also cares a lot about, like, what we do, so I'd say he's a lot higher than my mom.

**Interviewer 2:05** Okay, you mentioned that you argue with your mom. What do most of your arguments revolve around?

**Participant 2:10** I don't argue with my dad often, but with my mom, it's usually about like, how me and [REDACTED] act at home, like, if we, I mean, we're not even necessarily mad at her, like, if we're just upset because we had a bad day, she'll get mad at us. So usually it revolves around, like, how we control our emotions.

**Interviewer 3:00** Okay, um, would you say that school plays a large role in your relationship?

**Participant 3:05** Yes, yeah, because she, well, I mean, yeah, she has to pick us up and drive us around, like things for school. And I know she says she doesn't care about how we perform academically, but I know she still does.

**Interviewer 3:45** So would you say your relationship kind of depleted through the years compared to when you were younger?

**Participant 3:52** Yes, definitely.

**Interviewer 4:00** You also said she comments on how you act. Is it how you act around her, or how you like, dress, how you speak, in general?

**Participant 4:10** I think for me, it's how I act around her. But for my sister, she's a lot more strict. [REDACTED] is definitely not, like, really socially adept, which is completely fine. She's also very smart, but she's like, she doesn't really know how to, I guess, navigate around, like, super emotional settings, so she usually just lets things slip, and she's a little too honest, which is completely fine, but my mom gets mad at the fact that she can't really, like, put a mask.

**Interviewer 5:15** I see. Okay, okay. How connected are you with your culture on the scale of one to ten?

**Participant 5:22** I'd say, for the years, it's depleted a lot, especially when I took a trip to China and it was lowkey, not the best place I've been, because my family there is really toxic, especially my great uncle, who lectured me and my sister in a restaurant very loudly for like 30 minutes about how bad our Chinese

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was. And then everyone in the restaurant was looking at us, which is really funny, but I'd say out of 10, I would rate it like a four.

**Interviewer 6:30** A four, okay. And do you think that sort of disconnect between your culture has impacted any other relationships, like with your immediate family, extended family, community, or friends?

**Participant 6:45** Um, definitely, because I don't feel connected with my culture, I find it hard to interact with some of my family who are really connected, like they have all these superstitions that are all related to Chinese culture, and I just don't relate with that very well. I would say my mom especially, is very tied to Chinese culture, which is partly why she is the way she is. But I feel like that has degraded our relationship, because she expects me to be connected to our culture. But I don't feel like it.

**Interviewer 7:50** I see, okay. Okay, so you are a sibling. Are you the older one or the younger one?

**Participant 7:58** The younger one? But we are twins, so yeah.

**Interviewer 8:05** Okay, so would you say you're the more responsible twin compared to your sister?

**Participant 8:12** Um, like, navigating around our parents, yes, but actual, like, work around the house and also schoolwork, she's more responsible. I'd say I'm probably the one to like mediate conflicts more with my parents than [REDACTED], but she is definitely more responsible than me in terms of, like, work ethic. So okay.

**Interviewer 9:00** So you said you mediate. Did you ever feel like you had to be a third parent, kind of like be a bigger person?

**Participant 9:10** Yeah, I think over the summer, when me and my mom had a lot of fights, I felt like I had to be first of all, stopping the fights between her and Avery, and then also taking care of my mom afterwards and Avery afterwards. So it was kind of draining.

**Interviewer 9:55** Okay? And why was that specifically your job?

**Participant 10:02** I think it's because neither my mom or my sister were willing to, like, emotionally step up and be the bigger person. So a lot of times I felt that like if I didn't want an argument to break out, then I would just have them stop it myself.

**Interviewer 10:45** Okay, um, okay, focus on the time you explained your side of the story to your parent because they were too angry to understand it. How were you able to explain those feelings and emotions in a way that your parents could understand but was still respectful, if that ever happened?

**Participant 11:05** Would explaining my sister's emotions count?

**Interviewer 11:07** Yeah, okay.

**Participant 11:08** I think she herself doesn't communicate with them well, which is, I mean, fine for a fifteen year old.. But, like, I would probably have to explain it to my mom in a sense that, like, break it down, so that she would understand that [REDACTED] also is a human being with emotions just like her and like tell her how she does these things too. So it's understandable that her children would do it too. So that's how I would explain it to her. I think I remember a few times when this happened.

**Interviewer 12:10** Really okay, and you said you're typically the one who has to explain this, why does that responsibility fall on you?

**Participant 12:22** We haven't really tested [REDACTED] yet, but I think she's neurodivergent, but I don't think either of my parents want to admit that, because that would definitely make them view her differently. But I do think [REDACTED] is neurodivergent, which leads her to not be able to communicate as well with my neurotypical parents. And I'm pretty sure I'm at least somewhat neurotypical. I think I may have ADHD, but it makes it a lot easier for me to communicate with our parents.

**Interviewer 13:20** Did you ever feel that by vouching for your side, like explaining your side or your sister's side of the story to your parents, you were able to be more empathetic towards their opposing viewpoints, kind of like expanding your knowledge base?

**Participant 13:40** Yeah, I constantly feel like, I think for a while I felt too empathetic for their views, and it really stopped me from prioritizing myself and my sister. But I do always see, like, whenever I have a conversation with my mom or anything, that she's like in her own bubble where she doesn't know why we're always arguing. So, like during our arguments, if she says something like, "why you're doing this to me, it always kind of makes me sad, because she just doesn't know.

**Interviewer 14:45** Do you feel that you have gained a level of patience with talking to her?

**Participant 14:52** No, I think my patience has gone down. I think after a bunch of arguments, I think why are we still doing this? So I would say I used to have a lot more patience, but now I have a lot less.

**Interviewer 15:20** Okay, and is that just because the arguments are repetitive, or is it because you're older now, or are they getting worse?

**Participant 15:30** I think all of those factors play into it. I think both because we have similar arguments over and over again, and also because I'm old enough to realize that maybe this shouldn't be happening. And so the fact that we do get into arguments often makes me less patient, because, like, why are we doing this in the first place?

**Interviewer 16:05** So yeah, and just to clarify, you mentioned the arguments were about how you act, kind of like, yeah.

**Participant 16:12** It could also be about really random things, but mainly like, if I'm in a mood or something.

**Interviewer 16:25** Have you ever accomplished something and felt like you couldn't celebrate it with your parents?

**Participant 16:32** My answer is yes, but I actually can't remember anything off the top of my head. I just don't know why I can't remember it. Um, I would say yes. If I were to give, like, a general formula for how this would happen, I'd say if I got a good grade on a test that wasn't 100, I wouldn't tell them, but I'd be happy about it myself.

**Interviewer 17:15** And why did you choose that?

**Participant 17:20** Probably because they don't fully understand the extent to which I felt happy about it, because they're both not super involved in my life. So if I told them a lot of things out of context, they'd be like, "oh, yeah," and they wouldn't really understand.

**Interviewer 17:45** And how does that typically make you feel when you're not able to share those things?

**Participant 17:52** Sometimes upset, but I have a lot of friends to share the happy things that happened to me. So yeah, and they're also a lot more in tune to my life than my parents.

**Interviewer 18:15** So, does the fact that you're a twin ever affect your relationship with your parents? Like, has that affected how you communicated with them?

**Participant 18:25** Yes, I think because I'm a twin, they my mom and my dad both have to use up a lot more time and energy to provide for both of us. And I would also say, if I ever had any scheduling conflicts, it gets more complicated, because my sister might not have the same scheduling conflicts. And if I bring it up to them, then it's a big mess. So I would say, especially with my mom, if I changed my schedule last minute, then she would get upset, because there's also a lot of other things to deal with.

**Interviewer 19:15** Do you ever feel responsible for your parent's, sibling's, or being friends behavior when out in public?

**Participant 19:25** Yes, I'd say when I was little and I didn't understand that my sister may be neurodivergent, I was always like, why is she like this" But luckily I've gotten used to it, and she's chill. And my mom, lately, I think she's been trying too hard to be closer with us, and so she tries to get involved in a lot of things that we're doing, but it usually falls flat because she doesn't understand what we're doing in the first place, so it's a little embarrassing when she does that. And also, I think her English is not that great, so when she's communicating with people, it's a little bit awkward.

**Interviewer 20:00** And you have to step in and explain it to her?

**Participant 20:06** Yeah, sometimes.

**Interviewer 20:12** And what's the reason behind that? Like, why are you correcting her on her behavior?

**Participant 20:20** I think maybe I'm a little, you know, like, sometimes when I see her have her Chinese accent, I'm like, oh man, that's embarrassing. But I don't really have any other explanation. It's more for me. She's lived in America for twenty to thirty years now, and she's been fine. It's just sometimes when I see her, I'm like, that's my mom, so I have to correct her.

**Interviewer 21:05** How often do you have to explain things to your parents, whether it's how to act in public or dumbing down a social situation?

**Participant 21:15** I think my dad's a lot more in tune with our life. But for my mom, I'd have to explain a lot more to her, because I don't tell her a lot of things. If I were to be explaining something to my mom, I'd have to give her even more background information, because I don't tell her a lot of things about my life.

**Interviewer 21:45** So would you say you typically avoid having those conversations with her?

**Participant 21:52** Yeah, because I think if I told her a lot of stuff that's going on in my life, she would kind of twist it to be like, "Oh, you're achieving so much for me, and you're being such a great daughter." No, I don't think that's why I'm doing all this.

**Interviewer 22:15** And how did that relationship develop? Was it always like that?

**Participant 22:22** I think it actually swapped, because I used to tell my mom a lot of stuff, but after we started arguing a bunch during the summer, I felt a lot more emotional disconnect with her, and I just stopped talking with her for a bit. Now it's kind of better, but the emotions are still there, so I just don't tell her anything, because I don't want to.

**Interviewer 22:50** Have you ever felt emotionally drained after talking to your family?

**Participant 23:00** Oh, yeah, definitely after conversations with my mom where she has a very different mindset than me. After conversations with her that made me realize how different she is than me, like in what beliefs I hold, I feel like I have to either defend my position or just completely go against my beliefs and agree with her.

**Interviewer 23:35** So when you say beliefs, is it like moral standpoints or political beliefs?

**Participant 23:45** Political beliefs would apply to my dad. Very Republican. After talking in conversations with him about politics, me and my sister always leave really drained, because he's saying things and me and my sister will be like, huh Yeah, sure buddy. With my mom, I think it's a lot about moral standings. I argue with her about AI a lot, because I don't use it at all really, but my mom loves AI, she's obsessed. It's a boundary I wouldn't cross.

**Interviewer 24:35** Have you ever felt angry explaining these things to your parents?

**Participant 24:42** I'd say yes, especially when I'm arguing for something I'm so adamant about. I feel angry why they can't just understand where I'm coming from. When I'm still trying to argue for my own point, they usually never budge.

**Interviewer 25:10** Have you ever felt pressure to act a different way around your parents?

**Participant 25:20** Oh, for sure, because there's like a generational disconnect there. If I were to use slang, they wouldn't understand. I feel like they raised me in a way that they're not really friends with us, but they are like the authorities. I wouldn't really act like you're my friend.

**Interviewer 25:55** And would you say that you act differently mainly for them, or to avoid getting in trouble?

**Participant 26:05** To avoid getting in trouble. I think I have habits instilled in me from when I was little of them punishing me. Now I have those habits of just listening to them on whatever they tell me.

**Interviewer 26:35** Last question, have you ever felt like you had to omit information or hide truth from your parents for the sake of either not making them stressed or not getting in trouble?

**Participant 26:50** I was telling my mom about a friend's birthday party where she got into a car accident. No one was hurt, but it was pretty bad. That night, I got home a little late and my mom was like, you're a girl, you can't be sitting out late. I was gonna tell her about the car crash, and then I was like, you know, it might not be the best time for that. I never told her, because I knew she'd get really upset over the fact that my friend had a car crash. I wasn't even in the car. I just didn't want to be in conversation for that long about something that I can't control.

**Interviewer 27:50** Ok, perfect. Well I appreciate you coming out here and doing this interview. This meant a lot. Thank you!

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Interview Participants: 3746

**Interviewer 0:00** Before we get started I want to say that you have full liberty to omit from answering any questions without repercussions. Okay, state your full name and your student ID.

**Participant 0:06** [REDACTED]

**Interviewer 0:12** So how good is your relationship with your parents?

**Participant 0:18** I think I have a really good relationship with my parents. Aside from my mother, she and I are pretty distant. We have never really seen eye to eye on many things. She's a lot more emotional

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than I am, and a lot more emotionally invested in most things. I think I'm more like my father, but yeah, I'd go seven.

**Interviewer 1:00** Seven with both your parents?

**Participant 1:05** I'd go seven with my dad, maybe like a four with my mom.

**Interviewer 1:15** Okay, and why would you choose those numbers for your relationships?

**Participant 1:22** My mother and I are just very strained. After a complex moment in my life, and in her life, we drifted apart. I was having a very hard time in middle school. It was seventh grade, and I turned to harming myself. Obviously that alerted my mother, considering she's your mother, but after that, she's never really looked at me the same way. Even after the therapy and the medication, she never returned to how she was before then, and it's really put a strain on our relationship. With my dad, the disconnect is that even though he is the immigrant in our family, I seem more in tune with our culture. He's forgotten his native language. He doesn't talk to his parents; I talk to his parents more. I kind of hold it against him a little bit. He's super integrated into American society and isn't really in tune with his roots.

**Interviewer 2:45** I see, okay. So you said that you were the youngest, right? Youngest of two?

**Participant 2:52** Yes, I have my older brother, [REDACTED]. He went to [REDACTED]. He is 20 now, a business major at [REDACTED]. He's quiet, super quiet and kind of disconnected from our family. The second he got his driver's license, I don't know if I ever saw him; he had three-month stints where he just was gone. I don't have a super great relationship with him. We've never fought because we don't talk to each other. Living with him is like living with a roommate who has the night shift while you work a nine-to-five. We're familiar, but I don't think I've ever had a conversation with him that amounted to anything.

**Interviewer 4:00** Okay. Would you say that your relationship with your parents and siblings has affected you in any way, or was it always like that?

**Participant 4:10** Yeah, besides my mom, it's really always been that dynamic. It has pushed me to be more extroverted. Outside the home, there was nobody to talk to growing up, so I kind of never stopped talking. Now that I'm a little bit older, I'm assuming there's a correlation there. The house was always really quiet; we've never eaten a family dinner or anything. Everybody eats and goes to bed at different times. The entire house is like four roommates just sharing a house, not really like a family.

**Interviewer 5:15** And would you say that your parents struggle to see your point of view? Is it difficult for you to communicate on any level?

**Participant 5:25** It really depends on where it's coming from. My father usually understands where I am coming from. My mother is a very emotional woman, and I'm not. I wouldn't say I'm less sympathetic, but I'm less empathetic. She's the type of woman who will cry at a sad story, and I've never been that way. She thinks when somebody brings you a problem, you're supposed to do everything you can to get into it. I've

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always thought of it as "you broke up with your boyfriend, it's not the end of the world." That tough love has led to lots of disconnects and her accusing me of being unempathetic or self-centered.

**Interviewer 6:30** What would you say most of your arguments revolve around with both of your parents and siblings?

**Participant 6:40** I don't argue with my brother at all. With my father, most arguments are about house safety. Ever since I was eight, I'm the person who turns off the lights, locks the doors, and turns on the alarm. My dad doesn't do that, which leads to arguments at 2:00 AM about shutting the back door. I'm also a lot more frugal than him. With my mother, arguments are mostly about my friends' problems; she'll say I'm going about it the wrong way or that I have no empathy.

**Interviewer 7:50** Have you ever felt like you had to act as a parent in your household, like you had to be a bigger person?

**Participant 8:00** Yes, on occasion. When it comes to safety, my mom goes to bed at 9:00 PM, so she's out. My dad has an unconventional job that allows him to work whenever, so on a random Tuesday, he might get drinks with friends and pass out on the couch. I resent him for that because he leaves the doors open and unlocked. I know we live in Lake Travis, but come on, man. I feel like I have to be the person to budget that and get the family to talk to each other.

**Interviewer 9:15** Have you ever had to explain your siblings' or friends' side to your parent because they were too angry to see it? How did you feel trying to translate those emotions respectfully?

**Participant 9:30** It's hard to argue with my brother when he doesn't talk to anybody. But with friends, it's more complicated. My dad has a bit of an anger issue and is very stubborn. One day I mentioned meeting my friend Gail for coffee. Gail identifies as gender-fluid, so I was switching pronouns. My dad has a big problem with trans people because of some trauma earlier in his life where he felt wronged. Trying to explain that Gail isn't hurting anybody without screaming back at him was nearly impossible. It led to a fighting match that didn't end well.

**Interviewer 10:45** How did that make you feel? Did it ever feel like it was your responsibility to vouch for yourself and explain your side?

**Participant 10:55** Yes. I always feel like I have to stand up for me. Because if you don't stand up for you, who will?

**Interviewer 11:15** Do you feel like that is an injustice, or do you feel like this is normal and has always happened?

**Participant 11:22** It's not always been that way, but I've always had to stand up for me. I don't think that's necessarily a bad thing.

**Interviewer 11:35** Did you ever feel like by explaining your side to your parents, it allowed you to be more empathetic or gain new perspectives?

**Participant 11:45** I can see where my father is coming from when I explain things, but I still don't agree. I never understood why he had such a big problem with the gender-fluid thing until he told a story about my grandmother, my Nona. She married a woman named Papa Steve, but in the late 90s, Papa Steve transitioned. That led my Nona to attempt suicide on multiple occasions. When my dad told me that, it clicked—it makes sense why he feels that way—but I still don't think I can understand why he won't get past it.

**Interviewer 13:10** Have you ever accomplished something and felt like you couldn't share it with your parents?

**Participant 13:22** Yes, I won an International Poetry Award. I still haven't told my parents because my dad doesn't want me winning poetry awards; he wants me winning the science fair or UIL. They want me to be a doctor or an engineer or some STEM job I do not want. I was so proud, but I knew if I told them, it would be a problem of "Poets don't make money." I felt like I'd be scrutinized.

**Interviewer 14:30** Do you think that hinders your relationship, like you constantly have to tiptoe around them?

**Participant 14:40** I wouldn't constantly tiptoe, but I'm not open with them. I moved my poetry journal from an obvious place on my desk to under my bed. I just felt like if they found out, they'd ask why I'm pursuing this instead of something else.

**Interviewer 15:45** Because you were the youngest sibling, did you feel like that affected how you communicate with your parents?

**Participant 15:55** No, I've always felt like the oldest sibling. My brother was literally invisible; he had middle child syndrome even though he's older. My friends don't even know I have a brother because he just stayed in his room. I kind of always felt like an only child.

**Interviewer 17:00** Did you ever feel responsible for your parents', siblings', or even friends' behavior when out in public?

**Participant 17:15** I wouldn't say in public, I have very low social anxiety. But when our extended family comes in, I usually have to shelter them. My Poppy and Nona grew up in Italy post-WWII and were very anti-Semitic because their parents voted for Mussolini. My grandpa will see someone with a beard or hear about an expensive doctor and call them slurs. He also hates Chinese people and other types of Europeans. He'll tell me, "Don't act like the white people," which is wild because I'm the whitest person I know.

**Interviewer 19:15** Do you ever feel like it's your responsibility to restrict what he says?

**Participant 19:25** Yes. If I don't restrict him, he's actually going to get us in trouble for hate crimes. He talks about building gas chambers in the basement. He's really into World War II for all the wrong reasons. A big Mussolini fan.

**Interviewer 20:30** And why are you the one who has to restrict him instead of your parents?

**Participant 20:40** My dad doesn't seem to care as much. My mom is disconnected from that side; she's an eighth-generation immigrant, so she doesn't interact with them. My dad tried his best to separate himself from the Italian culture—he got rid of the accent and forgot the native tongue. I feel like when he sees them, it reminds him of things he tried to replace.

**Interviewer 21:50** On the scale of one to ten, how connected with your culture do you think you are?

**Participant 22:00** I would say a seven, while my father is a five. I learned Italian customs and we celebrate traditional holidays, but we aren't Catholic. We spoke more Spanish in our house than Italian, and I don't even know why.

**Interviewer 22:45** And you said you live with extended family, does that make you closer or hinder your relationship?

**Participant 22:55** My grandmother is right next door. She's the most liberal person in the family. We agree on most things and I understand her very well. Other than her, I have nothing on the rest of the extended family.

**Interviewer 23:45** How often do you have to explain things to your parents, whether it's slang, acting in public, or dumbing down social situations?

**Participant 23:55** No, never. They are very in tune with American culture. Occasionally they'll ask what a slang term means, but that's it.

**Interviewer 24:30** Have you ever felt emotionally drained after talking to your family?

**Participant 24:40** Yes, especially trying to get my side through to my mom. She cares so much about what people think. Trying to convince her it's okay to wear PJ pants to school is exhausting. Talking to my brother Charlie has no drainage; it's like talking to a brick wall, but he listens.

**Interviewer 25:15** Have you ever felt angry when you have to explain your side to your family?

**Participant 25:22** Always. I feel like everybody should be awarded the chance to explain what they are thinking.

**Interviewer 25:45** Have you ever felt pressured to act in a different way when around your parents?

**Participant 25:55** Absolutely not. I act how I act. Always.

**Interviewer 26:15** Have you ever felt embarrassed or annoyed when you had to explain your or your friends' emotions to your family?

**Participant 26:25** Annoyed, yes. Embarrassed, no. Everyone is entitled to their opinion.

**Interviewer 27:00** Recall a time you were in a car or at dinner and could feel an argument between your parents or yourself. How did you change your behavior to stop it?

**Participant 27:10** I try my best to not change my behavior. If you act one way around one person, you should be that way around everybody. I try to de-escalate, but usually, it turns into a screaming match.

**Interviewer 28:00** Have you ever felt like you had to omit information from your parents because you were worried about them being stressed?

**Participant 28:10** No. I try to tell them everything; I don't try to preserve their feelings at all.

**Interviewer 28:30** Would you describe yourself as a family mediator? Why or why not?

**Participant 28:40** There is no family mediator. I am not the mediator. I am very vocal about what I believe in.

**Interviewer 29:15** Okay, well thank you. Your EEG headset is probably bothering you, so we can wrap this up. Perfect.

## **Appendix H: Coding Handbook**

This coding process specifically uses thematic and narrative coding. The research looks at the overall story and feeling of the participants. The coding chart has four different domains or categories for our coding process: parentification, emotional labor, prosocial skills, performance burden. The chart looks at the participants' verbal responses and open-ended responses in the questionnaire to understand where participants fall in these categories.

*A Child's Guide to Parenting: The Psychological and Neurological Impact of Child Emotional Brokers  
Across Various Ethnic Backgrounds*

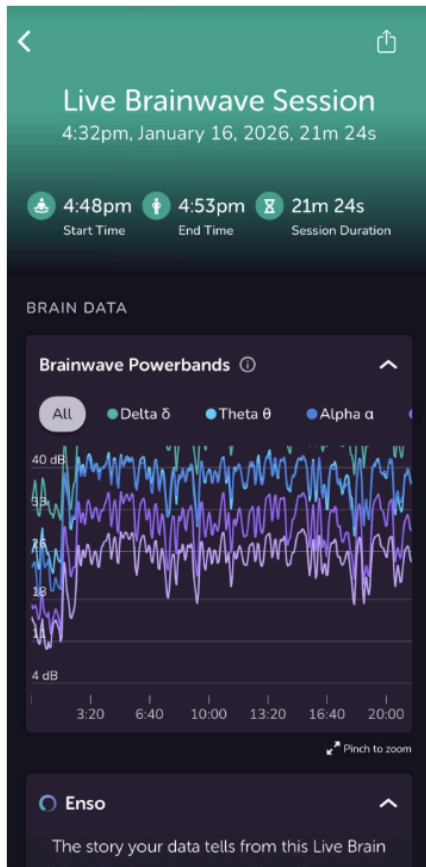
Score	Domain 1: Parentification
1	My parents handle everything; I just translate the occasional word.
2	I help with mail or simple menus, but I never feel like I'm in charge.
3	I explain social things to them, but they still make all the final decisions.
4	I feel like a consultant where they ask me what to do, then they do it.
5	In public or at the doctor, I'm the boss, but at home, I'm just the child.
6	I have to tell my siblings what to do because my parents don't understand.
7	I manage the communication between my parents and siblings to keep things running.
8	I am the one who handles the 'big talks' with my siblings because my parents cannot.
9	I feel responsible for the family's survival and I make adult-level choices daily.
10	I am the third parent and provide the emotional and social structure for the house.
	Domain 2: Emotional Labor
1	It feels completely natural and actually makes me happy to help.
2	It's just a thing I do and it doesn't take much out of me at all.
3	Sometimes I'd rather be doing something else, but it's generally fine.
4	I feel a bit tired after a long day of translating, but I move on quickly.
5	I get annoyed when I have to explain the same thing over and over again.
6	I have to hide my frustration so I don't hurt their feelings or cause drama.
7	I feel angry that I have to do this and it feels like a heavy chore.
8	After talking to my family, I need to be alone in my room to recover.
9	I feel trapped by these responsibilities and it's affecting my own mental health.
10	I feel completely drained, numb, or 'checked out' because the labor is too high.

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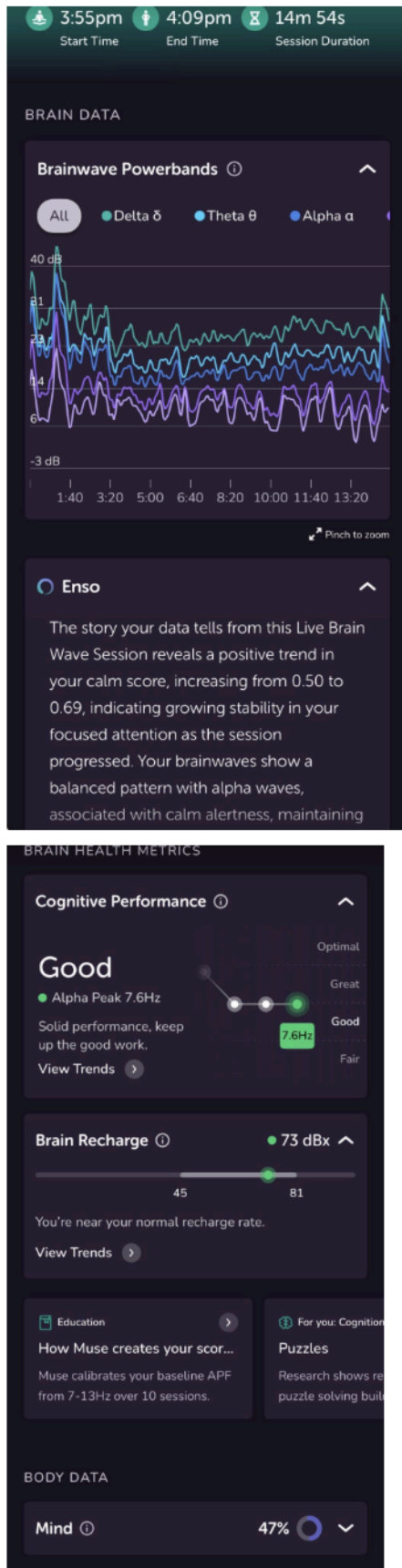
Domain 3: Prosocial Skill	
1	Brokering hasn't changed how I see people or the world at all.
2	I just translate words and I don't think about the emotions behind them.
3	I see that people have different views, but I don't really care about them personally.
4	It's taught me to be a bit more patient with people who don't understand things.
5	I started to realize how hard it is for my parents to live here and survive.
6	I know how to change my tone of voice specifically to get people to listen to me.
7	I can see both 'sides' of an argument, such as my sister versus my mom, clearly.
8	I translate the intent of the words so they don't fight and I choose words that protect them.
9	I feel like I have a superpower for understanding different backgrounds and religions.
10	Brokering made me who I am and I am an expert at mediating human emotions.
Domain 4: Performance Burden	
1	I can be messy, loud, or sad around my parents and I don't have to hide anything.
2	I share my wins and losses freely because my parents' stress is theirs, not mine.
3	I try not to add trouble to the house, but I don't feel like I have to be perfect.
4	I try to act like an 'adult' in public specifically to help our family's image.
5	I feel like I need to be successful to justify my parents' sacrifices for me.
6	I monitor my behavior closely to make sure I don't start any arguments or stress.
7	I hide my own stress or sadness so my parents don't have to worry about me.
8	I feel I must be the calm one because if I lose control, the whole family falls apart.
9	I cannot fail at anything and I feel like I'm performing a role twenty-four seven.
10	I don't even know who I am without the mask because my identity is purely 'the perfect child.'

## Appendix I: EEG Live Brainwave Graphs

These pictures showcase how the brainwaves get graphed in real-time during an interview and illustrate the different functions of the MUSE app that documents different forms of brain activity.



*A Child's Guide to Parenting: The Psychological and Neurological Impact of Child Emotional Brokers Across Various Ethnic Backgrounds*



## Appendix J: Coded Data

This is the link to all of our coded data including the numerical graphs from our EEG's and the coded qualitative version.

### [Numerically Coded Data](#)

The image shows a screenshot of a large spreadsheet with many columns and rows of numerical data. The spreadsheet is organized into several sections, with some rows highlighted in red. The columns appear to contain various numerical values, possibly representing EEG data points. The red highlights are scattered across the data, indicating specific rows of interest.

*A Child's Guide to Parenting: The Psychological and Neurological Impact of Child Emotional Brokers  
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Child to Perform	On a scale of 1-10	On a scale of 1-10, how	On a scale of 1-10, how	Psychological Stress	On a scale of 1-10, how	On a scale of 1-10, how	When translating, how of	Extroversion	Emotional Stability
10	3	7	2	9	5	2	7	27	9
10	1	4	1	4	3	1	4	67	16
5	1	2	1	3	5	1	3	46	43
8	1	3	1	1	2	1	2	67	52
6	2	1	1	2	1	6	2	57	22
6	2	2	1	2	2	1	7	16	19
6	1	4	1	7	4	2	9	54	45
8	3	5	2	9	5	6	5	88	48
6	2	2	1	5	1	1	7	13	57
6	1	6	2	3	4	3	5	54	39
7	1	3	1	7	1	8	6	88	43
7	1	5	3	1	6	6	5	9	4
7	1	2	1	3	1	1	5	81	52
6	1	7	2	3	7	8	7	38	48
5	7	5	3	1	3	2	8	88	48
7	1	8	5	2	5	3	5	41	52
8	5	9	3	4	9	6	7	93	48
8	4	3	5	4	3	1	6	81	19
10	1	8	1	5	7	1	5	98	19
5	2	6	1	2	6	3	6	90	16
7	1	3	1	3	3	3	5	70	81
7	1	2	2	1	1	1	2	58	32
8	2	4	4	2	3	4	4	29	70
4	1	5	1	4	5	3	3	22	48
5	1	2	1	7	1	3	2	27	48
5	1	1	1	4	2	2	1	74	48
8	7	3	6	4	3	2	3	81	9
5	1	2	1	5	1	2	2	98	92
5	2	1	1	2	1	2	1	54	93
8	1	1	1	3	1	6	3	91	23
8	1	3	2	2	2	1	8	23	91
10	8	8	3	5	8	5	10	73	23
4	7	10	3	6	6	10	3	74	99
8	1	3	1	7	2	6	1	73	23
1	1	1	1	2	1	5	1	72	31
3	3	1	1	1	3	6	2	43	54
8	2	2	1	8	1	3	1	22	14

*A Child's Guide to Parenting: The Psychological and Neurological Impact of Child Emotional Brokers Across Various Ethnic Backgrounds*

Emotional Stability	Agreeableness	Conscientiousness	Intellect/Imaginato	Domain 1	Domain 2	Domain 3	Domain 4	BPM	Alpha	Theta	Gamma	Beta	Delta	Stillness Sc	Calm Score
9	88	72	11	9	10	8	9	82	8.2	4.1	1.8	27.8	2.1	62	42
16	30	5	88	3	4	7	9	68	12.4	7.8	0.8	13.5	3.5	85	82
43	62	46	8	7	7	8	6	74	10.1	6.2	1.1	19.8	2.8	74	65
52	91	89	86	2	2	9	8	65	14.2	8.9	0.5	10.2	4.2	92	94
22	25	36	34	8	8	8	7	82	13.8	5.5	0.6	23.4	3.9	88	55
19	17	9	11	5	5	6	6	71	11.5	7.1	0.9	16.2	3.1	79	74
45	87	41	47	2	2	9	8	88	7.5	8.5	2.4	11.5	1.8	55	91
48	56	80	40	6	6	5	3	79	9.2	6.5	1.5	18.4	2.3	68	68
57	75	15	93	3	3	7	5	76	10.4	8.2	1.2	12.1	2.5	72	87
39	45	52	70	1	1	8	9	70	11.8	9.5	0.7	9.5	3.4	84	98
43	11	7	52	9	9	7	7	85	7.8	4.8	2.1	25.4	1.9	58	48
4	21	46	8	7	7	8	6	73	10.5	5.9	1	20.2	2.9	76	62
52	1	76	23	1	1	5	4	69	12.1	9.4	0.8	9.8	3.6	86	97
48	74	57	23	6	6	7	3	77	9.8	6.8	1.3	17.9	2.4	71	70
48	11	72	74	9	9	8	8	81	8.5	4.5	1.9	26.1	2	63	46
52	9	64	8	8	8	7	7	75	10.2	5.1	1.1	24.2	2.7	73	52
48	83	18	80	9	9	9	8	83	8.1	4.6	2	25.8	1.9	60	47
19	87	18	59	10	10	7	7	86	7.6	4	2.3	28.5	1.8	56	39
19	2	96	80	1	1	7	6	67	13.1	9.3	0.7	10.1	3.8	89	96
16	75	50	40	4	4	7	5	72	11.2	7.5	0.9	14.1	3	80	80
81	42	36	93	1	1	4	6	66	13.5	9.6	0.6	9.2	4	91	99
32	80	92	70	9	9	5	6	78	9.5	4.7	1.4	24.9	2.2	69	49
70	67	62	6	2	2	8	7	70	12.2	8.8	0.8	11.2	3.3	83	92
48	14	67	3	8	8	9	4	80	8.9	5.6	1.7	22.8	2.1	64	58
48	7	18	6	5	5	4	5	75	10.6	7.2	1.1	16.9	2.6	75	72
48	56	72	47	2	2	9	6	69	12.8	8.6	0.7	10.8	3.6	87	93
9	67	64	9	1	1	8	7	64	14.5	9.5	0.4	9.6	4.3	94	97
92	71	42	23	7	7	6	4	84	7.9	6.3	2.2	19.1	1.9	59	67
93	71	7	97	1	1	7	5	63	14.8	9.8	0.4	9.1	4.5	95	99
23	83	9	85	1	1	7	8	67	13.2	9.1	0.6	9.9	3.8	90	95
91	84	9	92	10	10	9	6	87	7.4	3.8	2.5	29.2	1.7	54	35
23	54	9	6	9	9	8	9	89	7.2	4.2	2.6	26.5	1.6	52	44
99	73	94	71	6	6	8	5	74	11.1	6.4	1	18.2	2.8	77	69
23	71	92	53	10	10	7	7	91	6.8	3.5	2.8	29.8	1.5	49	32
31	62	2	8	9	9	6	7	88	7.1	4.3	2.7	27.2	1.6	51	41
54	61	83	62	8	8	6	6	80	9.3	5.2	1.6	24.5	2.2	67	51
14	44	33	4	4	5	6	7	80	9.3	5.6	1.6	21.9	2.2	67	61

**Appendix K: XL Miner**

The link will take you to the XL miner which displays all of our correlations.

[XL Miner](#)

The image shows a large spreadsheet with multiple columns and rows of data. The data appears to be organized into sections, with some cells highlighted in yellow. The spreadsheet likely contains the correlation data mentioned in the text above.