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Relationship Between the Big Five Personality Traits and Response Styles: A Gender Differences Study Using Multidimensional IRT Models

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ABSTRACT

Objective: This study aimed to investigate the relationship between the Big Five personality traits and response styles, and to examine the role of gender in these associations using multidimensional Item Response Theory (IRT) models.

Methods: Data were collected from 17,994 participants (9,876 women and 8,118 men) who voluntarily completed the 60-item NEO personality questionnaire via an online platform. Three multidimensional IRT models were applied: the Generalized Partial Credit Model (GPCM), the Generalized Random Threshold Model (GRTM), and the Random Threshold Model with E and B design matrices. In the E-matrix coding, response styles were operationalized as follows: extreme response style (ERS) through the use of scale endpoints, midpoint response style (MRS) through the use of central options, and acquiescent response style (ARS) through the use of agreement-oriented options. Model fit comparisons indicated that the GPCM provided the best fit to the data (AIC = 2,775,512; BIC = 2,778,202; CAIC = 2,778,547).

Results: Correlation analyses showed the strongest associations between Extraversion and ARS (r = 0.597), and between Neuroticism and ERS (r = 0.255). Regression analyses identified Extraversion as the strongest predictor of ARS (β = 0.376). The model explained 38.5% of the variance in ARS, 17.5% in ERS, and 0.5% in MRS. Gender analyses indicated that women were less likely than men to use ERS (β = -0.190) but more likely to use MRS (β = 0.020). Interaction effects suggested that Neuroticism and Openness had stronger impacts on ERS among men than women.

Conclusions: These findings underscore the importance of considering both personality traits and gender in understanding response styles, with implications for personality assessment and test interpretation.

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Introduction

Over the past half century, the study of response styles in psychological testing has attracted considerable attention. Response styles, defined as systematic tendencies to respond to self-report items regardless of content, can undermine the validity of psychometric scores, as they introduce systematic variance that is independent of the construct being measured (Plieninger, 2017).

Despite their widespread use and importance in psychology, self-report instruments face several challenges. Baumgartner and Steenkamp (2001) demonstrated that response styles can distort statistical analyses and be mistaken for substantive information within the data. A key difference between personality and ability assessment is that, in personality measurement, respondents are often aware of the "correct" or socially desirable response, even when it does not accurately reflect their own personality.

Although numerous studies have examined response styles, the relationship between these styles and personality traits—particularly with respect to gender differences—has received less attention. Some research suggests that personality traits may account for up to 35% of the variance in response styles (Plieninger, 2021), yet the mechanisms underlying this association and the role of gender remain poorly understood.

Studying response styles is important for several reasons. First, from a measurement validity perspective, response styles can threaten the accuracy of questionnaire scores. Two individuals with identical levels of a personality trait may obtain different scores due to divergent response styles (Billiet & McClendon, 2000; Bolt & Johnson, 2009). Second, in cross-cultural research, variations in response styles may lead to misinterpretations of cultural differences.

Multidimensional Item Response Theory (IRT) models provide a framework for simultaneously examining both response styles and personality traits. Bolt and Johnson (2009) demonstrated that such models can effectively disentangle response styles from the primary traits being assessed. More recently, innovative approaches such as response trees and multi-process models have been developed, allowing for more precise analysis of the subprocesses underlying response behavior.

Among the various models of personality, the Five-Factor Model (FFM) is widely recognized as one of the most comprehensive and robust frameworks. It conceptualizes personality along five broad domains: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Prior studies have indicated associations between these traits and response

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styles, yet the role of gender in shaping these relationships has been less systematically investigated.

The present study aims to address this gap by providing a comprehensive examination of the relationship between the Big Five personality traits and response styles, with a particular focus on gender differences. Specifically, this research investigates the associations between the five personality dimensions and three primary response styles—extreme response style (ERS), midpoint response style (MRS), and acquiescent response style (ARS)—and explores how gender moderates these relationships. Understanding these patterns may enhance the accuracy of personality assessment and improve the interpretation of test results.

Material and Methods

This study was fundamental–applied in purpose and descriptive–correlational in method. Relationships among variables were examined without experimental manipulation.

Participants and Procedure

Data were collected from 17,994 participants who completed the 60-item short form of the NEO Five-Factor Inventory (NEO-FFI). Participants voluntarily responded to the questionnaire via an online platform. To ensure data quality, duplicate and incomplete responses were excluded from the final analyses.

Instrument

The primary instrument was the NEO-FFI (Costa & McCrae, 2014), which measures the Big Five personality traits across 60 items. These dimensions include Neuroticism (tendency toward negative emotions and emotional instability), Extraversion (sociability and energy), Openness to Experience (curiosity and creativity), Agreeableness (cooperation and empathy), and Conscientiousness (organization, responsibility, and goal-directedness). Each trait is assessed through 12 items rated on a five-point Likert scale ranging from *strongly disagree* to *strongly agree*.

Response Style Measures

Three primary response styles were examined: extreme response style (ERS), measured by the frequency of selecting endpoint categories (“strongly disagree” and “strongly agree”); midpoint response style (MRS), defined as the frequency of selecting the middle category (“neither agree

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nor disagree"); and acquiescent response style (ARS), measured by the frequency of selecting agreement-oriented categories ("agree" and "strongly agree"), regardless of item content. To ensure consistency, ARS loadings were fixed across items.

Modeling Approach

Response styles were modeled using a multidimensional E-matrix design that incorporated 60 items, five response categories, eight dimensions (five personality traits plus three response styles), and gamma parameters. Variances of all dimensions were fixed at 1, and model estimation employed 2,500 quasi–Monte Carlo integration points. To control for the effect of reversed items, 27 items were recoded. This computational approach enabled the simultaneous estimation of response styles and personality traits, allowing the effects of response styles to be examined independently of item content and of each other.

Multidimensional IRT Models

Following the framework proposed by Henninger and Meiser (2020), three multidimensional IRT models were estimated to comprehensively assess the impact of response styles on the psychometric properties of the NEO-FFI:

1. Model 1: Multidimensional Generalized Partial Credit Model (GPCM) with fixed scoring weights and estimated discrimination parameters, allowing detailed examination of how response styles differentially affect items.
2. Model 2: Generalized Random Threshold Model (GRTM), which incorporates random thresholds to account for individual differences in response scale usage.
3. Model 3: Random Threshold Model (RTM), a generalized version of the random threshold approach that also allows estimation of discrimination parameters.

Table 1. Estimated Models and Parameter Specifications

Parameters	Model 1	Model 2	Model 3
Item threshold parameters	240	240	240
Item slope parameters	77	120	0
Variance/covariance parameters	28	10	19
Discrimination parameters	Random	Fixed	Fixed (=1)
Personality dimensions	Jointly modeled	Jointly modeled	Independently modeled
Guessing parameters	0	0	0
Regression parameters	0	0	0
Delta parameters	0	0	0
Model complexity	High	Medium	Low
Estimation time	4.4 days	5.1 days	2.9 hours
Date of analysis	2024-04-27	2024-04-04	2024-03-29

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Model 1: Multidimensional Generalized Partial Credit Model (GPCM)

This model employed the E-matrix design, with item discrimination parameters estimated as random effects. It allowed for the simultaneous modeling of response styles and personality dimensions, making it possible to evaluate their combined effects on item responses. As shown in Table 1, this model estimated 240 threshold parameters, 77 slope parameters, and 28 variance/covariance parameters. Estimation was performed using quasi–Monte Carlo integration with 2,500 integration points and 119 replications.

Model 2: Generalized Random Threshold Model (GRTM; Wang & Wu, 2011)

This model also employed the E-matrix design but assumed fixed discrimination parameters. Personality variances were constrained to 1, and correlations between personality dimensions were fixed at zero. Compared with Model 1, this structure was simpler and particularly suitable for examining the influence of response styles on item responses. The model included 240 threshold parameters, 120 slope parameters, and 10 variance/covariance parameters. Estimation was performed using quasi–Monte Carlo integration with 2,500 integration points and 4,000 replications.

Model 3: Random Threshold Model (RTM; Wang et al., 2006)

This model used the B-matrix design, with item discrimination parameters fixed at 1. Personality variances were constrained to 1, and correlations among dimensions were fixed at zero. As the simplest IRT model applied in this study, it was primarily used to examine personality dimensions independently of response styles. The model estimated 240 threshold parameters and 19 variance/covariance parameters, with computation requiring only 2.9 hours.

To select the most appropriate model, several fit indices were employed, including Deviance, AIC, BIC, and CAIC. All analyses were conducted in R using the TAM package (Kiefer et al., 2017; Robitzsch et al., 2017).

Results

To address the research questions, the relationships between personality dimensions and response styles were first examined, followed by analyses of gender differences in these associations. Comparison of the three multidimensional IRT models indicated that the Multidimensional Generalized Partial Credit Model with fixed scoring weights and estimated discrimination

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parameters (Model 1) provided the best fit to the data. Fit indices supported the ability of this model to capture complex associations between personality traits and response styles.

Table 2. Model Fit Indices

Index	Description	Model 1	Model 2	Model 3
Deviance	Model deviance (lower = better fit)	2,774,822	2,813,269	2,931,279
Log Likelihood	Log-likelihood for model fit	-1,387,411	-1,406,635	-1,465,639
AIC	Akaike Information Criterion	2,775,512	2,814,009	2,931,797
AIC3	AIC with additional penalty	2,775,857	2,814,379	2,932,056
BIC	Bayesian Information Criterion	2,778,202	2,816,894	2,933,816
aBIC	Adjusted BIC	2,777,106	2,815,718	2,932,993
CAIC	Sample-size adjusted AIC	2,778,547	2,817,264	2,934,075
AICc	Small-sample adjusted AIC	2,775,526	2,814,025	2,931,804
GHP	Log penalty for number of parameters	1.28539	1.30322	1.35777

As shown in Table 2, Model 1 consistently demonstrated lower values across most fit indices compared with Models 2 and 3. For instance, the deviance value for Model 1 (2,774,822) was substantially lower than for Model 2 (2,813,269) and Model 3 (2,931,279). Likewise, the AIC value for Model 1 (2,775,512) was smaller than those for Model 2 (2,814,009) and Model 3 (2,931,797). Accordingly, Model 1 was selected as the optimal model for subsequent analyses, allowing for a more precise and comprehensive estimation of both response styles and personality dimensions.

Using Model 1, correlations and multiple regression analyses were conducted to investigate the effects of the Big Five traits—neuroticism, extraversion, openness, agreeableness, and conscientiousness—on three response styles: Extreme Response Style (ERS), Midpoint Response Style (MRS), and Acquiescence Response Style (ARS).

Table 3. Correlation Matrix of Personality Dimensions and Response Styles

	N	**E**	**O**	**A**	**C**	**ERS**	**MRS**	**ARS**
N	1.000							
E	0.062	1.000						
O	0.082	0.056	1.000					
A	0.013	0.072	0.087	1.000				
C	0.024	0.015	0.137	0.270	1.000			
ERS	0.255	0.181	0.205	0.163	0.241	1.000		
MRS	-0.030	-0.035	-0.013	-0.056	-0.027	-0.158	1.000	
ARS	0.133	0.597	0.085	0.158	0.112	0.460	-0.048	1.000

As presented in Table 3, neuroticism and extraversion showed the strongest correlations with response styles. Specifically, neuroticism was positively associated with ERS (r = 0.255),

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indicating that individuals with higher emotional instability were more likely to adopt extreme response patterns. Similarly, extraversion correlated positively with ERS (r = 0.181), suggesting that extraverted individuals also tended to rely more on extreme responses. Furthermore, extraversion demonstrated a strong positive correlation with ARS (r = 0.597), highlighting its role as a key predictor of acquiescence.

Regarding MRS, the correlations were generally weaker than for ERS. Specifically, agreeableness and neuroticism exhibited small but significant negative correlations with MRS (r = –0.056 and r = –0.030, respectively). This suggests that individuals with higher levels of positive traits, such as agreeableness or lower emotional instability, may be less inclined toward midpoint responding.

In contrast, ARS showed stronger associations with the Big Five traits. Extraversion and neuroticism demonstrated significant positive correlations with ARS (r = 0.597 and r = 0.133, respectively), indicating that more extraverted and emotionally variable individuals tend to endorse agreement-oriented response patterns. Openness (r = 0.085) and agreeableness (r = 0.158) also correlated positively with ARS, suggesting that open-minded and cooperative individuals are more likely to exhibit acquiescent responding. Overall, the correlation matrix highlights the differential impact of personality traits on response styles, underscoring the importance of identifying these relationships to better understand how personality influences response behavior.

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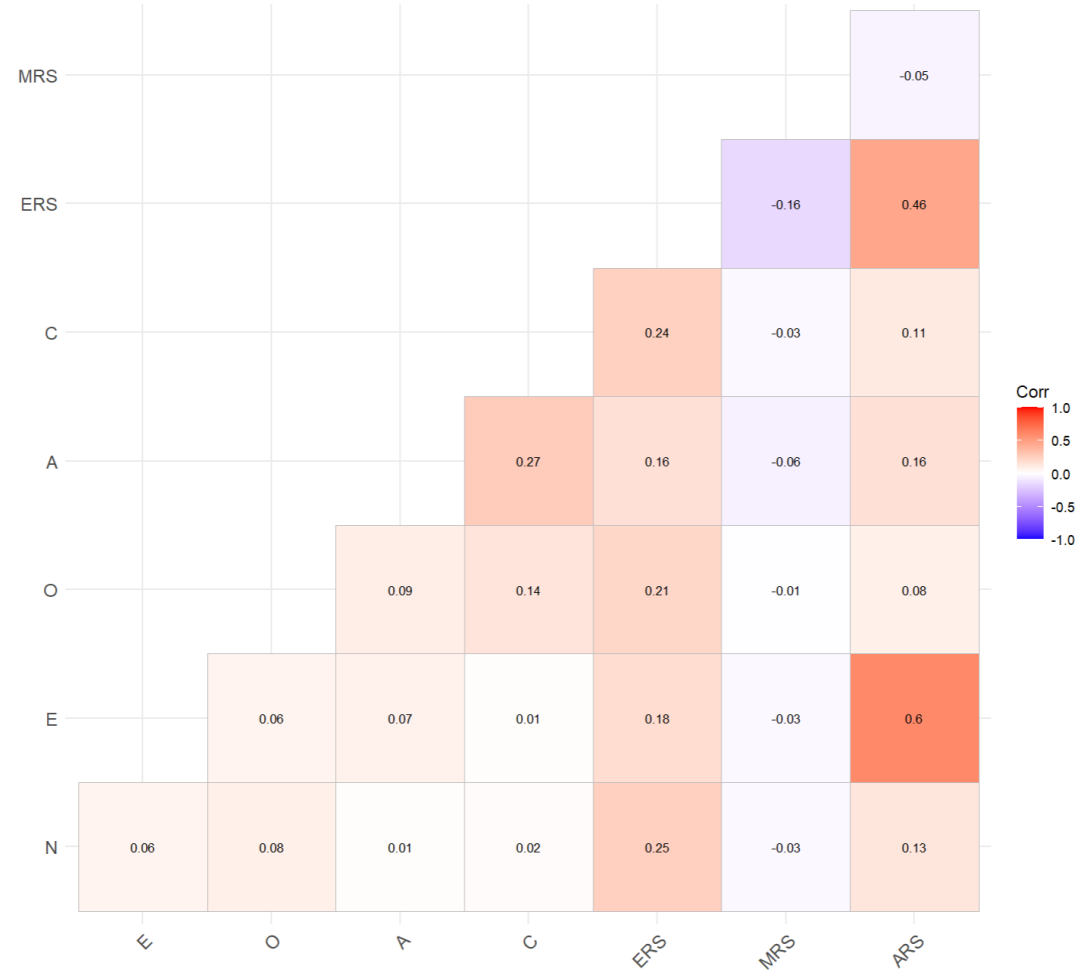


Fig. 1. Correlation matrix in the form of a heat map

Figure 1 presents a heatmap visualization of the correlation matrix. Warmer colors represent stronger positive correlations, while cooler colors indicate negative associations, providing an intuitive overview of the interrelationships among personality traits and response styles.

To further examine these associations, multiple regression analyses were conducted for each response style. The results (Table 4) revealed distinct predictive patterns.

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Table 4. Multiple regression analysis to examine the effect of the five personality dimensions on the three response styles

Variable	Extreme Response Style (ERS)				Intermediate Response Style (MRS)				Affirmative response style (ARS)			
	Coefficient	**Std. error**	**T value**	**P**	**Coefficient**	**Std. error**	**T value**	**P**	**Coefficient**	**Std. error**	**T value**	**P**
Constant	-1.449	0.028	-52.14	<2e-16***	0.423	0.003	126.72	<2e-16***	-1.405	0.022	-64.93	<2e-16***
N	0.165	0.005	33.49	<2e-16***	-0.002	0.001	-3.57	0.00036***	0.059	0.004	15.49	<2e-16***
E	0.107	0.005	21.99	<2e-16***	-0.002	0.001	-3.93	8.67e-05***	0.376	0.004	98.99	<2e-16***
O	0.102	0.005	21.05	<2e-16***	-0.0002	0.001	-0.41	0.679	0.017	0.004	4.50	6.88e-06***
A	0.083	0.007	12.08	<2e-16***	-0.005	0.001	-6.44	1.25e-10***	0.081	0.005	15.25	<2e-16***
C	0.162	0.006	26.85	<2e-16***	-0.001	0.001	-1.61	0.108	0.055	0.005	11.79	<2e-16***
R^2	0.175				0.005				0.385			
Adjusted R^2	0.174				0.004				0.384			

For ERS, all five traits significantly predicted the response style ($p < .001$), with neuroticism ($\beta = 0.165$) and conscientiousness ($\beta = 0.162$) emerging as the strongest predictors. The model explained 17.5% of the variance in ERS ($R^2 = 0.175$, Adjusted $R^2 = 0.174$), indicating a moderate predictive power.

For MRS, only neuroticism, extraversion, and agreeableness were significant predictors, while openness and conscientiousness were nonsignificant. The overall variance explained was minimal ($R^2 = 0.005$, Adjusted $R^2 = 0.004$), suggesting that midpoint responding is likely influenced by factors beyond personality traits.

For ARS, the strongest associations were observed. Extraversion emerged as the most powerful predictor ($\beta = 0.376$, $p < .001$), followed by agreeableness ($\beta = 0.081$), neuroticism ($\beta = 0.059$), conscientiousness ($\beta = 0.055$), and openness ($\beta = 0.017$). Collectively, these predictors explained 38.5% of the variance in ARS ($R^2 = 0.385$, Adjusted $R^2 = 0.384$), indicating substantial predictive power and a meaningful influence of personality on acquiescent responding.

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The similarity of R^2 and Adjusted R^2 values across all models supports their reliability. The differences in predictive strength (ARS > ERS > MRS) suggest that response styles vary in the extent to which they are shaped by underlying personality traits.

Finally, to assess the role of gender, regression models incorporating interaction terms between gender and personality dimensions were estimated. Gender was coded as a binary variable (0 = men, 1 = women). This approach allowed for the detection of gender differences not only in mean levels of response styles but also in how personality traits interact with gender to influence response tendencies.

The model coefficients are interpreted in two ways: as main effects and as interaction effects. Main effects indicate how a change in gender from male to female influences response styles, while interaction coefficients demonstrate how the relationships between personality traits and response styles differ across genders. For example, the interaction between gender and Neuroticism shows how the effect of this trait on response style differs for women compared to men.

This analytical approach provides a deeper understanding of gender differences in response styles. Rather than merely comparing mean differences between genders, it highlights how personality traits may influence response styles differently in men and women. Such analyses are particularly valuable for uncovering the underlying mechanisms of gender differences in response styles and for designing gender-sensitive approaches in personality assessment.

To examine the role of gender and its interactions with personality dimensions in predicting response styles, three separate multiple regression analyses were conducted for Extreme Response Style (ERS), Midpoint Response Style (MRS), and Acquiescent Response Style (ARS). In these models, gender, the Big Five personality traits (N, E, O, A, C), and the interaction terms between gender and each trait were included as predictors. Table 4 presents the regression results, reporting standardized coefficients (β), standard errors, t-values, and significance levels for each predictor in all three models. Gender was coded as 0 = male and 1 = female.

The analyses revealed that the influence of gender and its interactions with personality traits varied across response styles. For ERS, gender showed a significant negative effect ($\beta = -0.190$, $p < 0.001$), indicating that women were less likely than men to use extreme options on the Likert scale. Significant interactions were also found between gender and Neuroticism ($\beta = -0.027$, $p < 0.01$)

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and between gender and Openness (β = -0.023, p < 0.05), suggesting that the effects of these traits on ERS differed by gender.

For MRS, women showed a significantly greater tendency than men to select midpoint options (β = 0.020, p < 0.01), reflecting a possible inclination toward more cautious or balanced responses. Among the interaction terms, only the interaction between gender and Conscientiousness reached statistical significance (β = -0.004, p < 0.01), indicating that the relationship between Conscientiousness and midpoint responding differed between men and women.

For ARS, no significant main effect of gender was observed (β = -0.057, p = 0.20), and none of the interaction terms reached statistical significance. This suggests that the association between personality traits and acquiescent responding is consistent across genders, with no moderating role of gender in this response style.

Table 5. Interaction effects between the Big Five personality traits and gender across the three response styles (ERS, MRS, ARS)

Variable	ERS				MRS				ARS			
	Estimate	**Std. error**	**T value**	**P**	**Estimate**	**Std. error**	**T value**	**P**	**Estimate**	**Std. error**	**T value**	**P**
Constant	-1.33549	0.046461	-28.74	<2E-16***	0.4105124	0.0056017	73.284	<2E-16***	-1.369	0.036299	-37.730	<2E-16***
Female	-0.19056	0.057898	-3.291	0.000999***	0.0203378	0.0069806	2.913	0.00358**	-0.057	0.045234	-1.279	0.2010
N	0.181399	0.008627	21.028	<2e-16***	-0.003015	0.0010401	-2.899	0.00375**	0.0548	0.006740	8.143	4.11e16***
E	0.102303	0.008353	12.247	<2e-16***	-0.002560	0.0010072	-2.542	0.01103*	0.3708	0.006526	56.820	<2e-16***
O	0.113750	0.008384	13.568	<2e-16***	0.0002452	0.0010108	0.243	0.80830	0.0263	0.006550	4.018	5.89e05***
A	0.072555	0.011174	6.493	8.62e-11***	-0.003586	0.0013472	-2.662	0.00777**	0.0768	0.008730	8.798	<2e-16***
C	0.152602	0.009911	15.397	<2e-16***	0.0012849	0.0011949	1.075	0.28227	0.0537	0.007743	6.945	3.92e12***
N: Female	-0.02728	0.010494	-2.600	0.009341**	0.0013551	0.0012653	1.071	0.28419	0.0062	0.008199	0.756	0.4494
E: Female	0.004569	0.010275	0.445	0.656533	0.0004310	0.0012388	0.348	0.72789	0.0071	0.008028	0.889	0.3740
O: Female	-0.02335	0.010267	-2.275	0.022940*	-0.000597	0.0012379	-0.482	0.62949	-0.015	0.008021	-1.872	0.0612
A: Female	0.017768	0.014099	1.260	0.207601	-0.002618	0.0016999	-1.540	0.12350	0.0072	0.011015	0.662	0.508

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C: Female	0.024506	0.012511	1.959	0.050146	-0.004012	0.0015084	-2.660	0.00782**	-1.369	0.036299	-37.730	<2E-16***

Overall, these results suggest that gender can play an important role in individuals' response styles to questionnaires, though its influence varies across different styles of responding. Moreover, the significant interactions observed between gender and certain personality traits indicate that the effects of personality characteristics on response styles may be moderated by the respondent's gender.

Figure 2 illustrates the relationships between the Big Five personality traits (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) and the three response styles (ERS, MRS, ARS), separately for men and women. The figure is organized into three rows: the first row represents ERS, the second row represents MRS, and the third row represents ARS. In each plot, the horizontal axis represents the level of the personality trait, while the vertical axis represents the response style score. Blue and red lines depict the trends for men and women, respectively. The scattered points around the trend lines represent actual observations, while the slope of the lines indicates the strength and direction of the relationships.

In the first row (ERS), notable findings emerge. Gender has a significant negative effect on ERS ($\beta = -0.190$, $p < 0.001$), indicating that women are less likely than men to endorse extreme responses. Two significant interactions were also observed: gender × Neuroticism ($\beta = -0.027$, $p < 0.01$) and gender × Openness ($\beta = -0.023$, $p < 0.05$).

In the second row (MRS), a different pattern appears. Gender shows a significant positive effect ($\beta = 0.020$, $p < 0.01$), suggesting that women are more likely than men to select midpoint options. The only significant interaction in this model was between gender and Conscientiousness ($\beta = -0.004$, $p < 0.01$).

In the third row (ARS), gender had no significant effect ($\beta = -0.057$, $p = 0.201$), and none of the interaction terms reached statistical significance. This indicates that the relationship between personality traits and ARS is similar for both genders.

The scatter of points around the trend lines across all figures reflects individual variability, but the overall patterns are consistent with the statistical analyses.

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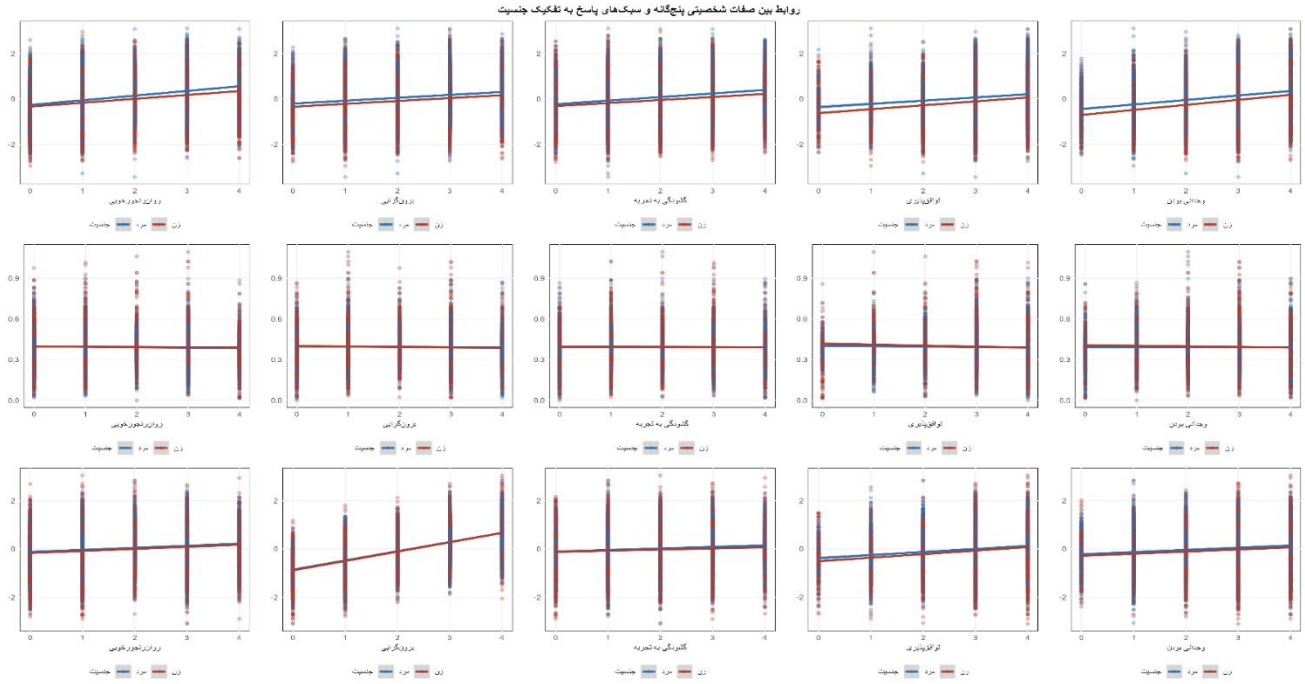


Figure 2. Interactive relationships between response styles and personality traits by gender.

The analysis of the relationships depicted in the figures reveals additional important insights. In the ERS plots, the strength of the association between personality traits and response style differs across genders. This difference is particularly pronounced for Neuroticism and Openness, where the influence of these traits on ERS appears stronger in men than in women.

In the MRS plots, the relatively flat slopes for most personality traits indicate weak associations between these traits and the midpoint response style. The only notable exception is Conscientiousness, which shows a distinct difference in slope between genders, suggesting that this trait relates differently to the tendency to select midpoint responses in women and men.

In the ARS plots, the approximately parallel lines across all personality traits indicate a similar pattern of influence of personality on the agreeable response style for both genders. The most prominent pattern in this row is the steep slope associated with Extraversion, indicating that this trait, regardless of gender, has the strongest relationship with the tendency to agree.

The greater scatter of points in some plots compared to others may suggest the presence of additional moderating variables that were not examined in this study.

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Discussion

The findings of this study revealed complex and meaningful relationships between the Big Five personality traits and response styles. Among the response styles, the Agreeable Response Style (ARS) demonstrated the strongest associations, with the model explaining 38.5% of the variance. Within this context, Extraversion ($\beta = 0.376$, $p < 0.001$) and Neuroticism ($\beta = 0.059$, $p < 0.001$) emerged as prominent predictors. These results align with Plieninger (2021), supporting the notion that response styles are not merely measurement errors but can represent meaningful manifestations of underlying personality traits.

The strong relationship between Extraversion and ARS is consistent with theoretical expectations regarding the characteristics of extraverted individuals, who typically exhibit higher levels of assertiveness and active engagement, potentially explaining their greater tendency to agree with questionnaire items. This finding corroborates prior work by Khorramdel and von Davier (2014), which identified Extraversion as a robust predictor of response style.

Regarding gender differences, the results indicated that women, compared to men, were less likely to adopt the Extreme Response Style (ERS; $\beta = -0.190$, $p < 0.001$) and more likely to utilize the Midpoint Response Style (MRS; $\beta = 0.020$, $p < 0.01$). These findings are consistent with Kim and Bolt (2021), who reported greater use of midpoint responses among women, and align with the results of Austin et al. (2006). Interaction analyses revealed that the association between Neuroticism and ERS was stronger in men ($\beta = -0.027$, $p < 0.01$), and a similar pattern emerged for Openness ($\beta = -0.023$, $p < 0.05$).

For ARS, the present study confirmed Plieninger (2021) finding that this response style is less influenced by demographic variables such as gender. No significant gender differences were observed in ARS, nor were interactions between gender and personality dimensions statistically significant, indicating that the relationship between personality traits and ARS is comparable across genders.

The weak associations observed for MRS, which explained only 0.5% of the variance, warrant further consideration. This may suggest that midpoint responding is more influenced by situational or cognitive factors than by stable personality traits. As Wetzel et al. (2016) suggested, MRS may reflect cognitive strategies used under uncertainty. Other factors, such as prior knowledge,

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confidence, or familiarity with the questionnaire content, could also play a more substantial role in shaping this response style.

From a theoretical perspective, these findings highlight several important implications. First, gender differences in response styles extend beyond mean-level differences and are evident in how these styles relate to personality traits. Second, the presence of significant interactions for some traits but not others indicates that distinct mechanisms may underlie the formation of response styles in men and women.

From a practical standpoint, these findings provide guidance for improving personality assessment practices. Knowledge of gender-related differences in response styles can inform the development of bias-correction methods sensitive to gender, and clinicians or counselors should consider these differences when interpreting personality test results (Rizopoulos, 2007). Separate norms for men and women may be warranted to ensure that observed differences in response styles are accurately accounted for.

Despite these contributions, the study has several limitations. First, data were collected online, which may have influenced participants' responding (Böckenholt & Meiser, 2017). Second, while the short form of the NEO inventory offers practical advantages, it may not capture the full spectrum of personality–response style relationships observable in the long form.

Future studies could explore the temporal stability of the observed relationships between personality traits and response styles using longitudinal designs. Experimental approaches could also be employed to examine the underlying cognitive and motivational mechanisms that mediate these associations. Additionally, investigating the influence of cultural and social variables on the relationship between personality traits and response styles would provide valuable insights into the generalizability and contextual factors shaping these patterns.

Overall, this research provides robust evidence for systematic relationships between personality traits and response styles. These associations are complex and cannot be simply dismissed as measurement error. Understanding these dynamics not only enhances personality assessment but also offers new insights into how personality and gender influence individuals' response behavior.

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Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Islamic Azad University.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Austin, E. J., Deary, I. J., & Egan, V. (2006). Individual differences in response scale use: Mixed Rasch modelling of responses to NEO-FFI items. *Personality and individual differences*, *40*(6), 1235–1245.

Baumgartner, H., & Steenkamp, J.-B. E. (2001). Response styles in marketing research: A cross-national investigation. *Journal of marketing research*, *38*(2), 143–156.

Billiet, J. B., & McClendon, M. J. (2000). Modeling acquiescence in measurement models for two balanced sets of items. *Structural equation modeling*, *7*(4), 608–628.

Böckenholt, U., & Meiser, T. (2017). Response style analysis with threshold and multi-process IRT models: A review and tutorial. *British journal of mathematical and statistical psychology*, *70*(1), 159–181.

Bolt, D. M., & Johnson, T. R. (2009). Addressing score bias and differential item functioning due to individual differences in response style. *Applied Psychological Measurement*, *33*(5), 335–352.

Costa, P. T., & McCrae, R. R. (2014). The NEO Inventories1. In *Personality assessment* (pp. 229–260). Routledge.

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Henninger, M., & Meiser, T. (2020). Different approaches to modeling response styles in divide-by-total item response theory models (part 1): A model integration. *Psychological Methods*, *25*(5), 560.

Khorramdel, L., & von Davier, M. (2014). Measuring response styles across the big five: A multiscale extension of an approach using multinomial processing trees. *Multivariate Behavioral Research*, *49*(2), 161–177.

Kiefer, T., Robitzsch, A., & Wu, M. (2017). TAM: Test analysis modules (Version 2.8-21)[Computer software]. In.

Kim, N., & Bolt, D. M. (2021). A mixture IRTree model for extreme response style: Accounting for response process uncertainty. *Educational and Psychological Measurement*, *81*(1), 131–154.

Plieninger, H. (2017). Mountain or molehill? A simulation study on the impact of response styles. *Educational and Psychological Measurement*, *77*(1), 32–53.

Plieninger, H. (2021). Developing and applying IR-tree models: Guidelines, caveats, and an extension to multiple groups. *Organizational Research Methods*, *24*(3), 654–670.

Rizopoulos, D. (2007). ltm: An R package for latent variable modeling and item response analysis. *Journal of statistical software*, *17*, 1–25.

Robitzsch, A., Kiefer, T., & Wu, M. (2017). Test analysis modules. *R package version*, *2*, 4–9.

Wetzel, E., Lüdtke, O., Zettler, I., & Böhnke, J. R. (2016). The stability of extreme response style and acquiescence over 8 years. *Assessment*, *23*(3), 279–291.

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