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The Big Five personality traits and theory of planned behavior in physical education students

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Abstract

Purpose: This study aimed to test the correlation between the Big Five personality traits and the theory of planned behavior in Chinese physical education students.

Design/methodology/approach: This is a cross sectional study which used the Big Five Inventory-44 and the Physical Educator's Intention Toward Teaching Individuals with Disabilities III. Using a large number of randomly selected samples, a total of N =2305 physical education students (782 females and 1523 males, M age = 20.12, SD = 1.47) were purposely selected from 10 normal or comprehensive universities located in Eastern, Central and Western China.

Findings: Our findings showed that the big five personality traits and theory of planned behavior are closely linked in physical education students. Future intervention experiments can focus on the impact of the big five personality traits on the TPB, to improve the mental health and academic performance of physical education students.

Research and practical limitations/implications: First, the research method of this study is single, and subsequent studies can add mediator or moderator variables. Second, because this study is a cross-sectional study, it fails to explore the causal relationship between the Big Five personality traits and the various dimensions of the planned behavior theory of physical education for normal students.

Originality/value: This study explored the relationship of the Big Five personality traits with intention, attitude toward the behavior, and subjective norms of physical education students, within the theory of planned behavior. It suggests ways for educators, counselors, and coaches to promote the physical and mental development of physical education students.

Keywords: Theory of planned behavior; Big-Five personality; Physical education students

1. Introduction

The Theory of Planned Behavior (TPB) was designed to explain and predict human behavior in specific contexts. It examines modes of action and intention, combined with perceptions of behavioral control to account for individuals' actual behavior. Therefore, it can predict intention from the attitudes toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). The theoretical origin of the theory of planned behavior can be traced back to Fishbein's Theory of Multiattribute Attitude, which holds that behavioral attitudes determine behavioral intentions, and expected behavioral outcomes and outcome evaluations determine behavioral attitudes (Fishbein, 1963). Attitude toward the behavior is an assessment of how much an individual likes or dislikes performing a particular behavior. Subject Norm refers to the social pressure perceived by individuals when deciding whether to perform a specific behavior. It reflects the influence of essential others or groups on individual behavioral decisions. Perceived Behavior Control refers to how individuals perceive that it is easy or difficult to perform a specific behavior. It reflects the individual's perception of factors that promote or hinder behavior execution. The TPB is an extension of the theory of reasoned action (Ajzen & Fishbein, 1980) and has mainly focused on predicting intentions to perform a behavior, which measures the effect of individuals' beliefs, normative beliefs, and control beliefs on their intentions. Previous studies have shown that planned behavior theory has good explanatory power for whether individuals engage in self-regulation behaviors, such as physical exercise, rule compliance, dieting, addiction withdrawal, and risk-taking (Armitage & Conner, 2001; McEachan et al., 2011). In addition, the planned behavior theory has been widely used in educational research to predict individuals' behavioral intentions and behavior (Jones, 2009; Leeuw et al., 2015; Shafieinia et al., 2016). Nevertheless, generally speaking, there are few studies on the theory of planned behavior of physical education students. Furthermore, there is a lack of research on which factors affect the theory of planned behavior of physical education students. Therefore, discussing the generation and development mechanism of the theory of planned behavior of physical education students has scientific value of promoting physical education students' mental health and academic performance.

As the most influential personality research paradigm - the Big Five personality model has been extensively studied and proven consistent and stable across cultures and languages. Personality psychologists have recognized and accepted its dimensions (McCrae & Costa, 1989; McCrae, & Terracciano, 2005; John et al., 2008). The Big Five personality is divided into neuroticism, agreeableness, conscientiousness, extraversion, and openness. This personality trait classification is currently the most recognized and widely used classification system (Anglim, & Horwood, 2021; Sleep et al., 2021). Personality traits refer to a general tendency system of similar behaviors, which are relatively stable and persistent traits that individuals always show in different backgrounds (Corr, & Matthews, 2009). Numerous studies have shown that the dimensions of the Big Five personality traits and the TPB are closely related (Picazo-Vela et al., 2010; Wang et al., 2021). Some scholars believe that personality traits are external constructs of the theory of planned behavior (Conner & Sparks, 2005). This view further supports the TPB perspective that personality traits play an important role in predicting and explaining behavior (Ajzen, 1991). In addition, Church (2016) also believes that personality traits can be thought of as a unique dynamic organization that determines an individual's thinking and behavior. Empirical studies in different fields also found that personality traits can have significant explanatory and predictive effects

on each dimension of planned behavior theory (Hoyt et al., 2009; Rhodes et al., 2005; Wilson et al., 2016). Hence, based on the TPB, this study explores the influence paths of personality traits on each dimension of the planned behavior of typical physical education students. Furthermore, it guides students with different personality traits to formulate targeted interventions to improve mental health.

Neuroticism refers to the individual's degree of emotional stability, whether a person often exhibits negative emotional traits such as anxiety, hostility, depression, self-consciousness, impulsiveness, and vulnerability (Widiger & Oltmanns, 2017). Affect regulation and emotional instability in neurotic individuals (McCrae & Costa, 1987). It is the most frequently explored personality dimension in evaluating the relationship between personality and stress (Bolger & Zuckerman, 1995).

Past research has shown that neuroticism has a significant predictive effect on variables in theory of planned behavior across different groups (Ho et al., 2017; Rhodes et al., 2002). For example, individuals with high levels of neuroticism are more likely to be impulsive. In addition, they are more likely than people with low levels of neuroticism not to engage in desired behaviors that would put their physical or mental health at risk (Moskowitz &Zuroff, 2004). Furthermore, scholars have demonstrated that neuroticism has solid explanatory power for healthy behaviors (Bogg & Roberts, 2004). Neuroticism might predict various variables in theory of planned behavior to a certain extent, based on the above literature. Therefore, this study proposes the following hypothesis (H1): Neuroticism can significantly predict various dimensions in the theory of planned behavior for physical education students.

Agreeableness refers to whether an individual is agreeable, warm-hearted, and good at communicating with others (Tobin et al., 2000; Jensen-Campbell et al., 2002). Individuals high in agreeableness are more likely to control negative emotions such as anger in conflict situations. They are more likely to use constructive strategies when in conflict with others. In contrast, individuals low in agreeableness are more likely to use coercive tactics (Jensen-Campbell & Graziano, 2001). Individuals with low agreeableness are associated with hostile ideation, adolescent aggression, and social maladjustment (Gleason et al., 2004). In terms of psychiatric disorders, low agreeableness may be associated with narcissistic and antisocial tendencies (Costa & McCrae, 1992). Previous studies have found that agreeableness can significantly predict factors of the positive theory of planned behavior (Picazo-Vela et al., 2010; Wang et al., 2021). The relationship between agreeableness and the TPB among physical education students should be clarified. Therefore, this study proposes the following hypothesis, H2: Agreeableness could significantly predict various dimensions in the theory of planned behavior for physical education students.

Conscientiousness refers to whether an individual has a high achievement-oriented and responsible attitude towards work (Buecker et al., 2020). Individuals with low due diligence exhibit low self-discipline and cannot motivate themselves to perform the tasks that will be accomplished (Costa & McCrae, 1992). Individuals with high due diligence scores to tend to be more organized and excel in academic achievement and work performance (Dewitt & Schouwenburg,2002). Numerous studies have shown that conscientiousness is an important influence on the TPB in individuals. It is closely and intrinsically linked across different populations (Conner & Abraham, 2001; De Bruijn et al., 2009). Based on the above study, we will further explore the relationship between conscientiousness and the theory of planned behavior in physical education students. Thus, the study proposes Hypothesis 3 (H3), that conscientiousness significantly predicts various dimensions in theory of planned behavior in physical education students.

Extraversion refers to whether an individual is active, outgoing, and expressive in social interactions (Costa & McCrae, 1980; John et al., 2008). Numerous empirical studies have found that individuals with higher extroversion score report more positive emotional experiences in everyday life in past research. This correlation is moderately predictive of positive emotional experiences 10 years later (Amin et al., 2004; Burgdorf & Panksepp, 2006; Costa & McCrae, 1990). Openness refers to a broad range of personal interests, creativity and imagination, and curiosity about new things and facts (Barford, & Smillie, 2016). Several studies have shown that extroversion and openness can predict the individual theory of planned behavior (Zaremohzzabieh et al., 2019). Therefore, this study proposes Hypotheses 4 and 5 (H4, H5): Extraversion and openness predict various dimensions in the theory of planned behavior for physical education students.

Based on previous studies, we proposed the following model (Figure 1).

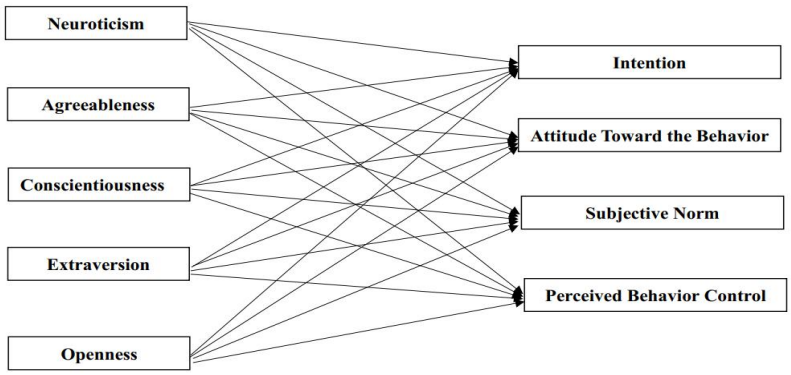

Figure 1. Illustrates the conceptual model applied.

2. Methods

2.1. Participants

This research involved 2305 physical education students (782 females and 1523 males, M age = 20.12, SD = 1.47) purposely selected from 10 normal or comprehensive universities located in Eastern, Central and Western China. In this study, a cluster sampling method was adopted to identify participants. Questionnaires were distributed between the September 1 of 2017 to March 8 of 2018. Permission was obtained from the University's Human Research Ethics Committee. The survey was conducted within classrooms and approvals were obtained from the schools. Before administering the questionnaire, participants read the information of the study, and agreed to participate. The information stressed that participation was completely voluntary and anonymous. The questionnaire took approximately 20 minutes to complete. Based on this, a prior power analysis using G*Power (Faul et al., 2007) indicated that with a power level of .8, an alpha level of .05, a sample size of 125 should be sufficient to reveal an effect of this magnitude. This sample size satisfies this objective.

2.2. Measures

(1) Demographic questions

The survey included demographic questions (i.e., gender and age).

(2) The Big Five Personality Inventory (BFPI)

The BFPI (John et al., 1991) is a 44-item measure that consists of the following five personality factors: extraversion (e.g., ‘‘Is reserve’’), agreeableness (e.g., ‘‘Is helpful and unselfish with others’’), conscientiousness (e.g., ‘‘Perseveres until the task is finished’’), neuroticism (e.g., ‘‘Gets nervous easily’’), and openness to experience (e.g., ‘‘Has few artistic interests’’). Each item was evaluated on a 5-point Likert scale, ranging from ‘‘Strongly Disagree’’ to ‘‘Strongly Agree’’. This scale has been validated and used in Chinese samples, showing good psychometric properties (Wang et al., 2012). The internal consistency coefficient for each of the subscales is good: extraversion (α =.669), agreeableness (α =.695), conscientiousness (α =.669), neuroticism (α =.691), and openness (α =.660). The neuroticism CFA results were good: $\chi 2/df$ =2.074, RMSE =.022, TLI =.988, GFI =.997, CFI =.994. The agreeableness CFA results were good: $\chi 2/df$ = 1.239, RMSE =.010, TLI =.997, GFI =.998, CFI =.999. The conscientiousness CFA results were good: $\chi 2/df$ =1.185, RMSE =.009, TLI =.998, GFI =.998, CFI =.999. The extraversion CFA results were good: $\chi 2/df$ =1.740, RMSE =.018, TLI =.991, GFI =.998, CFI =.996. The openness CFA results were good: $\chi 2/df$ =1.221, RMSE =.010, TLI = .997, GFI =.998, CFI =.999. The factor loadings of the items ranged between a = .402 and a =.634.

(3) Physical Educator’s Intention Toward Teaching Individuals with Disabilities III (PEITID-III)

The PEITID-III (Rizzo, 2010) assesses preservice and in-service physical educators’ intentions and attitudes toward the inclusion of disabilities in their physical education classes, and conforms to Ajzen’s Theory of Planned Behavior (TPB). The PEITID-III has 11 items. The first 11 items used a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), and the item 11 is the Self-Reported Behavior (SRB) scoring by 0 (will not teach) or 1 (will teach). The 35 items were grouped into 7 factors, including Intention (I, 2-items: 1, 2), Attitude Toward the Behavior (ATB, 3-items: 3, 4, 5), Subjective Norm (SN, 2-items: 6, 7), Perceived Behavior Control (PBC, 4-items: 8, 9, 10, 11). A confirmatory factor analysis confirmed the one-dimensionality of the scale (CFA): $\chi 2/df$ =1.343, RMSE = .012, TLI = .998, GFI =.997, CFI =.999. The factor loadings of the items ranged between a =.233 and a =.700. The internal consistency of the questionnaire was good (α = .765).

2.3. Data analysis

This study used SPSS 22.0 and AMOS 21.0for statistical analysis (including descriptive statistical analysis, correlation analysis, linear regression analysis, and confirmatory factor analysis).

3. Results

3.1. Testing for Common Method Bias

There is a risk of common method bias by collecting data using questionnaires. To combat this, this study adopted the method proposed by previous researchers (Zhou & Long, 2004) to control for common method bias. Harman’s single factor test was applied to test for common method bias. The results showed that there were 15 factors with an eigenvalue greater than 1, and the first factor had an explanatory variance of 15.42%, which is lower than the threshold of 40%. This indicated that the common method bias was not significant.

3.2. Big five personality and theory of planned behavior: Correlations

Means, standard deviations, and correlations among the study variables are presented in Table 1-5. Specifically, correlation results demonstrated that intention, attitude toward the behavior, and subjective norm were all negatively correlated with neuroticism, and perceived behavior control was not correlated with neuroticism. Intention, attitude toward the behavior, and subjective norm were all positively correlated with agreeableness, and perceived behavior control was not correlated with agreeableness. Intention, attitude toward the behavior, and subjective norm were all positively correlated with conscientiousness, and perceived behavior control was not correlated with conscientiousness. Intention, attitude toward the behavior, and subjective norm were all positively correlated with extraversion, and perceived behavior control was not correlated with extraversion. Intention, attitude toward the behavior, subjective norm, and perceived behavior control were all positively correlated with openness. As such, H1-H5 were confirmed.

Table 1. Means, standard deviations, and correlation coefficients of neuroticism and I, ATB, SN, PBC.

Variable	M	SD	1	2	3	4	4
Neuroticism	2.53	.644	-				
I	5.86	1.236	-.195***	-			
ATB	5.29	1.180	-.219***	.620***	-		
SN	5.36	1.294	-.192***	.537***	.537***	-	
PBC	4.65	1.126	.034	.233***	.119***	.268***	-

Notes: M = mean, SD = standard deviation. I=Intention, ATB=Attitude toward the behavior, SN=Subjective norm, PBC= Perceived behavior control. *** P < 0.001.

Table 2. Means, standard deviations, and correlation coefficients of agreeableness and I, ATB, SN, PBC.

Variable	M	SD	1	2	3	4	4
Agreeableness	3.59	.599	-				
I	5.86	1.236	.280***	-			
ATB	5.29	1.180	.317***	.620***	-		
SN	5.36	1.294	.221***	.537***	.537***	-	
PBC	4.65	1.126	-0.010	.233***	.119***	.268***	-

Notes: M = mean, SD = standard deviation. I=Intention, ATB=Attitude toward the behavior, SN=Subjective norm, PBC= Perceived behavior control. *** P < 0.001.

Table 3. Means, standard deviations, and correlation coefficients of conscientiousness and I, ATB, SN, PBC.

Variable	M	SD	1	2	3	4	4
Conscientiousness	3.47	.604	-				
I	5.86	1.236	.201***	-			
ATB	5.29	1.180	.216***	.620***	-		
SN	5.36	1.294	.167***	.537***	.537***	-	
PBC	4.65	1.126	.015	.233***	.119***	.268***	-

Notes: M = mean, SD = standard deviation. I=Intention, ATB=Attitude toward the behavior, SN=Subjective norm, PBC= Perceived behavior control. *** P < 0.001.

Table 4. Means, standard deviations, and correlation coefficients of extraversion and I, ATB, SN, PBC.

Variable	M	SD	1	2	3	4	4
Extraversion	3.57	.679	-				
I	5.86	1.236	.230***	-			
ATB	5.29	1.180	.243***	.620***	-		
SN	5.36	1.294	.187***	.537***	.537***	-	
PBC	4.65	1.126	0.034	.233***	.119***	.268***	-

Notes: M = mean, SD = standard deviation. I=Intention, ATB=Attitude toward the behavior, SN=Subjective norm, PBC= Perceived behavior control. *** P < 0.001.

Table 5. Means, standard deviations, and correlation coefficients of openness and I, ATB, SN, PBC.

Variable	M	SD	1	2	3	4	4
Openness	3.41	.523	-				
I	5.86	1.236	.190***	-			
ATB	5.29	1.180	.212***	.620***	-		
SN	5.36	1.294	.161***	.537***	.537***	-	
PBC	4.65	1.126	.047***	.233***	.119***	.268***	-

Notes: M = mean, SD = standard deviation. I=Intention, ATB=Attitude toward the behavior, SN=Subjective norm, PBC= Perceived behavior control. *** P < 0.001.

3.3. Big five personality and theory of planned behavior: Linear regression analysis

Table 6 shows the linear regression analysis results of the relationships of the big five personalities with intention, attitude toward the behavior, subjective norm, perceived behavior control. After adjusting confounding factors, it was found that agreeableness (B =.414, β=.201, P < 0.001) and extraversion (B =.166, β=.091, P < 0.01) were associated with intention, agreeableness (B =.473, β=.240, P < 0.001) and extraversion (B =.133, β=.077, P < 0.01) were associated with attitude toward the behavior, agreeableness (B =.277, β=.128, P < 0.001) and extraversion (B =.114, β=.060, P < 0.05) were associated with subjective norm, neuroticism (B =.117, β=.067, P < 0.05) was associated with perceived behavior control.

Table 6. Linear regression analysis of the big five personalities with the theory of planned behavior

Variable	B	SE	β	t	R2	F
I	3.545	.326	-	10.891	.088	44.428***
Neuroticism	-.031	.050	-.016	-.619		
Agreeableness	.414	.057	.201	7.317***		
Conscientiousness	.030	.056	.015	.529		
Extraversion	.166	.050	.091	3.339**		
Openness	.061	.062	.026	.995		.
ATB	2.931	.307	-	9.545	.110	56.551***
Neuroticism	-.050	.047	-.027	-1.049		
Agreeableness	.473	.053	.240	8.849***		
Conscientiousness	.004	.053	.002	.068		
Extraversion	.133	.047	.077	2.849**		

Openness	.090	.058	.040	1.541		
SN	4.031	.346	-	11.650	.060	29.224***
Neuroticism	-.149	.053	-.074	-2.791**		
Agreeableness	.277	.060	.128	4.609***		
Conscientiousness	.005	.060	.002	.076		
Extraversion	.114	.053	.060	2.154*		
Openness	.086	.066	-.074	1.313		
PBC	3.799	.309	-	12.280	.007	3.137**
Neuroticism	.117	.048	.067	2.451*		
Agreeableness	-.057	.054	-.031	-1.066		
Conscientiousness	.032	.054	.017	.593		
Extraversion	.071	.047	.043	1.514		
Openness	.115	.057	.053	1.955		

Notes: I=Intention, ATB=Attitude toward the behavior, SN=Subjective norm, PBC= Perceived behavior control. * $P < 0.001$, ** $P < 0.001$, *** $P < 0.001$.

4. Discussion

The correlation results demonstrated that intention, attitude toward the behavior, and subjective norm were all inversely correlated with neuroticism. Perceived behavioral control is not correlated with neuroticism in physical education students. Additionally, linear regression analysis found that neuroticism did not predict intention or attitude toward the behavior. However, neuroticism can significantly predict subjective norms and perceived behavior control in physical education students. The hypothesis H1 of this study was confirmed and consistent with previous studies (Ho et al., 2017; Rhodes et al., 2002). Neuroticism reflects an individual's ability to control emotions. Individuals with high neuroticism are susceptible to external stimuli, especially negative ones, leading to emotional fluctuations. They show adverse reactions such as anxiety, anxiety, or anger (Downey & Feldman, 1996). Therefore, we need to focus on the highly neurotic physical education students. Based on these findings, we should intervene within the framework of TPB to prevent physical and mental health problems and further promote the academic achievement of typical physical education students. This relationship should also be explored with other groups to test further the stability, accuracy, and generalizability of the results.

In addition, correlation results demonstrated that intention, attitude toward the behavior, and subjective norm were all positively correlated with agreeableness. Perceived behavior control was not correlated with agreeableness in physical education students. Additionally, linear regression analysis found that agreeableness can significantly predict intention, attitude toward the behavior, and subjective norm. However, it did not predict perceived behavior control in physical education students. Hypothesis 2 of this study was confirmed. This finding was consistent with previous studies (Picazo-Vela et al., 2010; Wang et al., 2021).

Intention, attitude toward the behavior, and subjective norm were all positively correlated with conscientiousness in physical education students. However, perceived behavior control was not correlated with conscientiousness. Furthermore, linear regression analysis found that conscientiousness did not predict intention, attitude toward the behavior, subjective norm, and perceived behavior control. The study findings did not support H3, consistent with previous studies (Conner & Abraham, 2001; De Bruijn et al., 2009). The relationship between the dimensions of conscientiousness

and the theory of planned behavior differs from those of other traits when compared with TPB. In intervening with physical education students to promote mental health, we need to be aware of the influence of different personality traits.

These results demonstrated that intention, attitude toward the behavior, and subjective norm were all positively correlated with extraversion. In contrast, perceived behavior control was not correlated with this trait in physical education students. Additionally, linear regression analysis found that extraversion can significantly predict intention, attitude toward the behavior, and subjective norm. However, it did not predict perceived behavior control in physical education students. Hypothesis 4 was confirmed, consistent with previous studies (Amin et al., 2004; Burgdorf & Panksepp, 2006). Future research should investigate the internal mechanism of extraversion related to the theory of planned behavior. Our results suggest that it might yield promising results for promoting mental health in physical education students.

This study found that correlation results demonstrated that intention, attitude toward the behavior, subjective norm, and perceived behavior control were positively correlated with openness in physical education students. Additionally, linear regression analysis found that openness did not predict intention, attitude toward the behavior, subjective norm, and perceived behavior control in physical education students. Hypothesis 5 was confirmed, consistent with previous studies (Zaremohzzabieh et al., 2019). Individuals with high openness to experience exhibit curious and inquiring attitudes. This attitude manifests in many realms, including interpersonal. This disposition often reflects better psychological functioning, focuses on feelings, and shows intellectual curiosity and independent judgment (Oswald et al., 2006). Individuals with high openness will strive to avoid emotional states induced by adverse events, such as stress, difficulty, or loss of control. At the same time, the suppression of negative emotions often leads to higher levels of stress responses (Gross, 2002). Therefore, openness is an important personality among physical education students and athletes. It benefits their attention, attitude toward the behavior, subjective norm, and perceived behavior control. Furthermore, this trait promotes mental health.

5. Limitations

First, the research method of this study is single, and subsequent studies can add mediator or moderator variables. Second, because this study is a cross-sectional study, it fails to explore the causal relationship between the Big Five personality traits and the various dimensions of the planned behavior theory of physical education for normal students. Future research can use longitudinal studies or experimental studies to confirm the causal relationship between the Big Five personality traits and the various dimensions of the planned behavior theory of physical education for normal students.

6. Conclusion

This study explored the relationship of the Big Five personality traits with intention, attitude toward the behavior, and subjective norms of physical education students, within the theory of planned behavior. It suggests ways for educators, counselors, and coaches to promote the physical and mental development of physical education students. On the other hand, this study also enriches the research on the TPB. It provides a new perspective on the theory. The data analysis supported aspects of Hypotheses 1, 2, 4, and 5. These findings will help practitioners to design and carry out interventions to promote mental health in physical education students and athletes from the perspective of personality traits and TPB.

Ethics statement

The protocol was approved by the Southwest University's Human Research Ethics Committee. Prior to initiation of the study, all subjects gave written informed consent in accordance with the Declaration of Helsinki.

Author Contributions

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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