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ARTICLE

Relationships between Features of Emerging Adulthood, Situated Decisions Toward Physical Activity, and Physical Activity Among College Students: The Moderating Role of Exercise-Intensity Tolerance

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ABSTRACT

A significant portion of emerging adults do not achieve recommended levels of physical activity (PA). Previous studies observed associations between features of emerging adulthood and PA levels, while the potential psychological mechanisms that might explain this phenomenon are not fully understood. In this context, there is some evidence that situated decisions toward physical activity (SDPA) and exercise-intensity tolerance might influence PA level. To provide empirical support for this assumption, the current study investigated whether (i) features of emerging adulthood are linked to SDPA, which, in turn, might affect PA engagement; (ii) exercise-intensity tolerance moderate the relationship between SDPA and PA level; and (iii) SDPA is a mediator of the relationship between features of emerging adulthood and PA levels under the prerequisite that exercise-intensity tolerance moderates the link between SDPA and PA engagement. In this study a group of 1,706 Chinese college students was recruited and asked to complete a set of questionnaires assessing their SDPA, PA levels, exercise-intensity tolerance, and features associated with emerging adulthood, namely Self-exploration, Instability, and Possibility. Our results indicated that SDPA positively predicted PA levels and this relationship became stronger when exercise-intensity tolerance was used as a moderator. Furthermore, it was observed that individuals with a higher level of Instability and a lower level of Possibility during emerging adulthood exhibited a lower level of SDPA. Taken together, the results of our study provide further insights on a potential psychological mechanism linking features of emerging adulthood and physical activity.

KEYWORDS

Emerging adulthood; situated decisions; physical activity; exercise-intensity tolerance; moderated model

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Introduction

Accumulating evidence indicates that being physically active has positive effects on physical and mental health [1–3]. Conversely, physical inactivity—as unhealthy lifestyle behavior—is associated with a variety of negative health issues including a higher risk for cardiovascular diseases and cancer [4–6]. To prevent such negative health consequences, public health organizations have released guidelines recommending that individuals should regularly engage in an appropriate amount of physical activity (PA) [7–9]. In this regard, the World Health Organization recommends for adults to carry out a minimum of 150-min moderate-intensity PA (MVPA) or 75-min vigorous-intensity PA (VPA) per week. However, although these evidence-based recommendations are widely disseminated, there is still a considerable proportion of adults who do not achieve the recommended minimum amount of physical activity. For instance, physical inactivity is relatively prevalent among emerging adults, particularly among college students who exhibit a wide range of prevalence rates from 21.9% in Kyrgyzstan to 80.6% in Pakistan, with a prevalence rate of 37.3% in China [10]. Against this background, a better understanding of the factors influencing the engagement in PA especially among emerging adults is needed to address the public health issue of physical inactivity.

Emerging adulthood (EA) refers to the period between 18 and 29 years of age. Younger adults such as college students during the emerging adulthood period have unique features in comparison to other age groups like adolescents and other adults (e.g., older than 30 years) [1,11,12]. Specifically, emerging adulthood features consisting of Self-exploration, Instability, Possibility, and Responsibility [13]. As college students in emerging adulthood are faced with various challenges including opportunities to explore their identity, or shifting choices in love and work, this life stage is potentially unstable, which, in turn, might negatively influence the development of daily routines including PA behaviors [12,14]. Recently, research has indicated that features of emerging adulthood were associated with PA levels among 1326 college students [15]. Although direct effects of features of emerging adulthood on PA have been observed, it remains unclear whether these effects are mediated or moderated by other psychological factors. Thus, further investigations are necessary to clarify the potential psychological mechanisms driving the relationship between features of emerging adulthood and PA.

In the past half-century, intention has been deemed as a prominent determinant of PA, playing a crucial role in decision-making processes [16,17]. In this context, situated decision as a proximal variable of PA behavior is suggested as a factor that can help to elucidate why individuals remain physically active or inactive [18]. Situated decision toward PA (SDPA) is defined as the tendency of individuals to decide to participate in PA in conflicting situations (e.g., in which alternatives to PA engagement are available) [18]. Comparable to the influence of different personality traits on behavioral tendencies [19], the distinctive features associated with emerging adulthood may also exert an impact on individuals' decision-making processes regarding PA. In other words, emerging adulthood features may be directly linked to individuals' tendencies (i.e., referring to SDPA), which, in turn, result in being physically active or inactive.

While the independent relationship of PA and SDPA has been previously established [18], it still remains largely unknown whether exercise-related features like exercise-intensity tolerance can moderate the above-mentioned relationship. Exercise-intensity tolerance which refers to the decision about selecting or tolerating a specific exercise intensity is closely linked to PA behavior [20]. Furthermore, individuals who had different exercise-intensity tolerance reported different affective responses to physical exercise [21,22]. For instance, experiencing negative affect or negative valence when surpassing a certain exercise-intensity tolerance or threshold is subsequently linked to decreased participation in PA in the future [23]. Conversely, individuals with higher exercise-intensity tolerance are more willing to participate in PA behavior even in the conflicting situations as they tend to gain more positive or pleasant experience/valence during physical exercise with higher intensities [23]. Further exploration in this field can yield valuable insights for developing effective interventions and strategies aiming to promote regular PA and long-term adherence.

Taking the above-presented observations into consideration, the present study tested three interactions and a hypothesized model which included the following features: (i) features of emerging adulthood are linked to SDPA, which in turn affects PA engagement; (ii) SDPA-PA level can be moderated by exercise-intensity tolerance; (iii) SDPA may play a mediating role in a relationship between features of emerging adulthood and PA levels while exercise-intensity tolerance can moderate the link between SDPA and PA engagement.

Method

Participants

The sample in the current study consisted of 1706 Chinese emerging adults with mean age of 19.81 years (SD = 1.44). These students were recruited from Chinese universities located in Southern China. An online-survey was used to reach out to these participants via the Questionnaire Star platform in which the students volunteered to participate in this study. Participants were excluded if they: (i) were not within the age group of 18–29 years old, which is typically recognized as the stage of emerging adulthood (n = 219) [24]; (ii) had physical disabilities (n = 13); (iii) reported musculoskeletal injury or illnesses that could influence their exercise tendency and PA engagement (n = 53); (iv) were diagnosed with psychiatric or neurological disorder(s) (n = 195) [25]; (v) did not complete the entire survey (n = 236).

Of note, school mental health counselors and teachers were asked to help to confirm whether participants were physically and mentally healthy. A total of 716 participants were excluded because they either failed to fall within the age range of the emerging adulthood or did not complete the entire survey. Main outcomes of interests contained

features of emerging adulthood, exercise-intensity tolerance, SDPA, and PA levels. This study is a part of a large research project investigating the psycho-social mechanisms regarding the influence of implicit and explicit attitude on exercise behavior (approved by the medical ethics committee of Shenzhen University (No. PN-2021-048)).

Measures

Demographic information

Demographic data were collected, including gender (male and female), age, ethnicity (Han and Minorities), educational background (no schooling, elementary school, junior high school, senior high school/technical secondary school, undergraduate/junior college student, and postgraduate and above), living situation (live alone, live with classmates in school, flat sharing, live with parents, and live with the other half, other), and body-mass-index (BMI, calculated by self-reported weight and height). The data regarding the above-mentioned variables is presented in Table 1.

Dimensions of emerging adulthood

The Inventory of Dimensions of Emerging Adulthood (IDEA) was used to assess the perceptions of the features of emerging adulthood [26]. The Chinese version of the IDEA being applied in the current study has, in comparison to the original version with a 5-factor structure, only a 4-factor structure and consists of 20 items [27]. All items were scored on a 4-point Likert scale ranging from 1 ("strongly disagree") to 4 ("strongly agree"), with higher scores indicating greater perceived level. The Chinese version of the IDEA shows good internal consistency (Cronbach's alpha >0.77) and test-retest reliability ($r > 0.49$, $p < 0.01$). In the current study, three features including Self-Exploration, Instability and Possibility were collected (Cronbach's alpha of three features >0.83), but not Responsibility as it refers to being responsible for others like parents, colleagues, and/or peers.

Physical activity (PA)

PA was measured using the short form of the International Physical Activity Questionnaire (IPAQ-SF) [28], which was used to determine the PA levels of participants in the last 7 days. We used the Chinese version that was already psychometrically evaluated [29]. Energy expenditure (reflected by the estimated metabolic equivalent-MET) was determined based on the widely used formula [30–32]. According to different exercise intensity, PA level was categorized into the following three types: (1) light-intensity PA (LPA), (2) moderate-intensity PA (MPA), and (3) vigorous-intensity PA (VPA). The sum of LPA, MPA, and VPA was used to determine the total amount of PA (total PA), whereas the amount spent in MPA and VPA was used to calculate the level of moderate-to-vigorous-intensity PA (MVPA). Reliability of internal consistency of the Chinese version in a previous study was acceptable with its ICCs ≥0.75 for all categories, except moderate-intensity activity (excluding walking) with a low ICC of 0.31 [33].

Situated decisions toward PA (SDPA)

In line with previous studies [34,35], two independent translators had translated the Situated Decisions to Exercise questionnaire into Chinese. As physical exercise refers to structure and planned PA, the dependent variable in the present study was measured using the IPAQ, thus physical exercise is replaced with PA, for example the Situated Decisions toward PA questionnaire (SDPA-Q). These translations were then reviewed by a group of 10 bilingual experts. Afterwards, two different translators independently translated the Chinese-language version back into English (i.e., backward translation). Finally, two sport psychologists compared the backward-translated items with the original ones and double-checked the accuracy of these translated items. In addition, we randomly selected 470 participants from those who completed the pretest and attended the re-test after two weeks [36].

In this study, the above-presented SDPA-Q was used to assess individual's tendency to decide on PA in situations in which they were faced with behavioral alternatives [18]. This uni-dimensional scale consists of 8 items (e.g., "after a long day of work you have just arrived at home and you feel tired. However, you planned to go work out tonight"). After each description, participants indicated whether she/he would exercise or not (i.e., "Do you exercise, or not?"). The items are scored via a 5-point Likert scale ranging from 1 ("by all means/definitely yes") to 5 ("by no means/definitely no"). All answers were reversed and summed to a total score which is divided by the number of all items. A higher total score represents greater desirability of doing physical exercises. The reliability and validity of the Chinese-language SDPA-Q are acceptable in the current study (Cronbach's alpha = 0.76; $r = 0.71$, $p < 0.001$).

Exercise-intensity tolerance

Exercise-intensity tolerance was measured using a sub-scale of the Preference for exercise intensity and tolerance of exercise intensity questionnaire (PRETIE-Q) [37]. This 8-item scale was validated in a Chinese sample [20,38]. Exercise-intensity tolerance consists of 4 items, which refers to a trait that influences one's ability to continue exercising at an imposed level of intensity even when the activity becomes uncomfortable or unpleasant. Specifically, 4 even-numbered items (2, 4, 6, 8) (e.g., "I'd rather slow down or stop when a workout starts to get too tough") were selected and rated based on a 5-point Likert scale ranging from 1 ("I totally disagree") to 5 ("I totally agree"). A higher sum score indicates greater level of exercise-intensity tolerance. Cronbach's alpha coefficient of internal consistency for the Tolerance dimension showed 0.89 in our previous validation study and 0.77 in the present study.

Statistical analyses

Statistical analyses were performed using IBM SPSS (IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp.) and Mplus 8 [39]. Normal distribution was checked for all outcomes of interest including emerging adulthood

TABLE 1

Gender difference on demographics, exercise behavior, and psychological measures

Variables	All (n = 990)		Female (n = 552)		Male (n = 438)		t	p
	M	*(P25, P75)*	*M*	*(P25, P75)*	*M*	*(P25, P75)*		
Age	20.00	(19.00, 20.00)	20.00	(19.00, 20.00)	20.00	(19.00, 21.00)	−2.38	<0.05
BMI (kg/m^2)	20.08	(18.37, 22.10)	19.34	(17.93, 21.22)	21.03	(19.04, 23.39)	−8.91	<0.001
Self-exploration	25.00	(24.00, 29.00)	25.00	(24.00, 29.00)	25.00	(24.00, 29.00)	0.86	0.39
Instability	15.00	(14.00, 17.00)	15.00	(14.00, 17.00)	15.00	(13.00, 16.00)	3.64	<0.001
Possibility	9.00	(9.00, 12.00)	9.00	(9.00, 12.00)	9.00	(9.00, 12.00)	0.10	0.92
SDPA-Q	3.00	(2.75, 3.50)	3.00	(2.63, 3.50)	3.13	(2.75, 3.63)	−4.46	<0.001
Exercise-intensity tolerance	14.00	(12.00, 15.00)	14.00	(12.00, 15.00)	14.00	(12.00, 16.00)	−2.29	<0.05
Sedentary time	360.00	(300.00, 480.00)	360.00	(300.00, 480.00)	381.00	(300.00, 480.00)	−0.23	0.82
LPA (MET)	1386.00	(693.00, 2079.00)	1386.00	(693.00, 2079.00)	1386.00	(693.00, 2079.00)	0.38	0.70
MPA (MET)	480.00	(180.00, 840.00)	360.00	(120.00, 720.00)	480.00	(240.00, 960.00)	−3.33	<0.001
MVPA (MET)	1440.00	(720.00, 2640.00)	1200.00	(600.00, 2400.00)	1800.00	(960.00, 3120.00)	−5.94	<0.001
VPA (MET)	960.00	(480.00, 1920.00)	720.00	(240.00, 1440.00)	960.00	(480.00, 2160.00)	−6.05	<0.001
Total PA level (MET)	2931.00	(1836.00, 4638.00)	2759.25	(1707.00, 4332.00)	3279.00	(2022.75, 4932.00)	−3.71	<0.001
	All (n = 990)		**Female (n = 552)**		**Male (n = 438)**			
	N	*%*	*N*	*%*	*N*	*%*		
Ethnicity								
Han	955	96.46	529	95.83	426	97.26	–	–
Minority	35	3.54	23	4.17	12	2.74	–	–
Educational background								
Junior high school	1	0.10	–	–	1	0.23	–	–
Senior high school	48	4.85	24	4.35	24	5.48	–	–
Undergraduate	910	91.92	507	91.85	403	92.01	–	–
Postgraduate and above	31	3.13	21	3.80	10	2.28	–	–
Living situation								
Live alone	7	0.71	5	0.91	2	0.46	–	–
Live with classmates in school	954	96.36	530	96.01	424	96.80	–	–
Flat sharing	5	0.51	2	0.36	3	0.68	–	–
Live with parents	20	2.02	12	2.17	8	1.83	–	–
Live with the other half	3	0.30	2	0.36	1	0.23	–	–
Other	1	0.10	1	0.18	–	–	–	–

Notes: M = median; $P25$ = 25% percentiles; $P75$ = 75% percentiles; BMI = body mass index; SDPA-Q = situated decisions to PA questionnaire; PA = physical activity; LPA = light-intensity physical activity; MPA = moderate-intensity physical activity; MVPA = moderate-to-vigorous-intensity physical activity; VPA = vigorous-intensity physical activity; MET = metabolic equivalent; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$.

related features, SDPA-Q, exercise-intensity tolerance, and PA levels using the Shapiro-Wilk test. As most of the above-presented variables were not normally distributed, the Mann-Whitney U test was performed to determine gender difference (median, 25% percentiles and 75% percentiles) only while other demographic data were not proportionate, for instance, the number of undergraduate students had reached 92%. In addition, associations between each pair of the above-presented variables were examined using the Spearman's rank correlation coefficient. The correlations were rated as follows: $r \geq 0.8$ = large, $r < 0.8$ to > 0.2 = medium, and $r \leq 0.2$ = small [40].

Different structural equation models were tested in order: (1) emerging adulthood related features → SDPA → PA; (2) SDPA → PA via exercise-intensity tolerance; (3) emerging adulthood related features → Hypothesis 2. The recommended indices [41] were presented below: (1) The normed χ^2, the chi-square value divided by the degrees of freedom; (2) the comparative fit index (CFI); Generally, values of the CFI exceeding 0.95 indicating good fits, and those ranging from 0.90 to 0.95 were acceptable; (3) the root-mean-square error of approximation (RMSEM), in which the criterion for a reasonable fit is <0.06; (4) the standardized root mean squared residual (SRMR) below

TABLE 2

Correlations of all tested variables

Variables	Self-exploration	Instability	Possibility	SDPA-Q	Exercise-intensity tolerance	Sedentary time	LPA	MPA	MVPA	VPA
Instability	0.232**									
Possibility	0.618**	0.199**								
SDPA-Q	0.102**	−0.109**	0.159**							
Exercise-intensity tolerance	0.152**	−0.103**	0.162**	0.373**						
Sedentary time	0.026	0.110**	0.067*	−0.086**	−0.033					
LPA	0.010	−0.034	0.018	0.055	0.067*	−0.042				
MPA	0.047	−0.065*	0.063*	0.170**	0.072*	−0.093**	0.216**			
MVPA	0.072*	−0.118**	0.084**	0.326**	0.186**	−0.120**	0.163**	0.673**		
VPA	0.073*	−0.113**	0.076*	0.332**	0.213**	−0.102**	0.086**	0.362**	0.903**	
Total PA	0.050	−0.105**	0.060	0.269**	0.172**	−0.126**	0.645**	0.600**	0.814**	0.704**

Note: SDPA-Q = situated decisions to PA questionnaire; PA = physical activity; LPA = light-intensity physical activity; MPA = moderate-intensity physical activity; MVPA = moderate-to-vigorous-intensity physical activity; VPA = vigorous-intensity physical activity; MET = metabolic equivalent; * = $p < 0.05$, ** = $p < 0.01$.

0.08 indicates a relatively good model fit. In all statistical tests, the level of statistical significance was set to $\alpha = 0.05$.

Results

Table 1 shows the demographics and gender difference of participants. Specifically, significant gender differences are observed on age ($t = -2.38$, $p < 0.05$), BMI ($t = -8.91$, $p < 0.001$), Instability ($t = 3.64$, $p < 0.001$), SDPA ($t = -4.46$, $p < 0.001$), exercise-intensity tolerance ($t = -2.29$, $p < 0.05$) and PA levels ($t = -6.05 \sim -3.33$, $p < 0.001$) (except for LPA). Specifically, male emerging adults demonstrated significantly higher scores on age, BMI, SDPA, exercise-intensity tolerance, and PA levels (except for LPA) in relation to female counterparts. Table 2 shows the correlations of all tested variables.

Relationship and moderators between features of emerging adulthood and levels of PA

Instability ($b = -0.146$, $SE = 0.034$, $p < 0.001$) and Possibility ($b = 0.154$, $SE = 0.042$, $p < 0.001$) are statistically linked to SDPA, which, in turn, is predictive of weekly of the total PA level ($b = 0.243$, $SE = 0.032$, $p < 0.001$). Meanwhile, Instability can significantly predict total PA ($b = -0.089$, $SE = 0.030$, $p < 0.01$). The whole model fit well ($\chi^2/df = 15.939$, RMSEM = 0.006, 90% CI [0.000, 0.063], CFI = 0.999, SRMR = 0.013, Fig. 2). While SDPA-PA link was indicated, individuals who had higher levels on tolerance of exercise-intensity reported higher weekly PA levels as compared to those participants with low exercise-intensity tolerance ($b = 0.090$, $SE = 0.033$, $p < 0.01$; Table 3). The moderating effect to the SDPA-PA link is further qualified by a significant SDPA x Exercise-intensity tolerance interaction ($b = 0.353$, $SE = 0.133$, $p < 0.01$). Specifically, confirming hypothesis 2 (Fig. 3)-both individuals with high- and low-SDPA have reported greater weekly PA level if they had higher exercise-intensity tolerance. The explanatory rate of the model (Total PA: $\chi^2/df = 33.602$, RMSEM = 0.000, 90% CI [0.000, 0.079], CFI = 1.000, SRMR = 0.014) becomes larger as exercise intensity increases. Finally, the model indices of hypothesis 3 (Fig. 4) (emerging adulthood features—> SDPA—> total PA level and the later relationship is mediated by exercise-intensity tolerance) are acceptable ($\chi^2/df = 0.587$, RMSEM < 0.001, 90% CI [0.000, 0.044], CFI = 1.000, SRMR = 0.007).

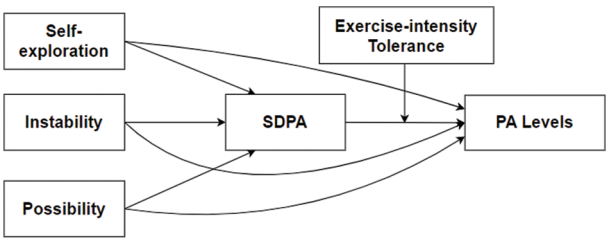

FIGURE 1. Hypothesized model of the relationships between features of emerging adulthood, situated decisions toward physical activity (SDPA), exercise-intensity tolerance, and physical activity (PA).

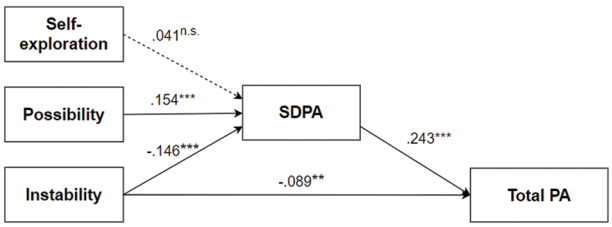

FIGURE 2. Situated decisions toward physical activity (SDPA) mediates the links between emerging adulthood features and the total amount of physical activity in a week (total PA).

Discussion

In the present study, we aimed to (i) determine whether SDPA mediated the relationship between features of emerging adulthood and PA; (ii) investigate whether the relationships

TABLE 3

Moderation modeling results of metabolic equivalent (MET), moderate-to-vigorous-intensity physical activity (MVPA), and vigorous-intensity physical activity (VPA)

Variables	Total PA		Total PA	
	β	*t*	*β*	*t*
SDPA	0.204	6.056	0.209	6.216
Exercise-intensity tolerance	0.089	2.66	0.098	2.944
SDPA × Exercise-intensity tolerance			0.091	2.945
R-square	0.079***		0.087***	
	MVPA		**MVPA**	
	β	*t*	*β*	*t*
SDPA	0.226	6.777	0.230	6.941
Exercise-intensity tolerance	0.082	2.484	0.091	2.770
SDPA × Exercise-intensity tolerance			0.091	2.970
R-square	0.103***		0.111***	
	VPA		**VPA**	
	β	*t*	*β*	*t*
SDPA	0.227	6.873	0.231	7.032
Exercise-intensity tolerance	0.112	3.441	0.121	3.719
SDPA × Exercise-intensity tolerance			0.088	2.892
R-square	0.120***		0.127***	

Notes: SDPA = situated decisions toward PA; PA = physical activity; MVPA = moderate-to-vigorous-intensity physical activity; VPA = vigorous-intensity physical activity; ** = $p < 0.01$; *** = $p < 0.01$.

between SDPA and PA levels were moderated by the individual exercise-intensity tolerance; (iii) examine the mediating role of SDPA in the relationship between three features of emerging adulthood and PA levels under the prerequisite that exercise-intensity tolerance moderates the link between SDPA and PA engagement. Our results suggest that SDPA can be a mediator between emerging adulthood features (Instability) and PA levels (especially MVPA and VPA). Furthermore, exercise-intensity tolerance was observed to moderate the associations between SDPA and PA levels. We will discuss these findings in more details below.

Nearly 70% of participants in the present study did not meet the recommended amount of at least 150-min MVPA or 75-min VPA (Cayon, 2016). This finding is consistent with observations of previous studies consistent with previous studies [42,43]. In addition, light-intensity PA was only associated with other PA levels including MPA, MVPA, VPA, total PA level, but a statistically significant

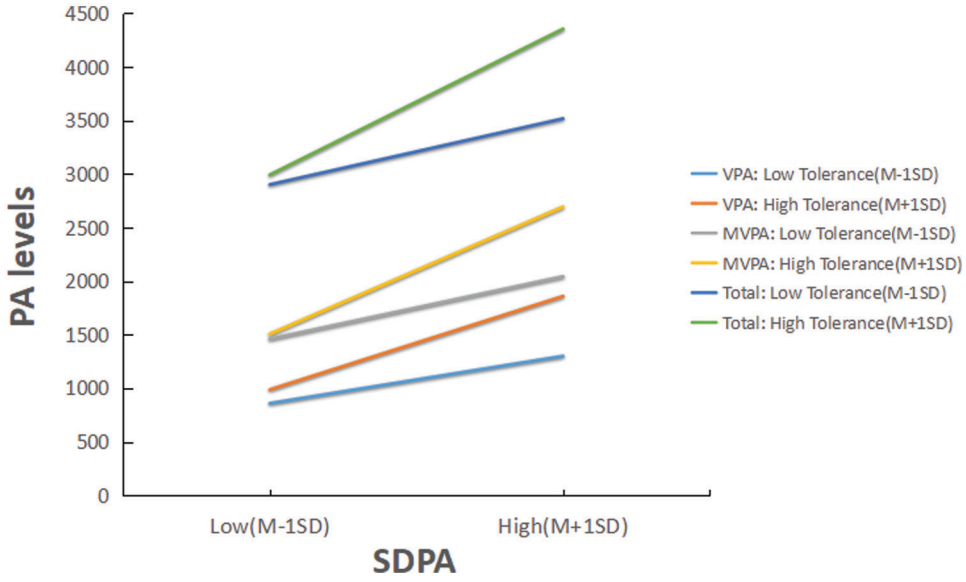

FIGURE 3. Moderation effect of metabolic equivalent (MET), moderate-to-vigorous-intensity physical activity (MVPA), and vigorous-intensity physical activity (VPA).

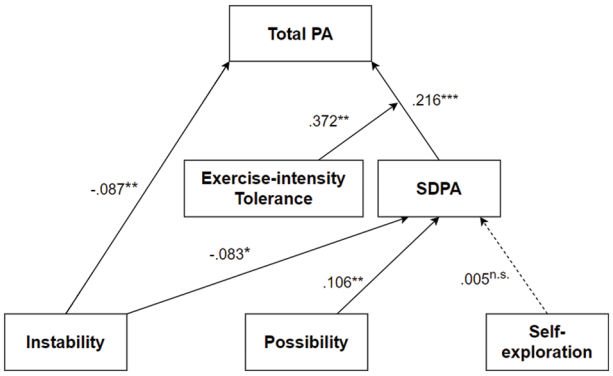

FIGURE 4. Path analysis.
Notes: Significant pathways are represented by solid lines while dotted lines means the non-significant ways. The values behind these lines are the standardized path coefficients of significance. SDPA = situated decisions toward PA; PA = physical activity; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$; *n.s.* = no significance.

association with emerging adulthood features, exercise-intensity tolerance, and SDPA was not observed. Such interesting findings may be attributed to the fact that participants might have incorrect perceptions about PA type. For instance, walking may not be perceived as PA in comparison to MVPA and VPA requiring a higher level of physical effort. Hypothetically, activities that require a considerable amount of energy expenditure and lead to physiological reactions such as sweating are recognized by the participants as PA, which is perhaps not the case for LPA such as walking. Of note, there is evidence that increasing LPA in this age group can be a practical way to not only increase total PA, but also to foster health benefits [44–46].

With respect to the hypothesized model (Fig. 1), Instability was negatively linked while Possibility was positively linked to SDPA. Instability refers to the continuous fluctuation in emotional and occupational choices [36]. The negative Instability-SDPA link may be attributed to the fact that data collection was conducted during COVID-19 pandemic—a period with more negative perception about the individual future including issues such as job seeking and security—[47] which might have put college student in a unstable situation that directly resulted in behavior change including lower levels of PA engagement [48–51]. Another possible explanation may be attributed to what they perceived or heard in the surrounding environment, especially in the period of COVID-19 that is linked to the increased rate of job loss and less job opportunity for senior students [52]. Thirdly, physical distancing in indoor and outdoor spaces have been mandatory in order to prevent the spread of COVID-19, which may cause greater difficulties to adhere to planned and structured forms of PA. As a result, those with higher Instability have a lower tendency to perform PA, further resulting in an insufficient overall amount of PA. In addition, our results suggest that SDPA was linked to PA at all intensity levels (except for LPA). Participants with high- and low-SDPA have reported a higher level of total PA, MVPA, and VPA when they showed a higher exercise-intensity tolerance, which is supported by the results of the path analysis (SDPA-PA link moderated by exercise-intensity tolerance). These findings indicate that exercise-intensity tolerance plays a moderating role in MVPA and VPA, which contributed to the level of total PA.

Concerning the relationship between emerging adulthood features and PA, the findings of the present study in Chinese emerging adults suggest that SDPA is a functional link between emerging adulthood features and PA. Based on the Reflective-Impulsive Model (RIM), the Affective-Reflective Theory (ART) was developed and predicts that affective and reflective processes influence the decision to become physically active [53,54]. According to dual-system approaches of behavior [55,56], situated decisions between behavioral alternatives are assumed to be a functional link between affective and reflective processes and physical exercise [18] as this reflects the tendency of individuals to engage in physical exercise when conflicts between affective and reflective assessments occur. Emerging adulthood features are manifestations of these affective and reflective processes. In contrast to the most distal behavioral criteria (i.e., PA measured by questionnaires or accelerometer), a proximal variable such as situated decisions can further help to elucidate why individuals remain physically inactive. The results of this study support this point of view.

Limitations

The findings of the current study should be interpreted in the light of the following limitations. Firstly, because of the cross-sectional study design no causal conclusion can be drawn. Thus, the results of the present study should be substantiated with longitudinal studies and preferably by longitudinal randomized controlled trials. Secondly, the relationship between Possibility, as a feature of emerging adulthood, and SDPA is rather weak as this relationship may be affected by other confounding variables (e.g., socioeconomic status, personality, educational attainment of parents, and major) that were not collected and controlled in the present study. Thirdly, the Responsibility feature of emerging adulthood refers to holding accountability for others. Given that we investigated individuals' PA behaviors and the large number of items of the IDEA, this emerging adulthood feature was not assessed in the present study. However, since Responsibility has been linked to the level of PA in a previous study [57], we recommend that future studies should include Responsibility in their assessment to elucidate this phenomenon in more detail. Fourthly, it should be considered that these emerging adulthood features have somewhat changed under the influence of the COVID-19 pandemic [58,59], and thus the findings of the current study should be cautiously interpreted. Finally, in the present study PA level was measured via self-reports which might introduce some bias with respect to the PA assessment (e.g., underestimate or overestimate of PA level and intensity). Thus, future studies should utilize more objective assessment instruments to measure the level and intensity of PA (e.g., accelerometers).

Conclusions

The current study investigated the relationship between specific features of emerging adulthood (i.e., Self-exploration, Possibility, and Instability) and PA levels by studying whether SDPA and exercise-intensity tolerance statistically mediate the above-mentioned relationships. In this context, this study provides evidence that in our sample of Chinese emerging adults, consisting of college students, (i) SDPA can be predicted by the Instability feature of emerging adulthood but not by Self-exploration and Possibility; (ii) SDPA was a proximal predictor of different PA levels except for LPA; (iii) exercise-intensity tolerance moderated the relationships between SDPA and different PA levels (VPA, MVPA, and total PA) except for LPA and MPA. Our promising findings may pave the way for future research and the development of new intervention approaches aiming to promote PA among Chinese college students.

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