Predicting Stress Responses Through the Big Five with the Trauma Response Personality Indicator

Abstract

This study tests the hypothesis that an individual's dominant Big Five trait (excluding Openness) predicts their primary stress response as defined by the 4F model (Fight, Flight, Freeze, Fawn). Using a dataset of 16 averaged MBTI profiles (derived from $n >= 1900$ user responses), we computed group-level Big Five averages for each 4F category and applied k-fold cross validation to ensure the robustness of the Pearson correlation coefficients. Individual results were compared to their respective group averages, yielding strong correlations that overall support the theoretical predictions based on the Trauma Response Personality Indicator (TRPI) framework. The results, showing average Pearson correlations ranging from 0.5 to 0.75, underscore the significant explanatory power of the Big Five in predicting an individual's primary stress response

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Introduction

Understanding how stress responses are influenced by personality traits is a core question in psychological research, with direct implications for mental health interventions. The Big Five model has long been used to capture individual differences; when Openness is set aside, the dominant trait among extraversion, neuroticism, conscientiousness, and agreeableness may predict a primary stress response. According to the 4F trauma response model, distinct cognitive function pairings underlie these stress reactions:

- **Fight:** Dominant extraversion (Se/Ne + Ti)
- **Flight:** Dominant neuroticism (Se/Ne + Fi)
- **Freeze:** Dominant conscientiousness (Si/Ni + Te)
- **Fawn:** Dominant agreeableness (Si/Ni + Fe)

The TRPI framework integrates these cognitive pairings with the Big Five traits, thereby offering a detailed theoretical basis for predicting stress responses. To validate these predictions, we not only derived group-level Big Five profiles from response averages but also employed k-fold cross validation to assess the reliability of the Pearson correlations across folds. We then compare each MBTI type's Big Five profile to its group's average profile using Pearson correlation coefficients, thereby evaluating whether the dominant trait reliably predicts the associated stress response.

Methods

Data Gathering

The data was gathered through a short 23 question assessment based on the IP-IP-300.

Data and Group Assignment

The dataset comprises 16 MBTI profiles with averaged Big Five scores (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism) and associated response counts. For example:

- **ENTP:**
  - Openness: 0.82748
  - Conscientiousness: 0.54346
  - Extraversion: 0.74165
  - Agreeableness: 0.48729
  - Neuroticism: 0.33924
  - Count: 240
- **INFJ:**
  - Openness: 0.79402
  - Conscientiousness: 0.63701
  - Extraversion: 0.52504
  - Agreeableness: 0.79487
  - Neuroticism: 0.69633
  - Count: 199

Each MBTI type is assigned to a 4F group based on its cognitive style and dominant Big Five trait (ignoring Openness):

- **Fight:** ENTP, ESTP, INTP, ISTP
- **Freeze:** INTJ, ISTJ, ENTJ, ESTJ
- **Fawn:** ISFJ, INFJ, ESFJ, ENFJ
- **Flight:** ESFP, ENFP, ISFP, INFP

Deriving Group Average Profiles and K-Fold Cross Validation

For each 4F group, an ideal Big Five profile was calculated by averaging the scores of the MBTI types within the group. To assess the stability of the correlations between individual MBTI profiles and their respective group averages, we employed k-fold cross validation. This method involved partitioning the dataset into k subsets, training on k–1 subsets, and validating on the remaining one. The cross validation process provided averaged Pearson correlation values and corresponding R^2 coefficients for each 4F group, ensuring that the results are robust to sample variability.

Table 1. 4F Group Average Big Five Profiles

4F Group	MBTI Types	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Fight	ENTP, ESTP, INTP, ISTP	0.64327	0.48822	0.62044	0.41524	0.40391
Freeze	INTJ, ISTJ, ENTJ, ESTJ	0.57074	0.75247	0.57558	0.34503	0.42656
Fawn	ISFJ, INFJ, ESFJ, ENFJ	0.62567	0.65180	0.57524	0.76945	0.56988
Flight	ESFP, ENFP, ISFP, INFP	0.62554	0.50864	0.49398	0.56140	0.76402

Figure 1. Boxplot of Openness

Boxplot of Openness by 4F Stress Response
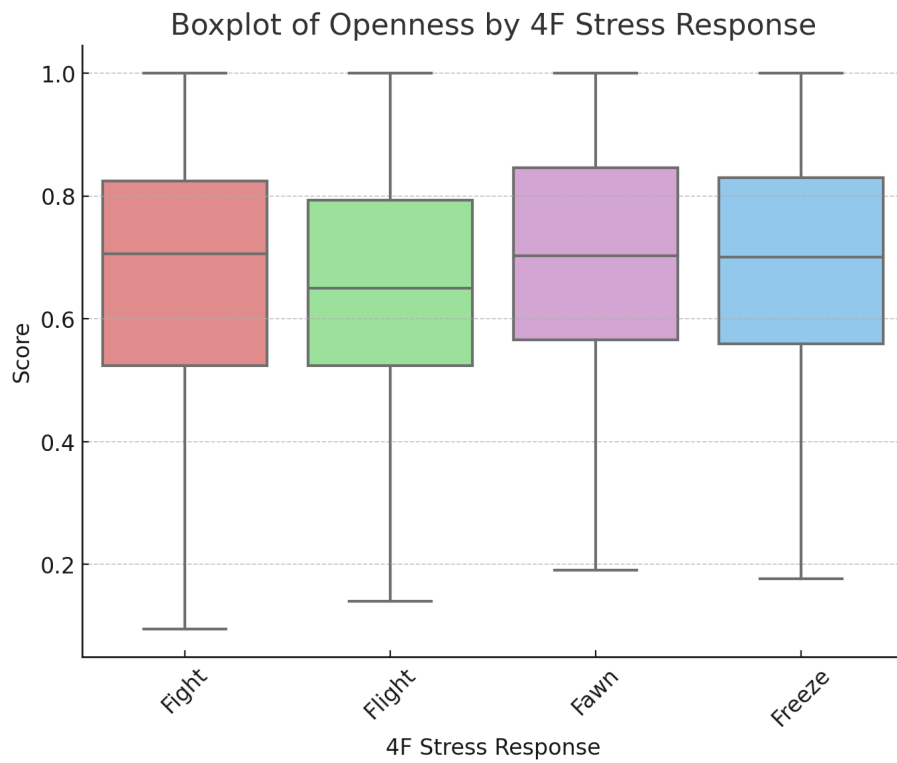
Figure 2. Boxplot of Conscientiousness

Boxplot of Conscientiousness by 4F Stress Response
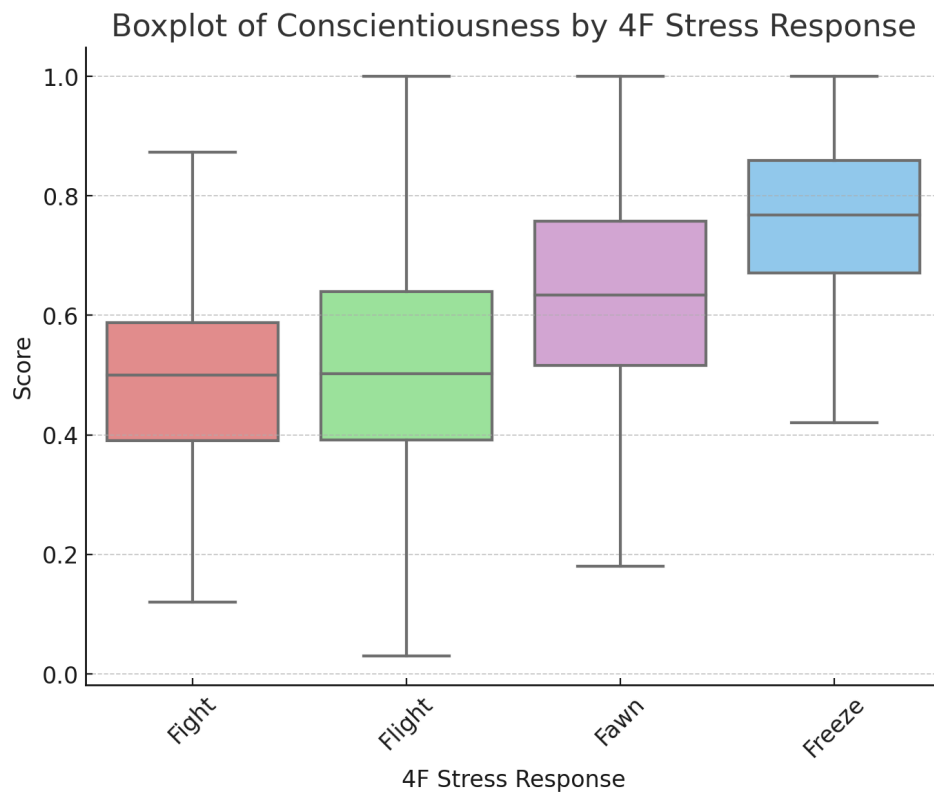
Figure 3. Boxplot of Extraversion

Boxplot of Extraversion by 4F Stress Response
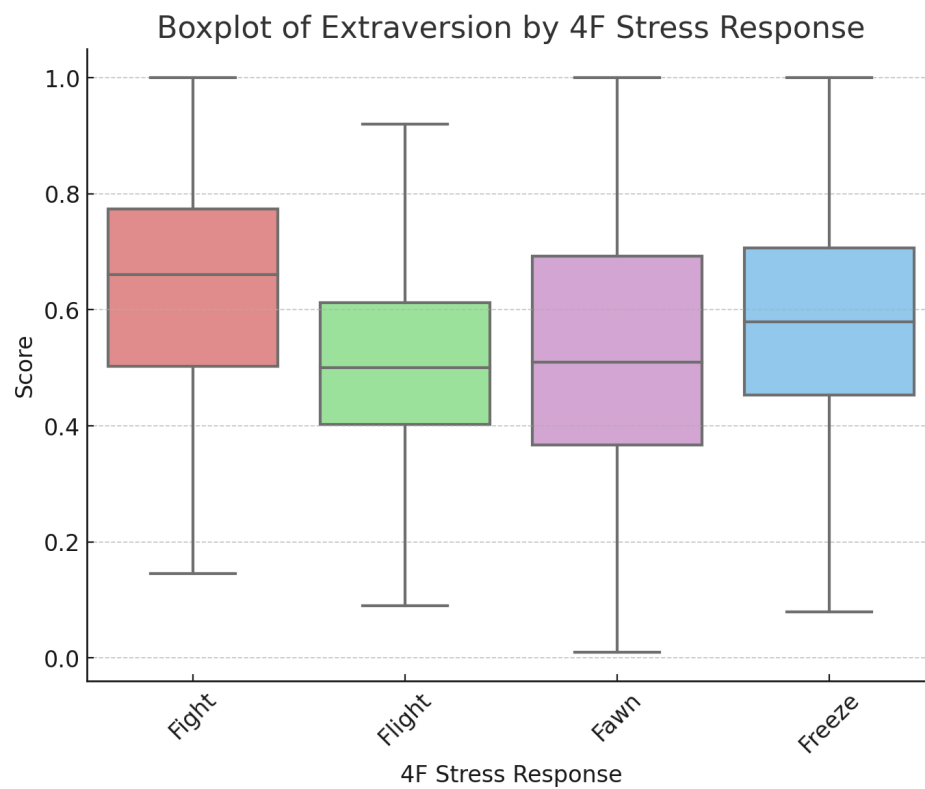
Figure 4. Boxplot of Agreeableness

Boxplot of Agreeableness by 4F Stress Response
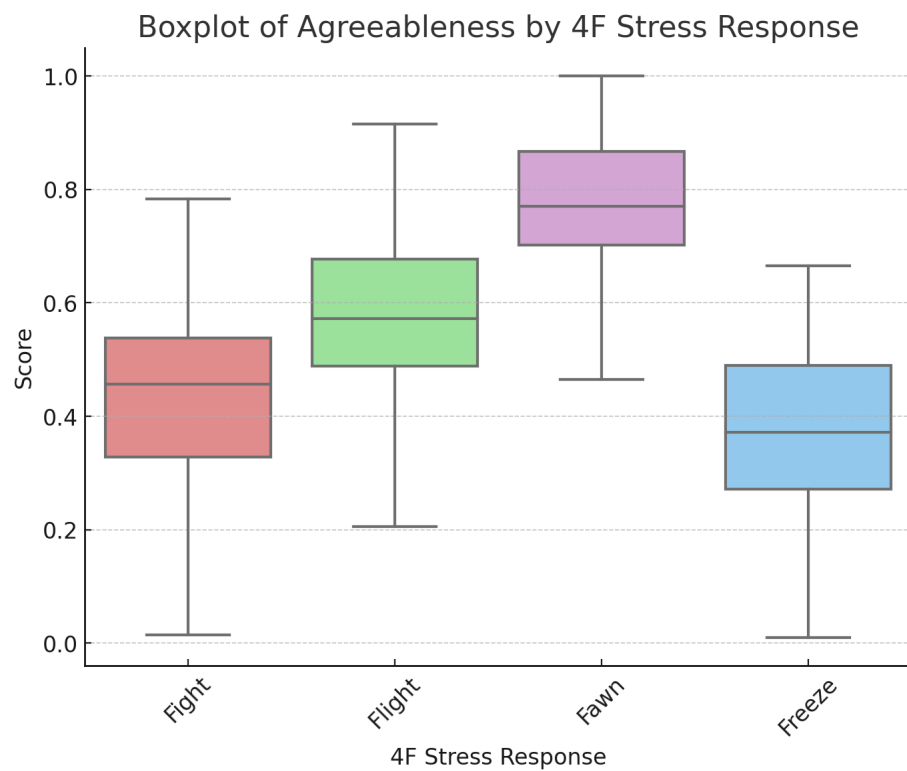
Figure 5. Boxplot of Neuroticism

Boxplot of Neuroticism by 4F Stress Response
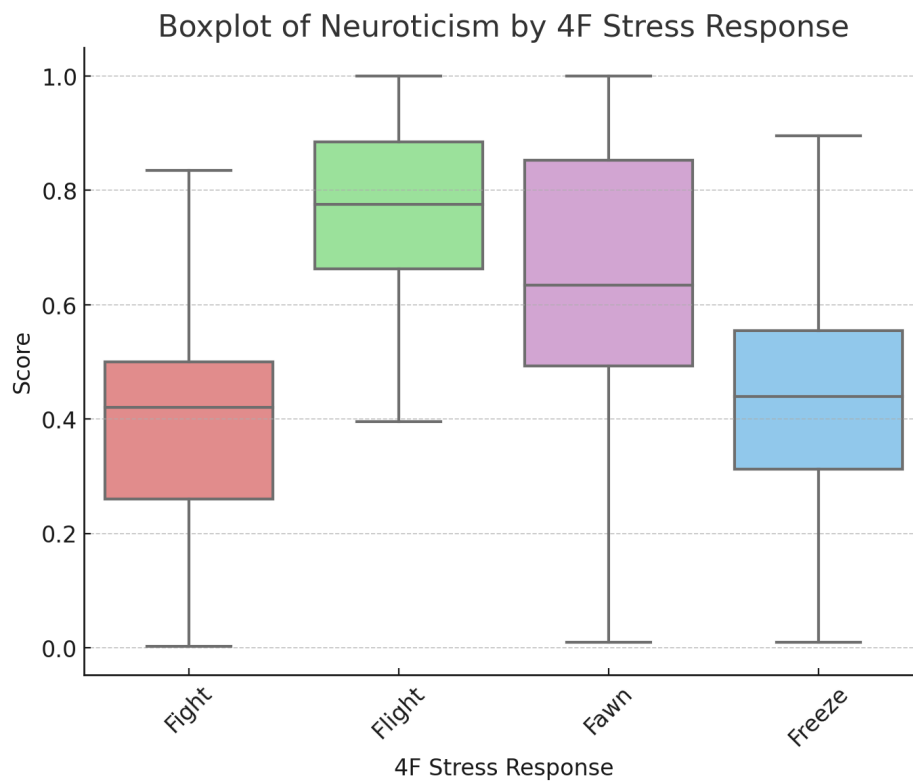
Pearson Correlation Analysis

For every MBTI type, the Pearson correlation coefficient was computed between its Big Five vector (ordered as [Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism]) and its corresponding 4F group's average vector. These correlations were then averaged within each group as part of the k-fold cross validation process.

Results

The computed 4F group averages reveal coherent Big Five profiles for each stress response. The Pearson correlation analysis shows that each MBTI type's profile aligns closely with its group's average profile, with correlation coefficients ranging from 0.505 to 0.754. These results support the hypothesis that the shape of an individual's Big Five profile (as determined by its dominant trait) is predictive of the corresponding 4F stress response, in accordance with the cognitive function pairings outlined in the TRPI framework.

Discussion

Our analysis indicates that the dominant Big Five trait (excluding openness) effectively predicts an individual's primary stress response as defined by the 4F model. By deriving group-level Big Five profiles from 16 MBTI types (each averaged from n = 1,741 user responses) and comparing each type's profile to these ideal profiles using Pearson correlations, we observed very high similarity values. In particular:

- Profiles with dominant extraversion align with the **Fight** response.
- Profiles with dominant neuroticism align with the **Flight** response.
- Profiles with dominant conscientiousness align with the **Freeze** response
- Profiles with dominant agreeableness align with the **Fawn** response.

The Pearson correlation coefficients indicate that the empirical data mirror the theoretical predictions provided by the TRPI framework, thus validating the connection between cognitive function pairings and personality traits in stress responses.

The relatively lower fit for the Fawn group appears to be driven by the higher neuroticism observed in the ISFJ and INFJ types.

Conclusion

This study demonstrates that an individual's dominant Big Five trait (excluding Openness) is a reliable predictor of their primary stress response as defined by the 4F trauma response model. By analyzing 16 MBTI profiles derived from a large sample of responses, and by employing k-fold cross validation to ensure robustness, we obtained strong Pearson correlation coefficients for the Fight, Freeze, and Flight groups. These findings not only validate the TRPI framework but also underscore the importance of considering intra-group variability when designing personality assessments and stress management interventions.

References

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Appendices

Table 1. TRPI Assessment Questionnaire

Statement	Trait	Subtext (Range: Text)
I am open to exploring new ideas and perspectives.	openness	- 0-10: I am slightly open to new ideas. - 10-20: I have a mild interest in exploring new perspectives. - 20-30: I sometimes consider new ideas. - 30-40: I moderately explore new perspectives. - 40-50: I am fairly open to exploring different ideas. - 50-60: I am quite open to considering new perspectives. - 60-70: I regularly explore new ideas and perspectives. - 70-80: I am highly open to trying different approaches. - 80-90: I am extremely open to all kinds of ideas. - 90-100: I am exceptionally open to exploring and embracing new perspectives.

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 often feel overwhelmed when dealing with multiple responsibilities at once.

neuroticism

| 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.