

The Multiple-Pathways of Personality Traits on Fitness Behavior: The Mediating Role of Ethical Orientation

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Abstract

This paper constructs a multi-impact path model of personality traits on fitness behavior, based on theories of personality psychology and normative ethics, empirically tests the relationships between constructs in the model, and reveals the influence mechanisms of economic value orientation and machiavellian personality traits on fitness behavior. A total of 278 fitness enthusiasts from 26 provinces in China, each with at least one year of fitness experience, were selected as research subjects using convenience and snowball sampling methods. A questionnaire survey was conducted to examine the relationships among their personality traits, moral orientation, and fitness behavior. Descriptive and visual analysis was performed using SPSS 25.0 and R 4.2.2, and the structural equation model of the multi-impact path model on fitness behavior was tested using AMOS 20.0. (1) Economic value orientation personality traits significantly positively influence normative fitness behavior; (2) Machiavellian personality traits significantly positively influence anomie fitness behavior; (3) Teleological ethics partial mediating role between economic value orientation personality traits and normative fitness behavior; (4) Deontological ethics partial mediating role between machiavellian personality traits and anomie fitness behavior. Fitness enthusiasts with economic value orientation personality traits who adhere to fitness pragmatism are more likely to exhibit a sense of social responsibility, pay more attention to pursuing moral purposes, focus on social fairness and justice, and the results and impacts of fitness behavior, thereby leading to more normative fitness behavior. Conversely, those with machiavellian personality traits who adhere to utilitarianism often face dilemmas where their moral beliefs conflict with practical benefits and disadvantages. They are more likely to violate moral standards and social order, resulting in unethical anomie fitness behavior.

Keywords: Economic Value Orientation Personality Traits, Machiavellian Personality Traits, Teleological Ethics, Deontological Ethics, Normative Fitness Behavior, Anomie Fitness Behavior.

Introduction

As people become more conscious of healthy living, a fitness wave is sweeping the globe (Millington, 2016). Surveys indicate that by 2020, the number of global fitness enthusiasts reached 220 million (Statista, 2020). The global fitness club market has seen steady growth in the past decade, reaching \$108 billion in 2021. It is expected to reach \$129 billion by 2026 (IBISWorld, 2021). The scale of global fitness consumers has grown by 37% in the past ten years (PwC, 2020). Recent research indicates that as the number of fitness participants continues to increase, there is a substantial demand for fitness-related information, such as fitness methods, training techniques, sports nutrition, and supplements. People are actively engaging

in fitness activities to improve their physical and mental health and quality of life. Fitness behavior, aimed at enhancing physical health, includes aerobic exercise, strength training, and yoga (Piko & Keresztes, 2006; Scully et al., 1998). Fitness behavior encompasses normative fitness behavior (NFB) and anomie fitness behavior (AFB). NFB, which is health-centered, is a safe and effective exercise that adheres to a set of fitness rules for physical training (Brown, 1993). NFB is characterized by wearing appropriate sports attire and shoes, performing adequate warm-up and cool-down exercises (Bushman, 2019), maintaining good hygiene habits, reasonably controlling exercise intensity and duration, and adhering to the rules and management of fitness facilities (Okely et al., 2021). AFB violates social and ethical norms and involves

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pursuing fitness goals in an unhealthy or even dangerous manner (Lejoyeux et al., 2012). It manifests as excessive and compulsive exercise (Meeusen et al., 2013), addiction to exercise (González-Hernández et al., 2021), disordered eating (Stice, 2002), use of stimulants (Andreasson & Johansson, 2020), abuse of weight loss drugs (Petróczi et al., 2015), use of fillers (Figueiredo et al., 2011), overuse of muscle-enhancing drugs (Ip et al., 2011), and body image disorders (Reinboth, Sundgot-Borgen, & Bratland-Sanda, 2022). In today's internet-informed society in China, people can quickly access fitness knowledge through social media. However, this fitness information is often of mixed quality. For instance, many online fitness influencers attract followers by flaunting muscular physiques and passionate performances, exaggerating their claims to promote unreasonable fitness methods, and even selling harmful fitness products. This has a significant negative impact on people's fitness behaviors (Fardouly et al., 2015). The proliferation of inaccurate fitness information online has a partial impact on certain fitness enthusiasts, impairing their capacity to discern reliable fitness guidance. This impairment can result in misconceptions and biases in their understanding of fitness practices, potentially leading to disorganized or AFB. While NFB can positively promote the development of fitness activities, AFB poses significant risks to the physical and mental health, as well as the social and moral perception, of the fitness community (Lechner, Bolman, & Van Dijke, 2006). Early research indicates that Émile Durkheim (1893) viewed anomie as deviant behavior by individuals or groups, primarily caused by the disconnection in the development of social moral norms and the ineffective control of people's desires and actions (Durkheim, 2014). Additionally, personality traits have a significant impact on individuals' normative or anomie behaviors. A review of the existing literature reveals a close relationship between personality traits and moral orientation, with personality traits influencing an individual's moral orientation and behavior (Rest, 1986). Personality traits refer to individual characteristics that can be measured using psychological tools. An individual's value orientation, a core component of personality traits, is a stable psychological and behavioral orientation based on one's values, internalized into one's personality structure. Value orientation has a directional function in evaluating things, evoking attitudes, and guiding and regulating behavior. Based on different individual value orientations, personality traits can be classified into economic value orientation personality traits (EVOP) and machiavellian personality traits (MVP), which are notably observed within fitness communities (Burger & Reevy, 2022).

Moral orientation is the fundamental cognition of people about what is right or wrong, good or bad, and it significantly influences an individual's decision-making and behavior. It can be divided into deontological and teleological ethics (TE) (Schwartz, 1992). Deontological ethics (DTE) holds that actions should conform to norms, emphasizing the legality of actions, while TE considers the consequences of actions, emphasizing goal achievement (Proios, 2010). Since different personality traits lead to varied cognitive differences, resulting in diverse individual behaviors, and moral orientation is a manifestation of an individual's moral cognition tendency and falls within the personal cognitive category, this study hypothesizes that personality traits may influence fitness behavior through moral orientation, which is an important mediating variable (Wang, Fang, & Jiang, 2011).

Reviews of past studies show that the factors affecting the fitness behaviors of fitness enthusiasts are numerous and complex. Current research mainly focuses on the relationship between fitness behavior and physical health (Warburton, Nicol, & Bredin, 2006), mental health (Penedo & Dahn, 2005), body esteem (Robinson et al., 2017), occupation (Yang et al., 2010), the impact of online social media (Tiggemann & Slater, 2013) and individual social environments on fitness behavior. These studies typically employ interviews, questionnaires, or literature reviews for data analysis but often lack theoretical foundations and a conceptual research framework. In China, the investigation and research on fitness behavior have not yet received sufficient attention and importance. Currently, behaviors that violate fitness norms (including the use of stimulants, abuse of weight-loss drugs, use of fillers, etc.) are increasingly prevalent, but scholars have not yet paid enough attention to this phenomenon. Limitations in research samples and methods have led to an incomplete understanding of the relationship between personality traits of fitness enthusiasts and their fitness behaviors, necessitating further in-depth study and validation (Kavussanu, 2019).

Based on this, this study constructs a multiple-impact path model of personality traits on fitness behavior, grounded in theories of personality psychology and normative ethics. It uses moral orientation as a mediating variable to explore the effects of prominent personality traits in the fitness population, such as EVOP and MVP, on both normative and AFB. The aim is to reveal the mechanisms by which different personality traits in the fitness population influence normative and AFB, and to provide a deeper understanding of the relationship between the personality traits of fitness enthusiasts and their demonstrated normative and AFB.

Literature Review and Hypothesis

Direct and Indirect Effects of Economic Value Orientation Personality Traits on Normative Fitness Behavior

EVOP refer to a practical value orientation. Individuals with this type of personality place more emphasis on the utilitarian value of things, seeking practicality, and evaluating the value of things based on whether they can bring benefits to the individual or group's survival and development. They focus more on the results rather than the process (Furnham, 1984). With the fitness community, individuals with positive personality traits, strong ethical beliefs, and self-control are more likely to exhibit normative behavior (Biddle et al., 2021). Individuals who pursue higher economic benefits are more concerned with maintaining social trust and order, are more willing to follow rules and laws, and tend to exhibit more normative behavior (Biddle et al., 2021). TE is concerned with the necessary conditions for achieving happiness and the consequences of actions, as opposed to DTE which emphasizes legality and justice. All human voluntary actions are teleological, as the purpose and behavior are interrelated when individuals speculate on the success or failure of an action. An individual's personality traits may influence their decision-making process and values, which may affect their ethical decision-making behavior. TE may also play a role in economic decision-making, especially when there is a conflict between social and economic interests. Based on these observations, this study proposes the following hypotheses:

H1: EVOP has a positive impact on NFB.

H2: TE has a mediation effect between EVOP and NFB.

Direct and Indirect Effects of Economic Value Orientation Personality Traits on Anomie Fitness Behavior

In the fitness community, individuals with negative personality traits are more likely to exhibit AFB (Biddle et al., 2021). Individuals with strong EVOP tend to evaluate and explain their behavior through the pursuit of personal interests and freedom, rather than considering social norms and values. This personality trait may lead individuals to overlook social and cultural norms in their behavioral decision-making, resulting in behavior that violates social norms (Mead et al., 2009). There is a negative correlation between individuals' economic interest orientation and their degree of identification with ethical concepts, and the more people focus on economic interests, the more they view ethics as a means to an end (Aquino & Reed II, 2002). DTE, which includes a moral orientation towards "normative order" and "justice or fairness," requires individuals to act in accordance with certain ethical principles or legitimate reasons, in contrast to

"teleology" and "utilitarianism" (Kohlberg, 1981). People are more likely to exhibit unethical behavior when they are financially abundant, especially those who prioritize DTE. This is because these people believe that following obligations is correct, but when they have more wealth, they may be more likely to ignore their obligations and exhibit unethical behavior (Gino & Pierce, 2009). Based on these observations, this study proposes the following hypotheses:

H3: EVOP has a positive impact on AFB.

H4: DTE has a mediation effect between EVOP and AFB.

Direct and Indirect Effects of Machiavellian Personality Traits on Normative Fitness Behavior

Machiavellianism, as conceptualized by Christie and Geis (1970), is a political philosophy and behavioral paradigm endorsing the employment of manipulation, coercion, and strategic maneuvering to fulfill objectives (Christie & Geis, 1970). MVP is a personality tendency that displays machiavellian characteristics in behavior (Wilson, Near, & Miller, 1996), which typically include selfishness, callousness, deceitfulness, immorality, competitiveness, and pursuit of power (Jones & Paulhus, 2010). Studies have proposed that machiavellianism is highly correlated with the two dimensions of pro-sociality and power, which means that MVP individuals may be more concerned with their own interests and power than building intimate relationships with others, which may have a significant impact on their behavior norms (Jones & Paulhus, 2010). TE judges the correctness and legitimacy of behavior based on its ultimate results, and if the behavior can maximize the benefits to society, then it is ethical. Unlike DTE, which emphasizes legality and justice, the focus of TE is on the purpose, goal, or consequence of the action, including utilitarianism and perfectionism. Utilitarianism can be further divided into egoistic utilitarianism and social utilitarianism, the former referring to the consequences for the individual and the latter referring to the consequences for the entire group (Colby & Kohlberg, 1987). Studies have also shown a significant positive correlation between MVP and egoistic ethical views (Forsyth, 1980). Machiavellians are more likely to use ethical norms to achieve their own goals rather than for the value of ethics itself (Christie & Geis, 1970). Based on this, the present study proposes the following hypotheses:

H5: MVP has a positive impact on NFB.

H6: TE has a mediation effect between MVP and NFB.

Direct and Indirect Effects of Machiavellian Personality Traits on Anomie Fitness Behavior

As one of the dark triad personality traits, machiavellianism is strongly associated with antisocial behavior (Paulhus & Williams, 2002). Individuals with dark personality traits are

more likely to pursue short-term and superficial fitness effects and engage in unethical fitness behaviors, such as using stimulants and over-exercising. There is a positive relationship between dark personality traits and fitness addiction (González-Hernández et al., 2021). Studies have shown that individuals with higher self-efficacy, self-discipline, and goal-orientation are more likely to exhibit NFB (Yu et al., 2022), while those with lower self-efficacy, extraversion, and neuroticism are more likely to exhibit AFB (Sherwood & Jeffery, 2000). Machiavellians tend to consider ethical issues from the perspective of individual interests rather than based on a universal obligation or principle to determine their behavior (Christie & Geis, 1970). Individuals with MVP exhibit a cold, detached mentality, less affected by the emotions of others, believing that means serve the end, and advocating the use of any means for the purpose, including unethical means. The higher the degree of machiavellianism, the lower the level of ethical consciousness (Rawwas, 1996). Based on this, the present study proposes the following hypotheses:

H7: MVP has a positive impact on AFB.

H8: DTE has a mediation effect between MVP and AFB.

In summary, the research framework and hypotheses proposed in this study are shown in Figure 1.

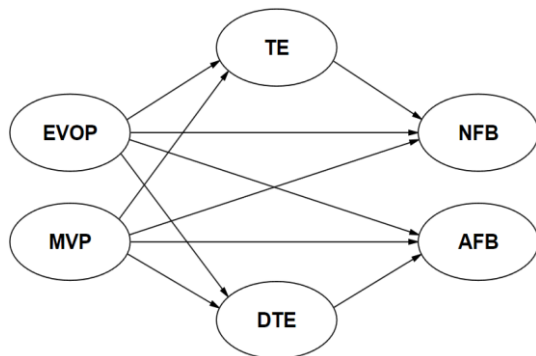


Figure1: Research Structure and Hypothesis.

Note: EVOP: Economic value orientation personality traits; MVP: Machiavellian personality traits; TE: Teleological ethics; DTE: Deontological ethics; NFB: Normative fitness behavior; AFB: Anomie fitness behavior; EVOP→NFB=H₁; EVOP→TE→NFB=H₂;

EVOP→AFB=H₃; EVOP→DTE→AFB=H₄; MVP→NFB=H₅; MVP→TE→NFB=H₆; MVP→AFB=H₇; MVP→DTE→AFB=H₈.

Research Design

Participants

The study recruited fitness enthusiasts who had at least one year of fitness experience as participants. A total of 278 valid questionnaires were collected through convenience sampling and snowball sampling in 26 provinces of China,

with a 100% valid response rate. The convenience sampling method was selected here for its ability to be implemented quickly and conveniently. To avoid biases associated with its sample representation not reflecting the entire population, the snowball sampling method was employed to supplement the sample. Among them, 216 were male, accounting for 77.7%, and 62 were female, accounting for 22.3%. The average age was 30.29±9.79 years, and the average duration of fitness experience was 4.96±3.58 years. Ten participants (3.6%) exercised once a week, 34 (12.2%) exercised twice a week, 83 (29.9%) exercised three times a week, 55 (19.8%) exercised four times a week, 65 (23.4%) exercised five times a week, 21 (7.6%) exercised six times a week, and 10 (3.6%) exercised more than six times a week, as shown in Table 1. The regression analysis of personality traits and fitness behavior achieved a significant level (0.05) with an effect size between 0.10 and 0.30. Based on this, G*Power3.1.9.2 software was used for analysis. The results showed that 25-92 participants were needed to achieve a statistical power of 0.80 (α=0.05). Therefore, the number of participants in this study met the minimum sample size requirement.

Table1

Analysis of Basic Information

Variable	Value Label	Frequency	Percent
Gender	Male	216	77.7
	Female	62	22.3
Age	Under 22	45	16.2
	22~28	116	41.6
	29~35	56	20.1
	Over 36	61	22.1
	1~3 years	128	46.2
Years of fitness	3~5 years	58	20.8
	5 years or more	92	33.0
	1~3 times	127	45.7
Weekly fitness frequency	4~6 times	141	50.7
	6 times or more	10	3.6

Description of Study Variables

Personal Background

This study mainly investigates the fitness behavior of fitness enthusiasts. Therefore, personal basic data will be measured in the first part of the questionnaire survey, including four items: gender, age, fitness experience, and weekly fitness frequency. (1) Gender: male, female. (2) Age: under 22, 22-28, 29-35, above 36. (3) Fitness experience: 1-3 years, 3-5 years, 5 years or more. (4) Weekly fitness frequency: 1-3 times, 4-6 times, 6 times or more.

Measurement of Latent Variables

The measurement of the questionnaire items is based on the Likert seven-point scale, which ranges from strongly disagree (1) to strongly agree (7) to score. The higher the score, the higher the level of agreement of the respondents toward the research variables. After the design of the questionnaire items, experts and scholars were invited to review and provide feedback. The questionnaire designs for each construction are explained as follows:

Economic value orientation personality traits (EVOP): The EVOP scale was developed based on Allport's work (Burger & Reeve, 2022). Three questions were revised, Sample items include "I prefer effective, diligent, and practical fitness partners". The internal consistency of the scale was Cronbach's $\alpha = 0.72$.

Machiavellian personality traits (MVP): The MVP scale was developed based on Dahling's work (Dahling, Whitaker, & Levy, 2009). Four questions were revised, Sample items include "If others threaten my fitness goals, I will intentionally sabotage their efforts". The internal consistency of the scale was Cronbach's $\alpha = 0.88$.

Moral orientation (MO): The moral orientation scale was developed based on Proios's work (Proios, 2010). There are four questions for Deontological ethics (DTE), Sample items include "I will acknowledge my violations". There are five questions for Teleological ethics (TE), Sample items include "I will strive to help my fitness partners". The internal consistency of the scales was Cronbach's $\alpha = 0.75$ and 0.89 , respectively.

Normative fitness behavior (NFB): Drawing on the scale of sports normative behavior (Chen et al., 2020) and combining it with the Rational Behavior Theory (Wong & Chow, 2020), the Scale was rewritten with 5 items, Sample items include "Reasonable training and diet can promote health or prolong life". The internal consistency of the scale, Cronbach's α , was 0.89 .

Anomie fitness behavior (AFB): Drawing on the scale of irrational behavior (Lee, 2022) and combining it with the scale of sports anomie behavior (Liu, Chen, & Yang, 2022), the Scale was rewritten with 5 items, Sample items include "I feel that the fitness courses and products promoted vigorously by fitness institutions recently are more attractive". The internal consistency of the scale, Cronbach's α , was 0.88 .

Data Analysis

Initially, invalid and aberrant data were cleansed before conducting any analyses. The distribution of the data was assessed using the Q-Q plot and the Shapiro-Wilk (S-W) test. Descriptive analysis was then carried out with SPSS 25.0. Subsequently, R 4.2.2 was utilized for correlation analysis and the creation of visual graphs.

For the assessment of the measurement model's reliability and validity, AMOS 20.0 was employed. The model fit was evaluated using several goodness-of-fit indices, including Chi-squared/deviation freedom (χ^2/df), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), Tucker-Lewis fit index (TLI), standardized root mean square residual (SRMR) and root mean square error of approximation (RMSEA). The general criteria for an acceptable model fit were <5 for χ^2/df , >0.90 for GFI, AGFI, CFI and TLI, and <0.08 for RMSEA and SRMR (Liu et al., 2021). For all direct and indirect effects in the path analysis, standardized coefficients (β) with 95% confidence intervals (CI) were calculated using maximum likelihood estimation with a bias-corrected bootstrapped approach (5000 resamples). All significance levels were set as $p < 0.05$ (two tailed). The effect size of Cohen's f^2 for the model prediction was calculated by using the equation " $f^2 = R^2/(1 - R^2)$ ", with 0.02 , 0.15 , and 0.35 indicating a small, moderate, and large effect, respectively (Duan et al., 2022). Additionally, this study used a nested competitive model to determine whether common method bias exists. The single-factor CFA analysis yielded a χ^2 of 2461.908 with 300 degrees of freedom, and the multi-factor CFA analysis yielded a χ^2 of 475.121 with 284 degrees of freedom. The significant difference was analyzed using the STATBL software (Zhang, Xu, & Su, 2020), and the $\Delta df=16$ and $\Delta\chi^2=1986.787$, with a p-value of <0.001 . Thus, this study is not affected by Common Method Bias.

Analysis Results

Confirmatory Factor Analysis

As shown in Table 2, the absolute values of Skew range from 0.108 to 0.697 , which are less than 3.000 , and the absolute values of Kurtosis range from 0.161 to 0.583 , which are less than 8.000 , indicating that the data distribution can be considered normal (Tabachnick & Fidell, 2014). The results of confirmatory factor analysis (CFA), including factor loadings range from 0.528 to 0.885 , the composite reliability ranges from 0.732 to 0.901 , and the average variance extracted ranges from 0.468 to 0.664 , all meeting the standard criteria (Hair Jr. et al., 2009): (1) factor loadings greater than 0.50 ; (2) composite reliability greater than 0.60 ; (3) average variance extracted close to or greater than 0.50 . Therefore, all six constructs have good reliability and convergent validity.

Table 2

Results of Confirmatory Factor Analysis

Latent variables	Observation variables	Significance of test parameters				Std	Item reliability	Composition reliability	Average variance extracted	M	SD	Skew	Kurtosis
		Unstd	SE	Z-value	P								
EVOP	EVOP1	1.000				0.618	0.382						
	EVOP2	0.961	0.127	7.594	***	0.723	0.523	0.732	0.478	5.940	0.887	-0.577	-0.161
	EVOP3	1.008	0.133	7.585	***	0.727	0.529						
MVP	MVP1	1.000				0.823	0.677						
	MVP2	1.080	0.063	17.159	***	0.885	0.783	0.887	0.664	2.220	0.888	0.697	0.312
	MVP3	1.158	0.068	16.912	***	0.873	0.762						
	MVP4	0.913	0.078	11.683	***	0.659	0.434						
DTE	DTE1	1.000				0.655	0.429						
	DTE2	0.814	0.087	9.400	***	0.783	0.613	0.775	0.468	5.970	0.781	-0.530	-0.233
	DTE3	0.425	0.059	7.249	***	0.528	0.279						
	DTE4	0.833	0.090	9.278	***	0.742	0.551						
TE	TE1	1.000				0.791	0.626						
	TE2	0.942	0.065	14.459	***	0.809	0.654						
	TE3	1.056	0.074	14.282	***	0.801	0.642	0.901	0.644	5.980	0.790	-0.583	0.341
	TE4	1.083	0.079	13.631	***	0.771	0.594						
	TE5	1.051	0.070	15.114	***	0.840	0.706						
NFB	NFB1	1.000				0.733	0.537						
	NFB2	0.992	0.075	13.143	***	0.817	0.667						
	NFB3	1.006	0.081	12.345	***	0.767	0.588	0.893	0.627	6.380	0.616	-0.642	-0.583
	NFB4	0.936	0.071	13.174	***	0.819	0.671						
	NFB5	0.876	0.066	13.185	***	0.819	0.671						
AFB	AFB1	1.000				0.775	0.601						
	AFB2	0.996	0.078	12.831	***	0.757	0.573						
	AFB3	1.102	0.081	13.642	***	0.800	0.640	0.885	0.607	3.460	1.278	-0.108	-0.510
	AFB4	1.146	0.081	14.171	***	0.829	0.687						
	AFB5	1.060	0.086	12.329	***	0.731	0.534						

Note: EVOP: Economic value orientation personality traits; MVP: Machiavellian personality traits; TE: Teleological ethics; DTE: Deontological ethics; NFB: Normative fitness behavior; AFB: Anomie fitness behavior; Unstd.: Unstandardized coefficients; SE: Standard error; SMC: Squared multiple correlations; CR: Composite reliability; AVE: Average variances extracted; M: Mean; SD: Standard deviation; *** $p < 0.001$.

Correlation Analysis and Discriminant Validity Test

Pearson correlation coefficients were used for visual analysis, allowing for a clear determination of the strength of the relationships between variables (as shown in Figure 2). In the figure, the upper right side of the diagonal line shows the correlation values between EVOP, MVP, TE, DTE, NFB, and AFB. The diagonal line itself represents the data distribution of each variable. The lower left side of the

diagonal line displays scatter plots of each variable's data, with scales indicating the 7-point scale of the questionnaire. The results show that the correlation coefficient between NFB and AFB is the lowest ($r = -0.073$, $p > 0.05$) and is significant with other variables. AFB and MVP have a significant positive correlation ($r = 0.326$, $p < 0.001$) and are negatively correlated with other variables. The correlation between EVOP and TE is the highest and significantly

positive ($r=0.510$, $p<0.001$), while it is the lowest and significantly negative with MVP ($r=-0.266$, $p<0.001$). The correlation between MVP and NFB is the lowest and significantly negative ($r=-0.172$, $p<0.001$). DTE and TE have the highest and a significant positive correlation ($r=0.490$, $p<0.001$), and TE and AFB have the smallest and a significant negative correlation ($r=-0.152$, $p<0.05$).

In addition, the discriminant validity was analyzed using the AVE method, where the square root of AVE for each

variable should be greater than the correlation coefficients between each pair of variables, indicating that the variables have discriminant validity. Based on the correlation analysis in Figure 2 and the AVE results in Table 2, which show the square root of AVE for each variable, it is evident that these values are greater than the standardized correlation coefficients with other variables. This demonstrates that the variables have discriminant validity.

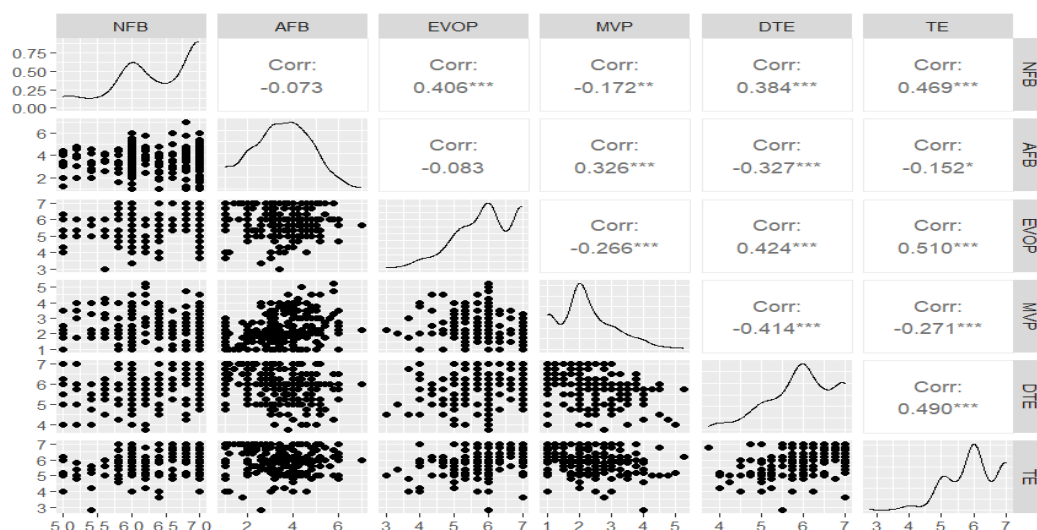


Figure 2: Correlation Analysis Visualization Chart.

Note: EVOP: Economic value orientation personality traits; MVP: Machiavellian personality traits; TE: Teleological ethics; DTE: Deontological ethics; NFB: Normative fitness behavior; AFB: Anomie fitness behavior; *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Model Fit Test

The model chi-square value can be impacted by sample size, leading to poorer model fit. To address this, the Bollen-Stine p Correction method can be used to adjust the model fit (Su & Xu, 2017). After The model fit results with Bollen-Stine Bootstrap correction are shown in Table 3, indicating that the model of this study has a good fit after the Bollen-Stine Bootstrap correction.

Table 3

Model Fit

Indicator	Standard	Model fit	Results
χ^2/df	<3	1.185	Pass
GFI	>0.90	0.919	Pass
AGFI	>0.90	0.896	Acceptable
CFI	>0.90	0.986	Pass
TLI	>0.90	0.988	Pass
SRMR	<0.08	0.052	Pass
RMSEA	<0.08	0.026	Pass

Note: GFI: goodness of fit index; AGFI: adjusted goodness of fit index; CFI: comparative fit index; TLI: Tucker-Lewis fit index; SRMR: standardized root means square residual; RMSEA: root means square error of approximation.

Hypothesis Testing

Using the Bootstrap estimation technique, the standard error of the mediating effect was estimated, and the significance level of the mediating effect was further calculated. The results (Table 4) showed that the direct effect between EVOP and NFB had a Z value of 2.559 ($\sigma=0.118$), with a Bias-Corrected 95% confidence interval of [0.098, 0.571], $p<0.05$, indicating that H_1 was supported. The indirect mediating effect of TE between EVOP and NFB had a Z value of 2.051 ($\sigma=0.078$), with a Bias-Corrected 95% confidence interval of [0.045, 0.371], $p<0.05$, indicating that H_2 was supported. The total mediating effect of TE between EVOP and NFB had a Z value of 4.863 ($\sigma=0.095$), with a Bias-Corrected 95% confidence interval of [0.312, 0.694], $p<0.05$, the effect size $f^2=0.150$, indicating that TE partially mediated the relationship between EVOP and NFB.

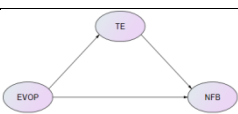
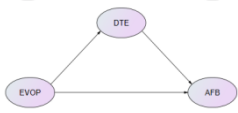
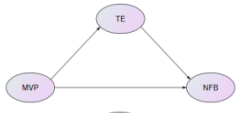
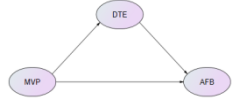
The direct effect between EVOP and AFB had a Z value of 1.136 ($\sigma=0.235$), with a Bias-Corrected 95% confidence interval of [-0.182, 0.755], $p>0.05$, indicating that H_3 was not supported. The indirect mediating effect of DTE between EVOP and AFB had a Z value of -1.867 ($\sigma=0.203$),

with a Bias-Corrected 95% confidence interval of [-0.923, -0.107], $p < 0.05$, indicating that H_4 was supported. The total mediating effect of DTE between EVOP and AFB had a Z value of -0.825 ($\sigma = 0.137$), with a Bias-Corrected 95%

confidence interval of [-0.432, 0.105], $p > 0.05$, the effect size $f^2 = 0.042$, indicating that DTE did not partially mediate the relationship between EVOP and AFB.

Table 4

Research Hypothesis Testing and Mediation Effect Analysis

Model	Effect	β	Bootstrapping				Hypothesis	f^2
			Multiplication of coefficients		Bias-Corrected 95% CI			
			Standard error	Z-value	Lower	Upper		
	Direct effect	0.302*	0.118	2.559	0.098	0.571	H ₁	0.150
	Indirect effect	0.160*	0.078	2.051	0.045	0.371	H ₂	
	Total effect	0.462*	0.095	4.863	0.312	0.694		
	Direct effect	0.267	0.235	1.136	-0.182	0.755	H ₃	0.042
	Indirect effect	-0.379*	0.203	-1.867	-0.923	-0.107	H ₄	
	Total effect	-0.113	0.137	-0.825	-0.432	0.105		
	Direct effect	-0.006	0.049	-0.122	-0.104	0.089	H ₅	0.05
	Indirect effect	-0.021	0.021	-1.000	-0.076	0.008	H ₆	
	Total effect	-0.026	0.053	-0.491	-0.127	0.083		
	Direct effect	0.312*	0.114	2.737	0.097	0.535	H ₇	0.120
	Indirect effect	0.162*	0.080	2.025	0.046	0.370	H ₈	
	Total effect	0.474*	0.098	4.837	0.288	0.673		

Note: EVOP: Economic value orientation personality traits; MVP: Machiavellian personality traits; TE: Teleological ethics; DTE: Deontological ethics; NFB: Normative fitness behavior; AFB: Anomie fitness behavior; Bootstrap 5000 times. * $p < 0.05$.

The direct effect between MVP and NFB is $Z = -0.122$ ($\sigma = 0.049$), with a bias-corrected 95% confidence interval of [-0.104, 0.089], and $p > 0.05$, indicating that H_5 is not supported. The indirect mediating effect of TE on the relationship between MVP and NFB is $Z = -1.000$ ($\sigma = 0.021$), with a bias-corrected 95% confidence interval of [-0.076, 0.008], and $p > 0.05$, indicating that H_6 is not supported. The total mediating effect of TE on the relationship between MVP and NFB is $Z = -0.491$ ($\sigma = 0.053$), with a bias-corrected 95% confidence interval of [-0.127, 0.083], and $p > 0.05$, the effect size $f^2 = 0.045$, indicating that TE does not partially mediate the relationship between MVP and NFB.

The direct effect between MVP and AFB is $Z = 2.737$ ($\sigma = 0.114$), with a bias-corrected 95% confidence interval of [0.097, 0.535], and $p < 0.05$, indicating that H_7 is supported. The indirect mediating effect of DTE on the relationship between MVP and AFB is $Z = 2.025$ ($\sigma = 0.080$), with a bias-corrected 95% confidence interval of [0.046, 0.370], and $p < 0.05$, indicating that H_8 is supported. The total mediating effect of DTE on the relationship between MVP and AFB is $Z = 4.837$ ($\sigma = 0.098$), with a bias-corrected 95% confidence interval of [0.288, 0.673], and $p < 0.05$, the effect size $f^2 = 0.120$, indicating that DTE partially mediates the relationship between MVP and AFB.

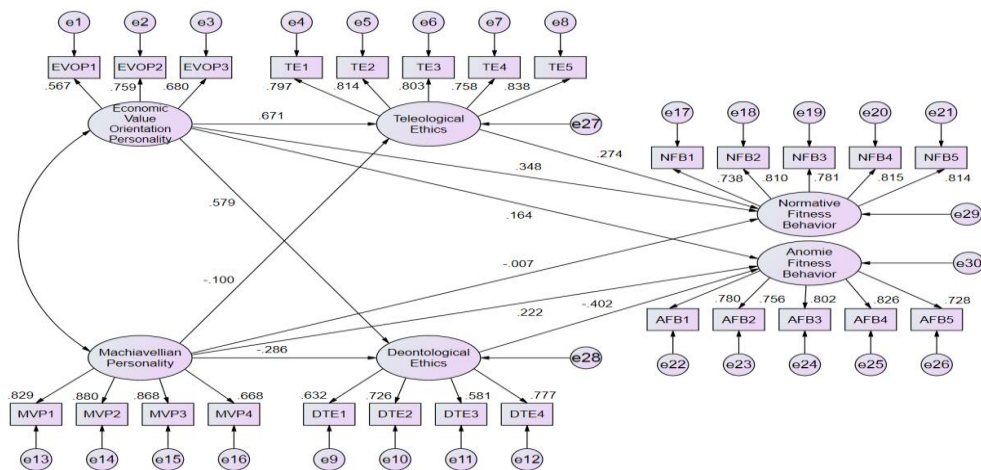


Figure3: Multiple Mediating Effects of Personality Traits on Fitness Behavior Path Model.

In this study, moral orientation was used as a mediator variable to examine the multiple influence paths of EVOP and MVP on NFB and AFB in the fitness population. The results (Figure 3) showed that EVOP had a positive effect on NFB, while MVP had a positive effect on AFB. TE played a partial mediating role in the relationship between EVOP and NFB, while DTE played a partial mediating role in the relationship between MVP and AFB.

Conclusion and Discussion

The Impact of Economic Value Orientation Personality Traits and Machiavellian Personality Traits on Fitness Behavior

Previous research has suggested that individuals with high levels of economic value orientation are more likely to engage in unethical behavior and make dishonest and unfair decisions (Piff et al., 2012), and are more likely to ignore social norms (De Hoogh & Den Hartog, 2009). However, the empirical results of this study indicate that economic value orientation has a positive and significant effect on NFB, but cannot explain AFB, which is inconsistent with most previous research findings. The NFB of fitness enthusiasts with an economic value orientation is more prominent, indicating that fitness enthusiasts who pursue practicality in fitness behavior are more normative. This also suggests that in China's fitness community, on one hand, they are influenced by traditional culture. This cultural background may lead Chinese fitness enthusiasts to be more inclined towards pursuing the practicality and efficacy of fitness, emphasizing physical health and longevity rather than merely seeking aesthetic appeal or the enjoyment of the activity. On the other hand, they are influenced by social pressures. In China, people often encounter multiple stresses from family, work, and social interactions, and fitness is considered an effective way to alleviate these pressures. Therefore, Chinese fitness enthusiasts may focus on the practical aspects of fitness, hoping to enhance physical health and relieve stress through exercise (Ren, Wang, & Zhang, 2022).

MVP may lead individuals to be more prone to anomie behaviors, especially under conditions of stress, when there is a potential for gain, or when they are at a disadvantage in competition (Jonason et al., 2013). For instance, some fitness enthusiasts may engage in excessive appearance comparison, leading to body image depression, or body dysmorphic disorders. This could also manifest as an Adonis complex, resulting in excessive exercise, compulsive exercising, and addiction to exercise (Pu et al., 2022). Our study results indicate that individuals with MVP are more likely to engage in AFB and are not

effective in explaining NFB. Individuals with MVP are goal-oriented around their self-interest, with behaviors characterized by the pursuit of short-term benefits. Thus, fitness enthusiasts with MVP tend to make decisions that unethically pursue personal gain, disregarding moral considerations (Bass & Steidlmeier, 1999). In China, contrary to the pursuit of fitness practicality, some fitness enthusiasts are influenced on one hand by their educational and cultural backgrounds. Some may possess utilitarian thinking, seeking quick and superficial results. Additionally, a lack of physical education and sports training experience may lead their misunderstandings and biases to fitness. On the other hand, they are influenced by the social environment. A significant emphasis on personal image and the influence of social networks leads some in the fitness community to pursue short-term physical changes for greater social recognition and confidence. Furthermore, fitness bloggers and influencers impact the views and behaviors of some fitness enthusiasts through sharing their fitness achievements and experiences, as well as the promotion of various fitness courses and products (Goodyear et al., 2021).

In fact, the occurrence of AFB among fitness enthusiasts, apart from fitness cognitive biases and a lack of moral sentiment, is often influenced by the social environment (such as fitness, social, and online environments). These factors may lead to the formation of MVP, resulting in poor behavioral judgments. They may also easily induce anomalous and unethical behaviors in those who have been already possessing MVP. Additionally, individuals with MVP whose goals are mostly centered around self-interest, on one hand, focus more on the pursuit of short-term gains or the achievement of core events; on the other hand, their disdain for morality leads them to disregard traditional moral standards in their actions. Therefore, fitness enthusiasts with MVP tend to make decisions unethically pursue personal gains (Bass & Steidlmeier, 1999). However, the impact of these traits is influenced by other factors. Research has found that these influences can be mitigated by clarifying individual goal orientations from the outside, creating an ethical atmosphere, enhancing internal communication, targeted measures (Verbeke, Ouwerkerk, & Peelen, 1996).

The Mediating Role of Teleological Ethics in the Relationship Between Economic-Value Orientation Personality and Normative Fitness Behavior

This study found that TE played a partial mediating role in the relationship between economic-value orientation personality traits and NFB. This result can be explained by the social intuitionist approach (Haidt, 2001), which suggests that ethical judgments are a mix of emotions and

reason. People typically judge whether a behavior is ethical based on their emotional reaction, and rational reasoning usually occurs after the emotional response. When individuals perceive that the outcome of a behavior is good, they are more likely to experience ethical satisfaction and exhibit behavior consistent with that outcome. Ethical judgment and ethical identification have important effects on ethical behavior. Specifically, when individuals believe that their ethical behavior can achieve a certain goal, they are more likely to exhibit ethical behavior consistent with that goal (Reynolds & Ceranic, 2007). Some studies argue that the fundamental meaning of morality lies in the moral value assessment of the behavior itself, and the nature and degree of a behavior's goodness or badness depend on the actual achievements produced by that behavior. These achievements must be substantive and primarily relative to the actors themselves, and secondarily to other related groups or individuals. The achievement of a goal is considered morally good; the higher the degree of achievement is, the complete and more substantial the moral goodness, and the higher the moral value people have. Conversely, actions that fail to achieve their moral purpose are considered morally bad. The moral purpose is not only related to the actor's motivation (but not equivalent to it) but more importantly, to the final achievement produced by the action. Since the achievement is fundamental, TE emphasize the consequences of actions rather than the motivations behind them, showing a clear consequentialist or utilitarian tendency (Jun-Ren, 2003). Combining the research results with previous findings, it was found that different personality traits determine individuals' degree of ethical identification with teleological goals, which in turn affects their ethical judgment under TE concepts. In addition, an individual's personality traits also determine their ability and willingness to pursue ethical goals in behavior. Fitness enthusiasts who adhere to pragmatic utilitarianism and possess an economic-value orientation personality exhibit a greater sense of responsibility, place greater emphasis on pursuing ethical goals, have a higher degree of ethical identification, and are concerned with social fairness and justice, the outcome and impact of behavior, thereby affecting NFB, compared to individuals with MVP.

Deontological Ethics Partially Mediate the Relationship Between Machiavellian Personality Traits and Anomie Fitness Behavior

The results of this study found that DTE partially mediate the relationship between MVP and deviant fitness behavior. Machiavellians are more likely to engage in unethical behavior because they prioritize their own interests over ethical or ethical standards. When their

ethical beliefs conflict with reality, fitness enthusiasts with MVP may abandon their ethical obligations and exhibit unethical behavior. "They will do whatever it takes to succeed." (Skitka et al., 2021). DTE focuses on the overall interest of society or groups and their just distribution as the goal of moral consideration. Its emphasis is not only on the rights and purposes of individual moral subjects but more on the fair distribution and rational arrangement of rights (including moral rights and duties) among all moral subjects. This encompasses the ethical relationships and moral commitments between moral subjects (individuals or groups). Since DTE initially use established moral and ethical norms as the objective standard for evaluating moral behavior, it can at least maintain the objectivity and impartiality of its moral assessments in form. Established moral and ethical norms always transcend personal interests or individualistic moral viewpoints; norms or principles are always societal and publicly recognized, and cannot be privatized (Jun-Ren, 2003). Under the mediating effect of DTE, the lower their sense of obligation and responsibility, the higher the probability of deviant fitness behavior. The principle of DTE holds that behavior should be based on ethical rules, not on the pursuit of personal interests or desires. Therefore, when people violate DTE norms, they are more likely to engage in deviant behavior. This deviant behavior may have negative consequences for themselves, others, and society. Individuals with MVP who pursue short-term benefits in fitness are more likely to lack the judgment to make correct decisions about fitness knowledge in the long run. This can lead to significant costs and more deviant fitness behavior, which can damage their health. For example, they may use stimulants, abuse weight loss drugs, and overuse muscle fillers in order to quickly achieve the perfect body shape.

Therefore, from the above analysis, we can draw the following conclusions: (1) For the fitness population, different personality traits can directly and significantly predict the normativeness of their fitness behavior. Fitness enthusiasts with EVOP who adhere to fitness pragmatism exhibit more normative behavior, while those with MVP who adhere to fitness utilitarianism are more likely to engage in AFB. (2) Some fitness enthusiasts are influenced in their fitness behavior by their moral cognition tendencies. Those with a deontological moral orientation tend to pursue fairness, justice, fulfill duties, and follow rules, so the lower their deontological moral orientation is, the more likely they are to exhibit anomie behavior in fitness activities. Conversely, those with a teleological moral orientation pursue the greatest benefits and values of behavior, so the higher their teleological moral orientation is, the more likely they are to value outcomes

and exhibit normative behavior in fitness activities. (3) TE plays a significant positive mediating role between EVOP and NFB, while DTE play a significant negative mediating role between MVP and AFB. Specifically, fitness enthusiasts with EVOP are more likely to influence their fitness behavior to be more normative through TE that judge based on outcomes. Those with MVP are more likely to engage in AFB by lowering standards of DTE and resorting to non-normative or unfair means.

Research limitations

While this study has enriched research in the relevant field and achieved some results that can serve as references for fitness enthusiasts and related organizational management practices. There are two main limitations due to objective conditions. Firstly, the sample of this study primarily consisted of individuals with at least one year of fitness experience, which to some extent restricts the external validity of this study. Future research can expand the sampling area and scope to obtain more rigorous conclusions. Secondly, this study used cross-sectional data,

which limits the explanatory power of causal mechanisms. Therefore, future research could consider using longitudinal data, grounded theory, or experimental research methods to further enhance the credibility of the research findings.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work.

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