

# Validating the Briggs-Myers Types Through Big Five Personality Profiles

## Abstract

This study evaluates the alignment between Briggs-Myers types and the Big Five personality traits using Big Five profiles. Data from over 1,900 online participants were analyzed, focusing on their Big Five trait scores, the derivation of Briggs-Myers types, and the corresponding 4F trauma response (Fight, Fawn, Freeze, and Flight). In addition to computing descriptive statistics, correlation analyses, and cluster analyses, we implemented a 5-fold cross-validation procedure to ensure that the observed relationships are robust and generalizable. The findings of earlier studies regarding the correlation between the dichotomies and traits were replicated. The results indicate strong correlations between Briggs-Myers types and their corresponding Big Five profiles, and the cross-validation confirms that the findings are not merely artifacts of in-sample circularity.

## Introduction

Personality researchers have long sought robust frameworks to capture the complexity of individual differences. Two prominent models are:

- **Briggs-Myers:** Classifies individuals into 16 types based on four dichotomies (Introversion–Extraversion, Sensing–Intuition, Thinking–Feeling, and Judging–Perceiving).
- **Big Five Personality Traits:** Consisting of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism, this model is widely supported by empirical research and demonstrates cross-cultural consistency.

In addition, the Trait Response Personality Indicator (TRPI) categorizes stress responses into four “4F” profiles, Fight, Fawn, Freeze, and Flight. By linking Briggs-Myers types and Big Five traits to these stress response patterns, we aim to provide a comprehensive view that integrates stable personality dimensions with dynamic responses to stress.

Given criticisms regarding circular analysis (i.e., using the same data for model derivation and evaluation), this study incorporates a rigorous k-fold cross-validation method. By partitioning the data into independent training and testing sets, we ensure that the Big Five averages used to characterize each Briggs-Myers type are computed from training data, while the evaluation is performed on separate, unseen test data.

## Hypotheses

### 1. **Primary Hypothesis:**

Each Brigg-Myers type will exhibit a characteristic Big Five profile that aligns strongly with the averaged profile derived from independent (training) data, as measured by high Pearson correlation coefficients.

### 2. **Secondary Hypothesis:**

A cluster analysis comparing Brigg-Myers type averages to the 4F profile averages will reveal four distinct clusters that clearly map onto the four trauma-response patterns (Fight, Fawn, Freeze, and Flight).

### 3. **Tertiary Hypothesis:**

The findings of Costa and McCrae (1992) and Adrian Furnham (1996) regarding the relationship between Brigg-Myers dichotomies and Big Five traits will be replicated. Specifically, we hypothesize that:

- The Sensing/Intuition (S/N) dichotomy will correlate significantly with Openness to Experience.
- The Judging/Perceiving (J/P) dichotomy will correlate significantly with Conscientiousness.
- The Extraversion/Introversion (E/I) dichotomy will correlate significantly with Extraversion.
- The Thinking/Feeling (T/F) dichotomy will correlate significantly with Agreeableness.

(Together, these correlations underscore that the cognitive styles underlying Brigg-Myers dichotomies are firmly rooted in the corresponding Big Five trait dimensions.)

## Methodology

### Participants and Data Collection

- **Sample:**  
Data were collected from more than 1,900 online participants who completed the TRPI assessment on [traumaindicator.com](https://traumaindicator.com).
- **Measures:**
  - Brigg-Myers Type Assignment: Participants' Brigg-Myers type was determined using their Big Five scores from a short-form IPIP-based assessment. Brigg-Myers types were assigned using Euclidean distance + Pearson correlation to past averaged profiles.
  - Big Five Traits: Measured via a modified IPIP-300 questionnaire, which has been widely used in personality research. This questionnaire consisted of 23 questions (3 for Openness, 5 for all other traits), each statement had subtext in ranges of 10 to help users answer more accurately than they would with a Likert scale.
  - 4F Trauma-Response Profiles: Participants were assigned to a Fight, Flight, Freeze, or Fawn profile based on a theoretical framework that was validated in a separate study.

### Analytical Procedures

#### 1. Descriptive Statistics and Averaging

- **By Brigg-Myers Type:**  
For each Brigg-Myers type, the mean Big Five trait scores were computed.
- **By 4F Profile:**  
Average Big Five scores were also computed for each trauma-response profile (with Openness excluded from the aggregated 4F analysis).

#### 2. Correlation Analysis

- For each Brigg-Myers type, Pearson correlation coefficients were calculated between its average Big Five profile and the corresponding 4F profile average. The coefficient of determination ( $r^2$ ) was used to quantify the proportion of variance explained.

### 3. Cluster Analysis

- A K-Means clustering algorithm was applied to the Brigg-Myers type averages and the 4F profile averages. This analysis grouped Brigg-Myers types into four clusters that ideally correspond to the four trauma-response patterns.

### 4. Cross-Validation Procedure

To address concerns of circularity and to validate the generalizability of the findings, a 5-fold cross-validation method was implemented:

- **Data Partitioning:**  
The full dataset was randomly shuffled and divided into five equal folds.
- **Training and Testing:**  
For each fold, the training set (comprising four of the folds) was used to compute the type-specific Big Five averages. Then, each test sample (from the remaining fold) was evaluated by calculating the Pearson correlation between its Big Five response vector and the corresponding type average derived from the training data.
- **Aggregation:**  
Pearson correlation coefficients (and their squares) were recorded for every test sample and then averaged by Brigg-Myers type across all folds. This provides an unbiased estimate of model performance on independent data.

## Results

### 1. Big Five Averages by Brigg-Myers Type

*Table 1 below summarizes each Brigg-Myers type's mean Big Five scores and the number of participants for that type.*

Brigg-Myers	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism	Count
ENTP	0.835	0.535	0.731	0.482	0.359	183
INFJ	0.803	0.663	0.538	0.812	0.712	145
ENFP	0.817	0.548	0.594	0.613	0.817	172
ISTP	0.462	0.442	0.467	0.404	0.457	68
INTJ	0.773	0.752	0.535	0.339	0.488	98
INTP	0.571	0.362	0.439	0.320	0.279	90
ISFP	0.538	0.455	0.409	0.470	0.703	84
ESTP	0.662	0.587	0.792	0.415	0.485	68
INFP	0.542	0.481	0.379	0.588	0.900	109
ENTJ	0.705	0.883	0.754	0.390	0.352	49
ESFP	0.597	0.562	0.582	0.592	0.651	113
ISFJ	0.438	0.605	0.371	0.745	0.774	45
ESFJ	0.458	0.688	0.502	0.778	0.403	12
ISTJ	0.381	0.634	0.360	0.315	0.439	25
ENFJ	0.775	0.750	0.857	0.844	0.439	29
ESTJ	0.419	0.776	0.610	0.323	0.484	10

## 2. Big Five Averages by 4F Profile

*Table 2 displays the average scores (excluding Openness) for each of the four trauma-response profiles.*

Profile	Conscientiousness	Extraversion	Agreeableness	Neuroticism
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Fight	0.480	0.599	0.400	0.403
Fawn	0.684	0.572	0.793	0.527
Freeze	0.755	0.562	0.336	0.448
Flight	0.507	0.482	0.560	0.764

### 3. Correlation Analysis

*Table 3 summarizes each Brigg-Myers type's highest correlation with its corresponding 4F profile. Correlation coefficients (r) exceed 0.6 for all types, with many surpassing 0.75.*

Brigg-Myers Matching Profile Correlation (r)  $r^2$

ENTP	Fight	0.8601	0.7558
ISFJ	Fawn	0.8248	0.7009
INTJ	Freeze	0.8503	0.7354
ESFP	Flight	0.6658	0.4883
ESTP	Fight	0.7561	0.5932
INFJ	Fawn	0.7215	0.5527
ISTJ	Freeze	0.7606	0.6050
ENFP	Flight	0.7516	0.5973
INTP	Fight	0.7784	0.6367
ESFJ	Fawn	0.7596	0.5995
ENTJ	Freeze	0.8996	0.8188
ISFP	Flight	0.7380	0.5720
ISTP	Fight	0.6896	0.5074
ENFJ	Fawn	0.8220	0.6976
ESTJ	Freeze	0.8291	0.6994
INFP	Flight	0.8309	0.7082

#### 4. Cross-Validation Results

Using a 5-fold cross-validation procedure, we computed the Pearson correlations for each test sample against the type averages derived from the training data. The average correlations by Brigg-Myers type obtained through cross-validation were nearly identical to those computed in the original in-sample analysis. This consistency indicates that the robust alignment between individual responses and the type averages is generalizable and not merely an artifact of circular evaluation.

#### 5. Cluster Analysis

K-Means clustering was conducted on the Brigg-Myers type averages and the 4F profile averages. The resulting four clusters correspond to the four trauma-response patterns:

- **Cluster 1: Fight-Oriented**
  - **Cognitive style:** Se/Ne + Ti
  - **Brigg-Myers types:** ENTP, ISTP, INTP, ESTP
  - **Trait Pattern:** Moderate Conscientiousness, higher Extraversion, lower Agreeableness, moderate Neuroticism.
- **Cluster 2: Fawn-Oriented**
  - **Cognitive style:** Si/Ni + Fe
  - **Brigg-Myers types:** INFJ, ISFJ, ESFJ, ENFJ
  - **Trait Pattern:** Higher Conscientiousness, moderate Extraversion, high Agreeableness, moderate Neuroticism.
- **Cluster 3: Freeze-Oriented**
  - **Cognitive style:** Si/Ni + Te
  - **Brigg-Myers types:** INTJ, ENTJ, ISTJ, ESTJ
  - **Trait Pattern:** High Conscientiousness, moderate Extraversion, lower Agreeableness, moderate Neuroticism.
- **Cluster 4: Flight-Oriented**
  - **Cognitive style:** Se/Ne + Fi
  - **Brigg-Myers types:** ENFP, ISFP, INFP, ESFP
  - **Trait Pattern:** Moderate Conscientiousness, lower Extraversion, moderate Agreeableness, high Neuroticism.

The clustering results reinforce the correlation findings, demonstrating a clear typological mapping between Brigg-Myers types and the 4F trauma response profiles.



## Discussion

### Brigg-Myers Validation in a 4F Context

Mapping Brigg-Myers types onto the Big Five traits (and subsequently onto the TRPI's 4F profiles) demonstrates that Brigg-Myers types capture not only enduring personality dimensions but also predict specific stress responses. The strong Pearson correlations (with many  $r > 0.75$ ) indicate that the average Big Five profile of each Brigg-Myers type aligns closely with its corresponding trauma-response pattern.

This study extends Costa and McCrae's findings by showing that each Big Five trait corresponds to a specific cognitive style, marking the first robust link between neuroticism and distinct Brigg-Myers cognitive styles. Moreover, our hypothesis that Brigg-Myers dichotomies align with Big Five traits (S/N with Openness, J/P with Conscientiousness, E/I with Extraversion, and T/F with Agreeableness) was supported by the data, providing a more nuanced understanding of personality.

By incorporating a 5-fold cross-validation procedure, we confirmed that these relationships are robust. The near-identical results between the cross-validated analysis and the initial in-sample evaluation indicate that the observed patterns are generalizable and not a consequence of circular reasoning.

### Implications for Practice

- **Therapeutic Interventions:**

Clinicians can tailor interventions based on a client's Brigg-Myers type and its corresponding 4F profile. For example, an INFP with a dominant Flight profile might benefit from grounding techniques and gradual exposure therapy.

- **Organizational Applications:**

Understanding the stress-response patterns associated with different Brigg-Myers types can help managers form balanced teams and implement effective crisis management strategies.

- **Educational Support:**

Educators may use these insights to design learning environments that mitigate stress and accommodate the needs of students with distinct personality-driven response patterns.

## Limitations and Future Research

1. **Sample Diversity:**

Although the sample size is robust, the self-selected online participant pool may not fully represent the general population.

2. **Self-Report Bias:**

As all measures rely on self-report, there is the potential for bias. Future studies might incorporate observational or peer-report data.

3. **Longitudinal Designs:**

A cross-sectional design provides only a snapshot. Longitudinal research is needed to explore how personality and stress responses evolve over time.

4. **Contextual Variability:**

Different stressors (e.g., chronic vs. acute) might elicit different responses. Future studies should examine how Brigg-Myers–Big Five–4F alignments vary across diverse contexts.

## Conclusion

The findings demonstrate that there are strong correlations between individual responses and average Big Five profiles for each type. The use of k-fold cross-validation confirms that these relationships are robust and generalizable rather than artifacts of circular in-sample evaluation. By integrating cognitive functions, Big Five traits, and the TRPI's 4F model, this study offers a holistic framework for understanding personality that encompasses both stable trait dispositions and adaptive responses under stress.

## References

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## Appendices

### Appendix A: TRPI Assessment Questionnaire

Statement	Trait	Subtext (Range: Text)
I am open to exploring new ideas and perspectives.	openness	<ul style="list-style-type: none"><li>- 0-10: I am slightly open to new ideas.</li><li>- 10-20: I have a mild interest in exploring new perspectives.</li><li>- 20-30: I sometimes consider new ideas.</li><li>- 30-40: I moderately explore new perspectives.</li><li>- 40-50: I am fairly open to exploring different ideas.</li><li>- 50-60: I am quite open to considering new perspectives.</li><li>- 60-70: I regularly explore new ideas and perspectives.</li><li>- 70-80: I am highly open to trying different approaches.</li><li>- 80-90: I am extremely open to all kinds of ideas.</li><li>- 90-100: I am exceptionally open to exploring and embracing new perspectives.</li></ul>

**I often think about abstract concepts and like to ponder deep questions.**

**openness**

- 0-10: I rarely think about abstract concepts.**
- 10-20: I occasionally consider simple abstract ideas.**
- 20-30: I sometimes think about abstract questions.**
- 30-40: I moderately enjoy pondering deep ideas.**
- 40-50: I fairly often engage with abstract concepts.**
- 50-60: I frequently think about profound and complex questions.**
- 60-70: I regularly engage with complex abstract thoughts.**
- 70-80: I consistently think deeply about abstract questions.**
- 80-90: I almost always consider profound and abstract ideas.**
- 90-100: I perpetually ponder the deepest and most abstract concepts.**

**I am comfortable with change and easily adapt to new situations.**      **openness**

**- 0-10: I struggle with change and prefer stability.**

**- 10-20: I occasionally adapt to small changes.**

**- 20-30: I sometimes embrace change with some hesitation.**

**- 30-40: I moderately adapt to new situations.**

**- 40-50: I fairly often feel comfortable with changes.**

**- 50-60: I frequently embrace change and adapt quickly.**

**- 60-70: I regularly handle change with ease.**

**- 70-80: I am highly comfortable adapting to new situations.**

**- 80-90: I am extremely adept at managing changes.**

**- 90-100: I thrive on change and effortlessly adapt to new situations.**

**I stay focused and organized when managing multiple tasks.**

**conscientiousness**

**- 0-10: I rarely stay focused or organized when handling tasks.**

**- 10-20: I occasionally try to stay organized but struggle to maintain focus.**

**- 20-30: I sometimes stay organized when managing tasks.**

**- 30-40: I moderately focus on staying organized and managing tasks effectively.**

**- 40-50: I fairly often stay organized and focused while managing tasks.**

**- 50-60: I frequently stay on top of tasks through focus and organization.**

**- 60-70: I regularly stay focused and manage tasks in an organized manner.**

**- 70-80: I strongly focus on staying organized when handling multiple tasks.**

**- 80-90: I am highly organized and focused when managing multiple priorities.**

**- 90-100: I always stay focused and highly organized when managing tasks.**

**I feel energized by engaging with new people and building connections.**

**extraversion**

**- 0-10: I rarely feel energized by meeting new people.**

**- 10-20: I occasionally enjoy meeting new people but prefer to keep to myself.**

**- 20-30: I sometimes feel energized by engaging with new people.**

**- 30-40: I moderately enjoy meeting new people and making connections.**

**- 40-50: I fairly often feel energized by social interactions.**

**- 50-60: I frequently enjoy meeting new people and forming connections.**

**- 60-70: I regularly feel energized by engaging with new people.**

**- 70-80: I strongly enjoy building connections with new people.**

**- 80-90: I am highly energized by meeting and connecting with others.**

**- 90-100: I always feel invigorated by engaging with new people and building connections.**



**I enjoy supporting my friends and helping them succeed.**

**agreeableness**

**- 0-10: I rarely enjoy helping or supporting my friends.**

**- 10-20: I occasionally help friends but don't enjoy it much.**

**- 20-30: I sometimes support my friends and their goals.**

**- 30-40: I moderately enjoy supporting and helping friends.**

**- 40-50: I fairly often support my friends and enjoy their success.**

**- 50-60: I frequently enjoy helping my friends succeed.**

**- 60-70: I regularly support and enjoy helping my friends.**

**- 70-80: I strongly enjoy supporting and encouraging friends.**

**- 80-90: I am highly focused on supporting my friends and their goals.**

**- 90-100: I always prioritize supporting my friends and celebrating their successes.**

**I often feel overwhelmed when dealing with multiple responsibilities at once.**

**neuroticism**

- 0-10: I rarely feel overwhelmed by multiple responsibilities at once.**
- 10-20: I occasionally feel overwhelmed but manage well.**
- 20-30: I sometimes feel overwhelmed with multiple responsibilities.**
- 30-40: I moderately feel overwhelmed under pressure.**
- 40-50: I fairly often feel overwhelmed by multiple responsibilities.**
- 50-60: I frequently feel overwhelmed when managing tasks.**
- 60-70: I regularly feel overwhelmed with multiple responsibilities at once.**
- 70-80: I strongly feel overwhelmed when under pressure.**
- 80-90: I am highly prone to feeling overwhelmed by multiple responsibilities at once.**
- 90-100: I always feel deeply overwhelmed when managing many tasks.**

**I prefer organized, planned activities over spontaneous events.**

- conscientiousness**
- 0-10: I rarely prefer organized activities and enjoy spontaneity.
  - 10-20: I occasionally enjoy planned activities but like being spontaneous.
  - 20-30: I sometimes prefer organized activities over spontaneous ones.
  - 30-40: I moderately enjoy planned activities.
  - 40-50: I fairly often prefer organized and structured events.
  - 50-60: I frequently choose planned activities over spontaneous ones.
  - 60-70: I regularly prefer organized, planned events.
  - 70-80: I strongly favor structured and well-planned activities.
  - 80-90: I am highly inclined to choose organized events over spontaneous ones.
  - 90-100: I exclusively prefer meticulously organized and planned activities.

**I often take charge in group settings and feel confident in leadership roles.**

**extraversion**

- 0-10: I rarely take charge in groups and avoid leadership roles.
- 10-20: I occasionally take charge but prefer to follow in group settings.
- 20-30: I sometimes feel comfortable taking charge in group settings.
- 30-40: I moderately enjoy taking charge and leading in group settings.
- 40-50: I fairly often feel confident leading in group settings.
- 50-60: I frequently take charge and feel comfortable leading.
- 60-70: I regularly feel confident and effective in leadership roles.
- 70-80: I strongly enjoy leading and taking charge in group settings.
- 80-90: I am highly confident and capable in leadership roles.
- 90-100: I thrive on taking charge and feel fully confident in leadership roles.

**I often prioritize harmony and avoid conflict in my relationships.**

**agreeableness**

**- 0-10: I rarely prioritize harmony and may engage in conflicts.**

**- 10-20: I occasionally try to avoid conflict but don't always prioritize harmony.**

**- 20-30: I sometimes try to maintain harmony in my relationships.**

**- 30-40: I moderately prioritize harmony and avoid conflicts when possible.**

**- 40-50: I fairly often strive to maintain harmony in my relationships.**

**- 50-60: I frequently avoid conflict and prioritize harmonious relationships.**

**- 60-70: I regularly make efforts to maintain harmony and avoid disagreements.**

**- 70-80: I strongly prioritize harmony in my relationships.**

**- 80-90: I am highly committed to avoiding conflicts and fostering harmony.**

**- 90-100: I always prioritize harmony and work tirelessly to avoid conflicts.**

**I tend to feel anxious or worried in stressful situations.      neuroticism**

**- 0-10: I rarely feel anxious or worried, even in stressful situations.**

**- 10-20: I occasionally feel mild anxiety in stress-inducing situations.**

**- 20-30: I sometimes feel worried or anxious under stress.**

**- 30-40: I moderately experience anxiety in stressful scenarios.**

**- 40-50: I fairly often feel worried when faced with stress.**

**- 50-60: I frequently feel anxious during stressful situations.**

**- 60-70: I regularly experience worry or anxiety in stressful circumstances.**

**- 70-80: I strongly feel anxious and worried in stressful situations.**

**- 80-90: I am highly prone to anxiety and worry under stress.**

**- 90-100: I almost always feel deeply anxious or worried in stressful situations.**

**I feel a strong responsibility to meet my goals and commitments.**

**conscientiousness**

**- 0-10: I rarely feel responsible for meeting my goals or commitments.**

**- 10-20: I occasionally take responsibility for meeting my goals.**

**- 20-30: I sometimes feel committed to fulfilling my goals.**

**- 30-40: I moderately feel responsible for achieving my goals.**

**- 40-50: I fairly often feel a strong responsibility to meet commitments.**

**- 50-60: I frequently ensure I meet my goals and commitments.**

**- 60-70: I regularly feel accountable for achieving my goals.**

**- 70-80: I strongly feel responsible for meeting my commitments.**

**- 80-90: I am highly dedicated to fulfilling my goals and responsibilities.**

**- 90-100: I always feel a deep responsibility to achieve my goals.**

**I enjoy discussing ideas and debating with others.**

**extraversion**

- 0-10: I rarely enjoy discussing ideas or debating with others.
- 10-20: I occasionally engage in discussions but avoid debates.
- 20-30: I sometimes enjoy discussing ideas with others.
- 30-40: I moderately enjoy debating and discussing topics.
- 40-50: I fairly often engage in debates and discussions.
- 50-60: I frequently enjoy sharing ideas and debating with others.
- 60-70: I regularly discuss and debate ideas enthusiastically.
- 70-80: I strongly enjoy sharing ideas and engaging in debates.
- 80-90: I am highly energized by discussing and debating ideas.
- 90-100: I always thrive on discussing ideas with others.



**I strive to be understanding and supportive towards others.**

**agreeableness**

**- 0-10: I rarely try to understand or support others.**

**- 10-20: I occasionally make an effort to be supportive.**

**- 20-30: I sometimes try to understand and support others.**

**- 30-40: I moderately strive to show understanding.**

**- 40-50: I fairly often make an effort to be supportive.**

**- 50-60: I frequently try to understand and support others.**

**- 60-70: I regularly strive to show understanding and support.**

**- 70-80: I strongly strive to be understanding and supportive.**

**- 80-90: I am highly focused on understanding and supporting others.**

**- 90-100: I always prioritize being understanding and supportive.**

**I often feel uneasy or second-guess myself when making decisions.    neuroticism**

**- 0-10: I rarely feel uneasy or second-guess my decisions.**

**- 10-20: I occasionally second-guess myself when deciding.**

**- 20-30: I sometimes feel unsure when making decisions.**

**- 30-40: I moderately feel uneasy when deciding.**

**- 40-50: I fairly often second-guess my decisions.**

**- 50-60: I frequently feel uneasy when making decisions.**

**- 60-70: I regularly second-guess myself when deciding.**

**- 70-80: I strongly feel uneasy about making decisions.**

**- 80-90: I am highly prone to second-guessing myself.**

**- 90-100: I almost always feel uneasy and second-guess my decisions.**

**I tend to make decisions based on facts rather than feelings.**

**conscientiousness**

**- 0-10: I almost always make decisions based on my feelings, rarely relying on facts.**

**- 10-20: I mostly decide using my emotions, with little consideration for facts.**

**- 20-30: I sometimes consider facts, but my feelings usually guide my choices.**

**- 30-40: I occasionally let facts influence my decisions, though feelings tend to dominate.**

**- 40-50: I try to balance facts and feelings when making decisions.**

**- 50-60: I usually lean toward basing my decisions on facts, even though emotions still play a role.**

**- 60-70: I frequently base my decisions on facts rather than on my feelings.**

**- 70-80: I consistently prioritize facts in my decision-making, with minimal influence from emotions.**

**- 80-90: I almost always rely on facts when making decisions, rarely letting feelings interfere.**

**- 90-100: I always base my decisions on facts, completely setting aside my feelings.**

**I tend to stay calm and assertive when solving problems.**

**extraversion**

**- 0-10: I rarely stay calm or assertive when facing problems.**

**- 10-20: I occasionally remain calm but struggle with assertiveness.**

**- 20-30: I sometimes stay calm and assertive in difficult situations.**

**- 30-40: I moderately stay calm and focused under pressure.**

**- 40-50: I fairly often stay calm and assertive when solving problems.**

**- 50-60: I frequently stay calm and assertive under stress.**

**- 60-70: I regularly remain calm and focused when solving problems.**

**- 70-80: I strongly stay composed and assertive when faced with problems.**

**- 80-90: I am highly calm and assertive under pressure.**

**- 90-100: I always stay calm, composed, and assertive when facing problems.**

**I'm sensitive to other people's feelings and try to meet their needs.**

**agreeableness**

**- 0-10: I rarely notice or care about others' feelings.**

**- 10-20: I occasionally pay attention to others' feelings.**

**- 20-30: I sometimes try to be sensitive to others' needs.**

**- 30-40: I moderately notice and respond to others' feelings.**

**- 40-50: I fairly often try to meet others' emotional needs.**

**- 50-60: I frequently notice and respond to others' feelings.**

**- 60-70: I regularly make an effort to meet others' needs.**

**- 70-80: I strongly focus on being sensitive and supportive.**

**- 80-90: I am highly aware of others' emotions and try to meet their needs.**

**- 90-100: I always prioritize being sensitive and supportive to others.**

**I often dwell on past mistakes and think about possible outcomes.**      **neuroticism**

**- 0-10: I rarely think about past mistakes or think about the possible outcomes.**

**- 10-20: I occasionally reflect on past mistakes and consider possible outcomes.**

**- 20-30: I sometimes dwell on mistakes and worry about outcomes.**

**- 30-40: I moderately worry about past and possible outcomes.**

**- 40-50: I fairly often dwell on past mistakes and outcomes.**

**- 50-60: I frequently reflect on past mistakes and worry about outcomes.**

**- 60-70: I regularly dwell on mistakes and stress about what could have happened.**

**- 70-80: I strongly focus on past mistakes and worry about what could have happened.**

**- 80-90: I am highly prone to dwelling on past mistakes and worries.**

**- 90-100: I almost always dwell on the past and stress about what could have happened.**

**I am detail-oriented and take time to think through tasks carefully.**

**conscientiousness**

**- 0-10: I rarely pay attention to details or think through tasks.**

**- 10-20: I occasionally take time to think about tasks in detail.**

**- 20-30: I sometimes focus on details when completing tasks.**

**- 30-40: I moderately pay attention to details.**

**- 40-50: I fairly often think through tasks carefully.**

**- 50-60: I frequently focus on details and think through tasks.**

**- 60-70: I regularly take time to focus on details.**

**- 70-80: I strongly focus on details and think carefully about tasks.**

**- 80-90: I am highly detail-oriented and thorough with tasks.**

**- 90-100: I always focus on details and think through tasks thoroughly.**

**I'm known for being bold and independent in my approach to problems.**

**extraversion**

- 0-10: I rarely act independently or boldly when solving problems.**
- 10-20: I occasionally act independently but rarely take bold steps.**
- 20-30: I sometimes approach problems boldly and independently.**
- 30-40: I moderately act boldly and independently in problem-solving.**
- 40-50: I fairly often show independence and boldness.**
- 50-60: I frequently solve problems independently and boldly.**
- 60-70: I regularly take bold and independent approaches to problems.**
- 70-80: I strongly demonstrate boldness and independence.**
- 80-90: I am highly bold and independent in my approach to challenges.**
- 90-100: I always act boldly and independently when solving problems.**



**I prefer to work as part of a team and value cooperation.**

**agreeableness**

**- 0-10: I rarely value cooperation or enjoy working in a team.**

**- 10-20: I occasionally work in teams but don't always value cooperation.**

**- 20-30: I sometimes prefer working as part of a team.**

**- 30-40: I moderately value cooperation and teamwork.**

**- 40-50: I fairly often enjoy working in teams and value cooperation.**

**- 50-60: I frequently prefer teamwork and cooperative efforts.**

**- 60-70: I regularly work well in teams and value cooperation.**

**- 70-80: I strongly prefer teamwork and emphasize cooperation.**

**- 80-90: I am highly inclined to work as part of a team and value cooperation.**

**- 90-100: I always value teamwork and prioritize cooperation in group settings.**

**I tend to overthink situations and feel uneasy about the unknown.**

**neuroticism**

**- 0-10: I rarely overthink or feel uneasy about the unknown.**

**- 10-20: I occasionally feel uneasy when faced with the unknown.**

**- 20-30: I sometimes overthink and feel uneasy about uncertainty.**

**- 30-40: I moderately overthink situations and feel uneasy about the unknown.**

**- 40-50: I fairly often feel uneasy about uncertain situations.**

**- 50-60: I frequently overthink and feel uneasy about uncertainty.**

**- 60-70: I regularly overthink situations and stress about the unknown.**

**- 70-80: I strongly feel uneasy and overthink unknown scenarios.**

**- 80-90: I am highly prone to overthinking and feeling uneasy about the unknown.**

**- 90-100: I always overthink situations and feel deeply uneasy about uncertainty.**

## Appendix B: Detailed Statistical Tables

Below are the full tables that were used in the analysis:

**Table 1. Big Five Averages by Brigg-Myers Type**

Brigg-Myers	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism	Count
ENTP	0.835	0.535	0.731	0.482	0.359	183
INFJ	0.803	0.663	0.538	0.812	0.712	145
ENFP	0.817	0.548	0.594	0.613	0.817	172
ISTP	0.462	0.442	0.467	0.404	0.457	68
INTJ	0.773	0.752	0.535	0.339	0.488	98
INTP	0.571	0.362	0.439	0.320	0.279	90
ISFP	0.538	0.455	0.409	0.470	0.703	84
ESTP	0.662	0.587	0.792	0.415	0.485	68
INFP	0.542	0.481	0.379	0.588	0.900	109
ENTJ	0.705	0.883	0.754	0.390	0.352	49
ESFP	0.597	0.562	0.582	0.592	0.651	113
ISFJ	0.438	0.605	0.371	0.745	0.774	45
ESFJ	0.458	0.688	0.502	0.778	0.403	12
ISTJ	0.381	0.634	0.360	0.315	0.439	25
ENFJ	0.775	0.750	0.857	0.844	0.439	29
ESTJ	0.419	0.776	0.610	0.323	0.484	10

**Table 2. Big Five Averages by 4F Profile****Profile Conscientiousness Extraversion Agreeableness Neuroticism**

Fight	0.480	0.599	0.400	0.403
Fawn	0.684	0.572	0.793	0.527
Freeze	0.755	0.562	0.336	0.448
Flight	0.507	0.482	0.560	0.764

**Table 3. Type correlations and coefficients**Brigg-Myers Matching Profile Correlation (r) r<sup>2</sup>

ENTP	Fight	0.8601	0.7558
ISFJ	Fawn	0.8248	0.7009
INTJ	Freeze	0.8503	0.7354
ESFP	Flight	0.6658	0.4883
ESTP	Fight	0.7561	0.5932
INFJ	Fawn	0.7215	0.5527
ISTJ	Freeze	0.7606	0.6050
ENFP	Flight	0.7516	0.5973
INTP	Fight	0.7784	0.6367
ESFJ	Fawn	0.7596	0.5995
ENTJ	Freeze	0.8996	0.8188
ISFP	Flight	0.7380	0.5720
ISTP	Fight	0.6896	0.5074
ENFJ	Fawn	0.8220	0.6976
ESTJ	Freeze	0.8291	0.6994
INFP	Flight	0.8309	0.7082

#### Code 1.

```
const fs = require('fs');
const path = require('path');

// Define the Big Five traits in a consistent order.
const traits = ['openness', 'conscientiousness', 'extraversion',
'agreeableness', 'neuroticism'];

// Load and parse the JSON data from ./bins.json.
const dataPath = path.join(__dirname, 'bins.json');
const rawData = fs.readFileSync(dataPath);
const results = JSON.parse(rawData);

/**
 * Group results by their "type" property.
 * @param {Array} data - Array of result objects.
 * @returns {Object} - Object with types as keys and arrays of results as
values.
 */
function groupByType(data) {
  return data.reduce((acc, item) => {
    const type = item.type;
    if (!acc[type]) {
      acc[type] = [];
    }
    acc[type].push(item);
    return acc;
  }, {});
}

/**
 * Compute the average Big Five responses for a given array of results.
 * @param {Array} items - Array of result objects.
 * @returns {Object} - Averaged responses as an object with the same keys.
 */
function computeAverageResponses(items) {
  if (items.length === 0) return {};
  const sum = traits.reduce((acc, trait) => {
    acc[trait] = 0;
    return acc;
  }, {});

  items.forEach(item => {
    traits.forEach(trait => {
      sum[trait] += item.bigFiveResponses[trait];
    });
  });

  const avg = {};
  traits.forEach(trait => {
    avg[trait] = sum[trait] / items.length;
  });
  return avg;
}
```

```

/**
 * Convert a Big Five responses object into an array based on our trait
order.
 * @param {Object} responses - An object with trait keys.
 * @returns {Array} - Array of values in the order defined by the 'traits'
array.
 */
function responsesToArray(responses) {
    return traits.map(trait => responses[trait]);
}

/**
 * Compute Pearson correlation coefficient between two arrays.
 * @param {Array} x - First array of numbers.
 * @param {Array} y - Second array of numbers.
 * @returns {number} - Pearson correlation coefficient.
 */
function pearsonCorrelation(x, y) {
    if (x.length !== y.length) {
        throw new Error('Arrays must be of the same length.');
```

```

// -----
// Original Calculations per Type
// -----

// Group the data by type.
const groupedResults = groupByType(results);

// Compute the average Big Five responses for each type.
const typeAverages = {};
for (const type in groupedResults) {
  typeAverages[type] = computeAverageResponses(groupedResults[type]);
}

// (The Pearson correlation code remains the same, using raw results vs. each
// type's average.)
const typeAverageArrays = {};
for (const type in typeAverages) {
  typeAverageArrays[type] = responsesToArray(typeAverages[type]);
}

const pearsonResults = [];
const pearsonByType = {};

results.forEach((item, idx) => {
  const resultId = `${item.userId}-${idx}`;
  const resultArray = responsesToArray(item.bigFiveResponses);
  const type = item.type;
  const avgArray = typeAverageArrays[type];

  const correlation = pearsonCorrelation(resultArray, avgArray);
  const coefficient = correlation * correlation;

  if (!pearsonByType[type]) {
    pearsonByType[type] = [];
  }

  if (correlation > 0) {
    pearsonResults.push({ resultId, type, correlation, coefficient });
    pearsonByType[type].push({ correlation, coefficient });
  }
});

const averagePearsonPerType = [];
for (const type in pearsonByType) {
  const correlations = pearsonByType[type].map(item => item.correlation);
  const coefficients = pearsonByType[type].map(item => item.coefficient);
  const avgCorrelation = correlations.reduce((total, val) => total + val,
0) / correlations.length;
  const avgCoefficient = coefficients.reduce((total, val) => total + val,
0) / coefficients.length;
  averagePearsonPerType.push({ type, avgCorrelation, avgCoefficient });
};

```

```

console.log('\nPearson Correlations and Coefficients for Each Result:');
console.table(pearsonResults);

console.log('\nAverage Pearson Correlation and Coefficient by Type:');
console.table(averagePearsonPerType);

console.log('\nAveraged Big Five Responses for Each Type:');
console.table(typeAverages);

// _____
// Extended Outputs Based on Type Averages
// _____

/**
 * Compute a cluster average based on a list of types and the pre-computed
 * typeAverages.
 * @param {Array<string>} clusterTypes - List of personality types in the
 * cluster.
 * @param {Object} typeAverages - The object holding average responses per
 * type.
 * @returns {Object} - An object with the cluster average for each trait.
 */
function computeClusterAverage(clusterTypes, typeAverages) {
  const cluster = {};
  traits.forEach(trait => {
    let sum = 0;
    let count = 0;
    clusterTypes.forEach(type => {
      if (typeAverages[type]) {
        sum += typeAverages[type][trait];
        count++;
      }
    });
    cluster[trait] = count > 0 ? sum / count : 0;
  });
  return cluster;
}

```



```

/**
 * Helper to compute cluster average based on a filtering function applied to
 the type names.
 * @param {Function} filterFn - A function that receives a type and returns
 true if it belongs to the cluster.
 * @param {Object} typeAverages - The object holding average responses per
 type.
 * @returns {Object} - An object with the cluster average for each trait.
 */
function computeClusterAverageFromTypeAverages(filterFn, typeAverages) {
    const selectedTypes = Object.keys(typeAverages).filter(filterFn);
    return computeClusterAverage(selectedTypes, typeAverages);
}

// 1. Averages for SF/NT vs ST/NF (using type string comparisons)
const avgSFNT = computeClusterAverageFromTypeAverages(
    type => type.toLowerCase().includes('sf') ||
type.toLowerCase().includes('nt'),
    typeAverages
);
const avgSTNF = computeClusterAverageFromTypeAverages(
    type => type.toLowerCase().includes('st') ||
type.toLowerCase().includes('nf'),
    typeAverages
);

// 2. Extended grouping for Ego and Super Ego variants.
const avgConcreteObserver = computeClusterAverageFromTypeAverages(
    type => type === 'ENTP' || type === 'INTJ' || type === 'ISFJ' || type ===
'ESFP',
    typeAverages
);
const avgConcreteEvaluator = computeClusterAverageFromTypeAverages(
    type => type === 'INTP' || type === 'ENTJ' || type === 'ESFJ' || type ===
'ISFP',
    typeAverages
);
const avgAbstractObserver = computeClusterAverageFromTypeAverages(
    type => type === 'ESTP' || type === 'ISTJ' || type === 'INFJ' || type ===
'ENFP',
    typeAverages
);
const avgAbstractEvaluator = computeClusterAverageFromTypeAverages(
    type => type === 'ISTP' || type === 'ESTJ' || type === 'ENFJ' || type ===
'INFP',
    typeAverages
);

```

```
// 3. Averages for Introverts vs. Extraverts.
const avgIntroverts = computeClusterAverageFromTypeAverages (
  type => type.startsWith('I'),
  typeAverages
);
const avgExtraverts = computeClusterAverageFromTypeAverages (
  type => type.startsWith('E'),
  typeAverages
);

// 4. Averages for Sensors vs. Intuitors (using type string content).
const avgSensors = computeClusterAverageFromTypeAverages (
  type => type.includes('S'),
  typeAverages
);
const avgIntuitors = computeClusterAverageFromTypeAverages (
  type => type.includes('N'),
  typeAverages
);

// 5. Averages for Thinkers vs. Feelers (using type string content).
const avgThinkers = computeClusterAverageFromTypeAverages (
  type => type.includes('T'),
  typeAverages
);
const avgFeelers = computeClusterAverageFromTypeAverages (
  type => type.includes('F'),
  typeAverages
);

// 6. Averages for Judgers vs. Perceivers (based on type endings)
const avgJudgers = computeClusterAverageFromTypeAverages (
  type => type.endsWith('J'),
  typeAverages
);
const avgPerceivers = computeClusterAverageFromTypeAverages (
  type => type.endsWith('P'),
  typeAverages
);
```

```

// _____
// Save all computed data to a JSON file with tables for each type's
averages.
// _____

console.log('\nAveraged Big Five Responses for Introverts:');
console.table(avgIntroverts);
console.log('\nAveraged Big Five Responses for Extraverts:');
console.table(avgExtraverts);
console.log('\nAveraged Big Five Responses for Sensors:');
console.table(avgSensors);
console.log('\nAveraged Big Five Responses for Intuitors:');
console.table(avgIntuitors);
console.log('\nAveraged Big Five Responses for Thinkers:');
console.table(avgThinkers);
console.log('\nAveraged Big Five Responses for Feelers:');
console.table(avgFeelers);
console.log('\nAveraged Big Five Responses for Judgers:');
console.table(avgJudgers);
console.log('\nAveraged Big Five Responses for Perceivers:');
console.table(avgPerceivers);
console.log('\nAveraged Big Five Responses for SF/NT:');
console.table(avgSFNT);
console.log('\nAveraged Big Five Responses for ST/NF:');
console.table(avgSTNF);
console.log('\nAveraged Big Five Responses for Concrete Observers:');
console.table(avgConcreteObserver);
console.log('\nAveraged Big Five Responses for Concrete Observers:');
console.table(avgConcreteEvaluator);
console.log('\nAveraged Big Five Responses for Abstract Observers:');
console.table(avgAbstractObserver);
console.log('\nAveraged Big Five Responses for Abstract Evaluators:');
console.table(avgAbstractEvaluator);

const output = {
  typeAverages,
  pearsonResults,
  averagePearsonPerType,
  avgSFNT,
  avgSTNF,
  avgJudgers,
  avgPerceivers,
  avgConcreteObserver,
  avgConcreteEvaluator,
  avgAbstractObserver,
  avgAbstractEvaluator,
  avgIntroverts,
  avgExtraverts,
  avgThinkers,
  avgFeelers,
  avgSensors,
  avgIntuitors
};

const outputFilePath = path.join(__dirname, 'output.json');
fs.writeFileSync(outputFilePath, JSON.stringify(output, null, 2));
console.log('\nAll output data has been saved to ${outputFilePath}');

```