Cognitive Mechanisms of the Barnum Effect in Personality Tests: The Case of MBTI

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Abstract

To investigate the generation mechanisms and influencing factors of the latent Barnum effect in personality tests, this study adopts a sequential explanatory mixed-methods research design, integrating quantitative and qualitative findings to explore the Barnum effect exhibited by individuals during personality testing. The results indicate that the Barnum effect is present among subjects of different genders and with varying levels of familiarity with the MBTI personality test; groups with higher belief in personality tests are more susceptible to the Barnum effect; females hold more believing attitudes toward personality tests than males; and the study reveals the limitations of personality tests and the drawbacks of blind faith in them, providing insights for reducing and intervening in the Barnum effect.

Full Text

Cognitive Mechanisms of the Barnum Effect in Personality Tests: A Case Study of MBTI

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Abstract

This study employed a sequential explanatory mixed-methods design to examine the existence, mechanisms, and influencing factors of the Barnum effect in personality testing. This innovative approach integrates quantitative breadth with qualitative depth to explore how the Barnum effect manifests in personality assessments. The findings reveal that participants across different genders and levels of familiarity with the MBTI personality test exhibited the Barnum effect. Individuals with higher belief in personality tests showed stronger Barnum effects, and women demonstrated significantly greater trust in personality tests

than men. The study illuminates the mechanisms underlying the Barnum effect and the pitfalls of blind faith in personality tests, offering insights for the public, employers, counselors, and test developers to adopt more critical perspectives on personality assessment tools.

Keywords: Barnum effect, MBTI personality test, gender, confirmation bias

Introduction

In recent years, personality tests such as the Myers-Briggs Type Indicator (MBTI) have gained remarkable popularity across social networks, career planning, and human resource management, becoming a notable sociocultural phenomenon. The test results are characterized by ambiguous, flattering descriptions, and test-takers may exhibit confirmation bias due to pre-existing beliefs about the test' s validity—psychological foundations that foster the Barnum effect. While previous research has documented the Barnum effect in astrology and horoscopes, this study investigates its presence in personality testing, its underlying mechanisms and influencing factors, and the consequences of uncritical acceptance.

The Barnum effect refers to the tendency for individuals to accept vague, general personality descriptions as highly accurate reflections of their unique characteristics, representing a classic cognitive bias. Forer (1949) first systematically demonstrated this phenomenon by providing students with identical, ambiguous personality descriptions that they nonetheless rated as highly accurate. Snyder and Shenkel (1977) later identified "ambiguity" as the most critical characteristic enabling the Barnum effect. This psychological phenomenon appears across diverse domains and populations, including astrology (Dickson & Kelly, 1985), clinical diagnosis, academic conferences (Lan, 2021), medical students (Wang, 2020), and consumer behavior (Wang et al., 2014).

Personality tests measure individual behavioral uniqueness and tendencies. The MBTI, based on Carl Jung's theory of psychological types, classifies personalities into 16 types across four dichotomies. Scholars consider it one of the most widely used personality assessments globally (Chen & Cao, 2024). In 2023, MBTI results ("i-person/e-person") topped the list of internet buzzwords, becoming the most popular social label (Song & Qin, 2024). The test is now employed in mate selection (Li, 2024), employee training (Meng, 2024), marketing (Chen, 2024), serves as social currency (Quan & Rui, 2024), and even appears in criminal investigation contexts (Zhao, 2024). Based on these trends, this study selected MBTI as the most representative personality test for investigation.

Despite its popularity, MBTI has faced substantial criticism. Some scholars equate it with "cyber fortune-telling" (Wang, 2025), while others note its negative effects on college students, including self-labeling and group stereotyping that hinder accurate self-perception (Li, 2023). Pittenger (2005a) identified low test-retest reliability and insufficient validity evidence, and Boyle (1995) highlighted issues with the forced-choice format, inter-dimensional correlations, and

unstable factor structure.

Given these concerns, investigating the Barnum effect' s presence, mechanisms, and influencing factors in personality testing is essential. This study proposes four hypotheses: **H1:** The Barnum effect exists in personality testing. **H2:** Gender and MBTI familiarity significantly influence Barnum effect intensity. **H3:** Gender and MBTI familiarity significantly affect belief in personality tests. **H4:** Higher belief in personality tests predicts stronger Barnum effects, as pre-existing attitudes likely moderate the effect through subjective validation and susceptibility to flattery.

Methodology

Research Design

This study employed a sequential explanatory mixed-methods design to elucidate the Barnum effect' s mechanisms and influencing factors. This approach leverages quantitative research' s breadth, generalizability, and replicability alongside qualitative research' s depth, specificity, and contextualization (Robinson, 2007). The research proceeded in two phases: first, quantitative analysis identified patterns and relationships; second, qualitative exploration illuminated the underlying reasons for these quantitative findings.

Quantitative Phase

Participants Sample size calculations used G*Power 3.1 (Faul et al., 2007). For detecting the Barnum effect via one-sample t-test ($\alpha = 0.05$, power = 0.95), 45 participants were required. For testing belief' s predictive effect via regression ($\alpha = 0.05$, power = 0.95), 74 participants were needed. For exploring gender differences via independent t-test ($\alpha = 0.25$, power = 0.80, exploratory analysis), 64 participants were required. Accounting for attrition, 79 university students were recruited (approximately equal across four undergraduate years; mean age = 20.64 $\pm$ 1.72 years; 32 male, 47 female). Participants provided informed consent and received compensation.

Materials The study used the MBTI personality type framework as the ostensible assessment tool, a widely adopted instrument in psychological research (Pittenger, 2005b). Actual data collection employed: (1) an accuracy rating questionnaire (10-point scale, higher scores indicating greater perceived accuracy); (2) a belief-in-personality-tests questionnaire (10-point scale, higher scores indicating stronger belief that tests measure true personality); and (3) demographic questions assessing gender and MBTI familiarity.

The "classic personality paradigm" (Barnum description) used was: "You are a very considerate person who always helps others promptly. Yet, if honest, you sometimes discover selfish aspects in yourself···Sometimes you are so true to your feelings that you reveal too much of yourself. You think things through

carefully and demand evidence before changing your mind about anything. In new situations, you are very cautious until you understand what is happening, then act confidently···You know how to be a good friend. You exercise self-control, so others see you as self-possessed, though sometimes you feel insecure. You wish you were more popular and comfortable in relationships than you are now. You appear wise to the world, a wisdom derived from difficult experiences rather than book learning."

Procedure A double-blind approach prevented demand characteristics. Experimenters and participants were told the study validated a new personality test' s reliability and validity; the true design was revealed post-experiment. Participants completed the study in a behavioral assessment laboratory. Phase one involved completing demographics and the MBTI questionnaire, with all participants receiving the classic personality paradigm as their "result." Phase two required rating how well this description matched their true personality and rating their belief in personality tests. Phase three involved data collection and analysis.

Qualitative Phase

Participants Purposeful sampling selected five participants from the 79 quantitative respondents for semi-structured interviews. Maximum variation sampling ensured diverse perspectives across gender and grade level (age range: 20-22 years, M = 21.0, SD = 0.8). Detailed participant information appears in Table 1 .

Materials Based on quantitative findings, the interview guide addressed: (1) familiarity with and perceptions of MBTI' s accuracy and scientific validity; (2) degree of belief in personality tests' ability to measure true character and reasons why; (3) awareness of the Barnum effect and its applicability to astrology; and (4) similarities between personality tests and astrology, and how to appropriately acknowledge the Barnum effect' s influence.

Procedure After obtaining informed consent, interviews were audio-recorded and transcribed. Braun and Clarke' s thematic analysis (Clarke, 2006) identified patterns explaining quantitative results. Participants showed no cognitive impairments and received compensation.

Data Analysis

Quantitative data were analyzed using SPSSPRO, a scientific statistical platform providing data analysis services (Yang, 2023). Origin 2024 software generated fitted curves and confidence intervals. AMOS 29' s graphics module visualized qualitative themes.

Results

Quantitative Findings

Descriptive statistics appear in Tables 2 and 3 . To test H1, a one-sample t-test compared accuracy ratings against the scale midpoint (conventional in Barnum effect research). Results showed accuracy ratings (M = 7.46, SD = 1.63) significantly exceeded the midpoint, t(78) = 10.66, p = 1.39×10^{-17}, confirming the Barnum effect' s presence and supporting H1.

To test H2 and H3, independent t-tests examined gender and familiarity effects. No significant gender difference emerged in accuracy ratings: men (M = 7.13, SD = 1.68) versus women (M = 7.68, SD = 1.58), t(77) = -1.50, p = 0.138, Cohen' s d = 0.34 (small effect). However, men (M = 6.75, SD = 1.67) showed significantly lower belief than women (M = 7.60, SD = 1.74), t(77) = -2.16, p = 0.034, Cohen' s d = 0.494 (medium effect). MBTI familiarity showed no significant effects on either accuracy ratings (t(77) = -0.20, p = 0.84, Cohen' s d = 0.058) or belief (t(77) = -0.23, p = 0.82, Cohen' s d = 0.056). Thus, H2 was partially supported and H3 was not supported.

To test H4, correlation and regression analyses examined relationships between variables. Pearson correlation revealed a strong positive relationship between belief and accuracy ratings, r(77) = 0.781, t = 10.97, p = 1.18×10^{-17} (Table 5). Simple linear regression showed belief significantly predicted accuracy ratings, F(1, 77) = 120.22, $R^2 = 0.61$, B = 0.73, SE = 0.07, $\beta = 0.78$, t(77) = 10.97, p = $1.18 \times 10^{-17} < 0.001$ (Table 6). All VIF values were below 10, indicating no multicollinearity. The fitted model (Figure 1 [Figure 1: see original paper]) and stacked plot (Figure 2 [Figure 2: see original paper]) visualized these relationships, with the regression equation y = 2.18 + 0.73x enabling prediction (e.g., at x = 7, predicted y = 7.29). These results support H4.

Qualitative Findings

Thematic analysis of interview transcripts identified three core themes explaining the quantitative results (Figure 3 [Figure 3: see original paper]).

Theme 1: Characteristics of Test Materials explains results from the test content itself. Subtheme 1, "Ambiguity,"emerged as most participants identified vague, two-sided descriptions as key to the Barnum effect: "I think the Barnum effect exists because many statements cover both sides, like saying you' re considerate but occasionally selfish. Because the answer is ambiguous, most people find it fits them [XS5]." This aligns with research showing people accept fuzzy descriptions (Mercier & Sperber, 2011). Subtheme 2, "Confirmation Bias," involved participants seeking supporting evidence from their lives: "If you already believe in personality tests' accuracy, many will trust the results even if they' re not scientifically valid [XS5]." Subtheme 3, "Flattering Tendency," reflected belief in socially desirable, pride-enhancing statements: "Many descriptions make you feel good and special, so most people find them fitting [XS5]."

Theme 2: Characteristics of Test-Takers explains results from individual differences. Subtheme 1, "Individual Attitude," confirmed that higher trust predicted stronger Barnum effects: "I really believe in personality tests and generally find the results quite accurate [XS3]." Subtheme 2, "Gender Differences," showed both genders exhibited the Barnum effect, but women held significantly stronger beliefs: "I really believe in personality tests and find them quite accurate [XS3]; I think I hide my true personality when answering, so tests only capture the tip of the iceberg [XS5]." Subtheme 3, "Familiarity," revealed that regardless of MBTI experience, participants trusted personality tests: "I haven' t taken MBTI but know about personality tests. Though they have limitations, they can still measure true character [XS5]."

Theme 3: Pitfalls of Blind Faith addresses consequences. Subtheme 1, "Self-Perception Bias," indicated that uncritical trust hinders accurate self-understanding: "I think over-trusting personality tests undermines developing good self-awareness and discernment [XS3]." Subtheme 2, "Self-Handicapping," suggested belief leads to conformity with test results: "Some people who completely believe in personality tests will self-handicap—they unconsciously conform to what the test says they are [XS1]." Subtheme 3, "Test Misuse," criticized over-reliance across domains: "Many companies use personality tests for hiring and promotion. I think the results don' t necessarily reflect true traits and shouldn' t be a major screening tool [XS2]."

Discussion

Existence of the Barnum Effect

The one-sample t-test confirmed that participants tended to believe the prepared classic personality paradigm, a finding corroborated in interviews. Thus, the Barnum effect exists in personality testing, supporting previous theoretical explanations. Classic personality descriptions typically exhibit flattering characteristics that satisfy universal self-enhancement needs (Sedikides & Gregg, 2008). Additionally, individuals display confirmation bias by focusing on matching information while ignoring mismatches. MBTI' s inherent ambiguity (Pittenger, 2005) provides fertile ground for these cognitive biases.

Universality of the Barnum Effect: Beyond Gender and Knowledge

The Barnum effect's intensity was not significantly influenced by gender or familiarity, suggesting a phenomenon rooted in more universal cognitive mechanisms that transcend demographic variables (Dickson & Kelly, 1985). Qualitative data support this: regardless of background, participants noted that "descriptions always have reasonable parts," reflecting confirmation bias as a ubiquitous cognitive strategy (Nickerson, 1998).

Key Driver: The Central Role of Trust

The strong positive correlation between belief and accuracy ratings, with belief powerfully predicting Barnum effect intensity, reveals that pre-existing attitudes serve as a critical psychological lever. Qualitative data explain this relationship: high-trust respondents exhibited "self-verification" (Swann & Pelham, 1989) and "positive illusion" (Taylor & Brown, 1988) motivations, actively seeking self-concept consistency within ambiguous descriptions and enjoying the positive feedback. Thus, the Barnum effect in personality testing arises not only from information ambiguity but also from the motivation to believe. This interaction between motivational and informational characteristics drives uncritical acceptance, consistent with Furnham and Schofield' s (1987) finding that trust is a common core driver across domains.

Theoretical Contributions and Implications

This sequential mixed-methods study integrates quantitative and qualitative findings to explore the Barnum effect in personality testing. It confirms the effect' s existence, reveals its universality beyond gender and knowledge backgrounds, and demonstrates that "confirmation bias" and "trust" serve as core mechanisms, with "ambiguity" and "flattery" acting as psychological catalysts. The established regression model linking pre-existing belief to Barnum effect intensity provides theoretical grounding for research across domains.

These findings caution users to maintain critical attitudes toward personality test results, recognizing their limitations and potential cognitive biases (Dickson & Kelly, 1985). The study helps users develop media literacy and critical thinking, encouraging reflection when encountering test results and avoiding self-handicapping. It discourages labeling oneself based on a single result, promoting more dynamic self-conceptualization. For organizations, it advocates 审慎 use of personality tests in hiring and assessment, pushing for more objective evaluation tools (Stein & Swan, 2019). For counselors and career advisors, it promotes proper test use and rational client guidance. For test developers, it encourages pursuing higher reliability and validity rather than exploiting the Barnum effect.

Limitations and Future Directions

This study did not explore why women trust personality tests more than men, and used a liberal significance level for gender difference tests. Future research should verify these findings with larger samples. The single experimental material limits generalizability to other personality tests, requiring further validation. Future work should develop interventions—such as brief critical thinking training or psychoeducation—to test whether these can improve public discernment and mitigate the Barnum effect' s negative impact, thereby enhancing scientific literacy. Neuroimaging studies could explore brain reward system and default mode network activity when processing Barnum descriptions, revealing neural

mechanisms underlying their perceived credibility.

Conclusion

This study demonstrates the significant presence of the Barnum effect in personality testing, unaffected by gender differences or familiarity levels. Individuals with higher belief in personality tests exhibit stronger Barnum effects, with women showing greater trust than men. These findings highlight the need for critical engagement with personality assessments and provide a foundation for developing interventions to reduce cognitive bias in test interpretation.

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Note: Figure translations are in progress. See original paper for figures.