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Original Article

Reliability and Validity of the Adapted Chinese Dispositional Flow Scale-2 in Leisure-time Runners

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Abstract

The dispositional flow in leisure-time runners may contribute to their long-term commitment to running. The existing Chinese translation of the Dispositional Flow Scale–2 (DFS-2) has poor psychometric properties, such as inadequate internal consistency. Therefore, the first objective of the study was to translate the DFS-2 into Chinese. The second objective was to validate it among leisure-time runners. Runners were recruited from several community leisure-time running groups in Guangzhou city in China. Three stages of analysis were conducted to achieve the second objective. In the first stage, an exploratory factor analysis was conducted on data obtained from 386 Chinese leisure-time runners (51% men). In the second stage, the analysis was performed on another sample of 534 Chinese leisure-time runners (55.5% men). A confirmatory factor analysis, an internal consistency evaluation, and an item analysis were conducted. A test-retest reliability assessment was conducted on 41 Chinese leisure-time runners (43.9% men) in the third stage. The internal consistency of the scale was excellent (α = .95). A positive and significant correlation (p < .001) was found among nine factors of flow and harmonious passion. Additionally, an excellent intraclass correlation coefficient (ICC) in the overall scale was found after a 2-week time period (ICC = .92, p < .001, 95%, CI = .84 to .96). The findings contribute to behavioral science by providing a reliable scale to measure the subjective tendency to experience flow in leisure-time activities. This can be used to promote physical activity by health educators.

Among people of all ages, leisure-time running is the most common physical activity (PA) due to its ease of practice and low cost (Rozmiarek et al., 2022). Running can improve mental health, such as reducing anxiety disorders and depression (Rozmiarek et al., 2022). However, people often give up running due to fatigue or boredom (Kennedy et al., 2019). Therefore, it is critical to identify factors that prevent PA dropouts.

Flow experience, also known as optimal experience, is characterized by intense focus, a sense of control, and intrinsic reward (Bassi et al., 2022). It is possible that flow will prevent PA dropouts since people who feel fulfilled, contented, and satisfied with their previous PA will remain engaged in it (Kim, 2021). According to Csikszentmihalyi et al. (2005), flow experience might be a strong motivator serving the positive emotional valence for PA promotion. Correspondingly, the level of dispositional flow in runners may contribute to their long-term commitment to running (Jackman et al., 2019). Therefore, a deeper understanding of flow in leisure-time running may provide insight into participation mechanisms.

To develop and implement interventions to promote leisure-time running, a reliable measurement of dispositional flow must be available.

As the concept of flow originated in the western culture, there is a debate as to whether this optimal experience is universal. Some researchers have suggested that flow experiences vary depending on culture and activities (Jackman et al., 2019). It is because majority of empirical studies on dispositional flow have been conducted with Caucasian populations (Riva et al., 2017). The evaluation of cross-cultural validation will provide a direct assessment of its external validity by ensuring equivalence across languages and cultures (Bittencourt et al., 2021). In order to avoid bias due to colloquialisms and the idiosyncrasies of the particular language in which the DFS-2 was originally developed, it is necessary to replicate the factor structure across countries.

There are only a few Chinese versions available that measure dispositional flow. Among those few, some validations of the translated instrument that measured dispositional flow were not entirely satisfactory, and the psychometric properties were not particularly robust. A recent Chinese version, for example, removed three items based on the CFA results (Liu et al., 2012). Some of the findings were not entirely solid, in particular on some dimensions where the internal consistency coefficient was low. Moreover, they did not examine the concurrent validity. Especially, there is no valid tool to measure the dispositional flow among leisure-time runners. Therefore, it is necessary to have a reliable and valid instrument to measure dispositional flow among Chinese leisure-time runners.

This study has two objectives. The first objective was to translate the English version into Chinese. The second objective was to examine the reliability and validity of the DFS-2 among Chinese leisure-time runners. The study has significant implications for exercise psychology. With this Chinese version of the dispositional flow scale, research can be conducted on flow interventions aimed at promoting leisure-time running among Chinese adults.

Literature Review

Flow is characterized by nine dimensions, according to Csikszentmihalyi et al. (2005): balance (a sense of undertaking challenges appropriate to current ability); merging (the feeling of involvement is so intense that action seems almost automatic and spontaneous); goals (the certainty of doing what one has to do); feedback (a clear assessment of the actions); concentration (a sense of total concentration); control (a feeling of being able to handle any situation); self-consciousness (not being concerned with oneself); time (a feeling of distortion in the passage of time); and autotelic (a feeling of intrinsic reward in an activity). Three dimensions facilitate flow (i.e., balance, goal, and feedback), while six represent the characteristics of flow (i.e., merging, concentration, control, self-consciousness, time, and autotelic; Goddard et al., 2021). Flow experiences are associated with a variety of positive outcomes, including motivation, engagement, performance, and well-being (Goddard et al., 2021).

Based on the model of flow, Jackson et al. (1998) developed the dispositional flow scale (DFS) for measuring the tendency to have flow experience in PA. Later, Jackson and Eklund (2002) replaced some problematic items and formed a new one: the Dispositional Flow Scale-2 (DFS-2). It showed good psychometric properties, with nine-factor loadings ranging from .51 to .83, and Cronbach's alpha ranging from .78 to .86 (Jackson & Eklund, 2002). The DFS-2 has been used in sports since it was developed (Garcia et al., 2022). According to the latest systematic review, flow is highly desirable for athletes (Goddard et al., 2021). There is no doubt that athletes are much more familiar with the concept of flow experience than other groups of people. As flow enables them to achieve sport performance (Sarı & Bizan,

2022). Consequently, Engeser and Rheinberg (2008) claimed that the flow model is only appropriate for specific populations (such as athletes).

A Chinese version of DFS-2 has been tested among sports students at universities (Liu et al., 2012). Neither bilingual group discussions nor pretesting were included in their translation procedures. To achieve culturally equivalent translations, bilingual group discussions and pretesting are required, according to WHO translation protocol (Kalfoss, 2019). During the data analysis process, three items were removed from the original scale based on the CFA results. Despite this, some internal consistency coefficients from their findings were not satisfactory. For example, one of its subscales, merging, has a Cronbach's alpha of .67. The cutoff value, according to Ponterotto and Ruckdeschel (2007), should be .70 ($n > 300$). Moreover, they did not perform the concurrent validity test on the DFS-2.

The dualistic model of passion has been proposed by Vallerand et al. (2003). According to this model, harmonious passion (HP) occurs when a person internalizes an activity (e.g., running) into his or her identity (Schellenberg et al., 2021). Researchers found that people with high HP exhibit adaptive cognitive processes (e.g., flow; Schellenberg et al., 2021). Empirical evidence indicates a significant relationship between passion and flow (e.g., Vallerand & Verner-Filion, 2020). The relationship between the Chinese DFS-2 and HP scale could therefore be used to examine the concurrent validity of the flow construct, as assessed by the Chinese DFS-2.

Running in groups has become a popular social phenomenon in China, especially in Guangzhou city (Xie et al., 2020). Guangzhou, China's third largest city, has a population of more than 13 million in 2020 (Wang et al., 2021). The running facilities in Guangzhou have improved since the 2010 Asian Games. Therefore, Guangzhou hosts one of the largest marathon events each year. Consequently, it was decided to assess the validity and reliability of the Chinese DFS-2 in Guangzhou city. In this study, the first objective was to translate the DFS-2 into Chinese. The second objective was to validate the Chinese DFS-2 among leisure-time runners.

Method

Design of Study

The study was divided into two phases based on its objectives. In the translating phase, the English version of DFS-2 was adapted to Chinese according to WHO translation protocols (Kalfoss, 2019). In the validating phase, data were collected from three groups of leisure-time runners to assess the validity and reliability of the Chinese DFS-2.

Participants

Chinese leisure-time runners were recruited from several community leisure-time running groups in Guangzhou city via an online survey from April to June, 2022. The convenience sample technique was used in this recruiting process. Informed consent was obtained from each leisure-time runner before answering the questions. To meet the inclusion criteria in the present study, the Chinese leisure-time runners should take part in running at least 20 minutes three or more times a week (Ham & Ainsworth, 2010).

Sample 1

Sample 1 was used for stage 1 analyses (item identification). A total of 386 Chinese leisure-time runners (51% men) completed the questionnaires. All of them are adults (23.1% are aged from 18 to 29 years, 30.6% are aged from 30 to 39 years, 21.2% are aged from 40 to 49 years, 18.9% are aged from 50 to

59 years, and 6.2% are over 60 years). The sample size was decided basing on subject to item ratios of 10:1, which is a rule-of-thumb that many researchers use in determining sample size (Costello & Osborne, 2005).

Sample 2

Sample 2 was used for stage 2 analyses (validity and reliability assessments). A total of 534 Chinese leisure-time runners (55.5% men) completed the questionnaires. All of them are adults (19.8% are aged from 18 to 29 years, 39.1% are aged from 30 to 39 years, 22.2% are aged from 40 to 49 years, 15.7% are aged from 50 to 59 years, and 3.2% are over 60 years). The sample size was decided in line with the decision with sample 1.

Sample 3

Sample 3 was used for stage 3 analyses (test-retest reliability assessment). A total of 41 Chinese leisure-time runners (43.9% men) from sample 2 completed the questionnaires after two weeks. All of them are adults (14.6% are aged from 18 to 29 years, 48.8% are aged from 30 to 39 years, 34.2% are aged from 40 to 49 years, 2.4% are aged from 50 to 59 years). A minimum sample size of 30 (alpha-value = .05, 90.0% power) was calculated according to the recommendations from Bujang and Baharum (2017).

Instruments

Data for this study was collected via a questionnaire approach. A 6-point Likert scale was utilized to obtain responses from Chinese leisure-time runners. Runners gave responses by rating on the following scales from 1 (not agree at all) to 6 (very strongly agree). Demographic information was collected such as age, gender, and level of education. Specifically, they were asked whether they had participated in vigorous running for at least 20 minutes three or more times a week. Two scales were used as described further.

Dispositional Flow Scale-2 (DFS-2)

The DFS-2 (Jackson & Eklund, 2002) is a 36-item questionnaire that assesses an individual's propensity for experiencing flow in various circumstances. The DFS-2 was developed based on the concept of flow: balance (challenge and skill), merging (action and awareness), goals, feedback, concentration, control, consciousness, time (transformation of time), and autotelic. In order to adapt the DFS-2 to Chinese, leisure-time runners were asked how often they had flow experiences while running. An example of the thirty-six items is: “I am challenged, but I believe my skills will allow me to meet the challenge.” In general, the higher the total score, the more likely the runner is to experience flow during running. According to a previous study, the internal consistency of the DFS-2 ranged between .81 and .90, with a mean alpha of .85 (Jackson & Eklund, 2002).

Harmonious Passion Subscale

In the current study, this subscale was used to measure leisure-time runners' harmonious passion. The correlations between the Chinese DFS-2 and the flow construct were examined to determine whether it has concurrent validity. The HP subscale was adapted from the Chinese version of sports passion scale (SPS; Chiung-huang et al., 2007) developed by Vallerand et al. (2003). An example of the six items is: “My sport (running) is in harmony with other things that are part of me.” A higher item score indicates a higher degree of harmonious passion for running. The internal consistency of the HP subscale was .84 (Chiung-huang et al., 2007). It was also found to have excellent internal consistency in this study (α = .95).

Procedures

The translating phase consisted of six major steps. First, two Chinese students (third-year psychology Ph.D. students) independently translated the DFS-2. Second, the Chinese scale was translated back into English by a Chinese university teacher with a specialization in English education. Third, the English version and the original questionnaire were independently compared by two English native speakers and a sports psychologist.

Fourth, a focus group meeting was held to identify items that were unclear or interpreted differently (Cortés et al., 2007). Focus group participants included two psychology Ph.D. students, four leisure-time runners and an amateur marathon runner with a psychology master's degree. Each group member shared their understanding of all 36 items by answering the following question: "Can you explain it in your own words?" The group leader (first author) recorded the following coding categories to assess the group members' comprehension: 1 = clear, 0 = unclear.

Fifth, a pretest was conducted with a small group of leisure-time runners (n = 26, 46.15% men). They were recruited by convenience sampling. The pretest was conducted to determine if the target population understood the questions clearly. Each item on the scale was followed by a question: "Was it difficult to respond (0 = not difficult, 1 = difficult)?" "If so, please type down why did you find it difficult to answer?"

Finally, the initial translated DFS-2 was modified based on feedback from back-translation, focus group discussions, and pretesting. For example, in the back-translation stage, one expert pointed out that "I clearly know what I am doing" and "I know clearly what I want to do" did not have the same meaning. Therefore, "want to do" was translated as "want" to make it more accurately understood.

In the validating phase, three stages of analyses were conducted. In stage 1, the initial Chinese DFS-2 was administered to leisure-time runners in sample 1 (n = 386) for item identification. In stage 2, the final Chinese DFS-2 and Harmonious Passion subscale were administered to leisure-time runners in sample 2 (n = 534) for reliability and validity evaluation. In stage 3, the final Chinese DFS-2 was administered again to a subset of sample 2 (sample 3, n = 41) after a 2-week interval to assess its test-retest reliability.

Data Analyses

Statistical analysis was performed using R software (R 4.1.2; R Core Team, 2020). The R package 'psych', 'Lavaan', and 'stats' were utilized in three stages of analyses (i.e., Revelle, 2020; Rosseel, 2012). A p-value < .001 was considered significant.

Ethical Considerations

The AU Institutional Review Board provided ethical approval on April 1, 2022 (No. 17/2021).

Results

Stage 1 Analyses: Item identification (Sample 1, n = 386)

Maximum-likelihood factor analysis (MLA) with a promax rotation was performed on the Chinese DFS-2 with 36 items (Procci et al., 2012). Prior to conducting MLA, an examination of the Kaiser–Meyer–Olkin statistic and Bartlett's test of sphericity suggested it was adequate to conduct factor analysis (KMO = .94 > .60; Bartlett's test, p < .001). Parallel analysis and scree plot both suggested nine factors. The number of nine factors had an eigenvalue greater than one.

Results of the EFA showed that 35 items were well-fit the 9-factor structure (see Table 1). Only one item (Item 36) overlapped two factors (Consciousness and Autotelic) and had low factor loadings in both factors. According to the rule of thumb in item identification, the minimum loading should be .32, which amounts to around 10% of overlapping variation with the other items in that factor (Costello & Osborne, 2005). Item 36 exhibited factor loadings less than .32 on any of the factors in the EFA. The reliability of Factor 9 would rise from .82 to .88 if Item 36 were removed from the scale. Based on the pretest feedback (such as "extremely rewarding is not clear to me") and its poor factor loadings, Item 36 was removed from the Chinese DFS-2.

Table 1
EFA Factor Loadings in Sample 1 (n = 386)

Factor	Item	1 (α = .91)	2 (α = .86)	3 (α = .88)	4 (α = .90)	5 (α = .88)	6 (α = .87)	7 (α = .86)	8 (α = .89)	9 (α = .82)
Factor1	Q1	.77								
	Q10	.94								
	Q19	.81								
	Q28	.81								
Factor2	Q2		.74							
	Q11		.77							
	Q20		.65							
	Q29		.75							
Factor3	Q3			.78						
	Q12			.81						
	Q21			.87						
	Q30			.71						
Factor4	Q4				.78					
	Q13				.84					
	Q22				.86					
	Q31				.84					
Factor5	Q5					.72				
	Q14					.83				
	Q23					.84				
	Q32					.75				
Factor6	Q6						.84			
	Q15						.77			
	Q24						.75			
	Q33						.73			
Factor7	Q7							.73		
	Q16							.88		
	Q25							.71		
	Q34							.75		
Factor8	Q8								.81	
	Q17								.83	
	Q26								.78	
	Q35								.75	
Factor9	Q9									.81
	Q18									.80
	Q27									.94
	Q36							.29		.23

Stage 2 Analyses: Validity and reliability assessments (Sample 2, *n* = 534)

In this stage, construct validity, internal consistency, item analysis, and concurrent validity (the correlation with harmonious passion) were utilized in evaluating the Chinese DFS-2.

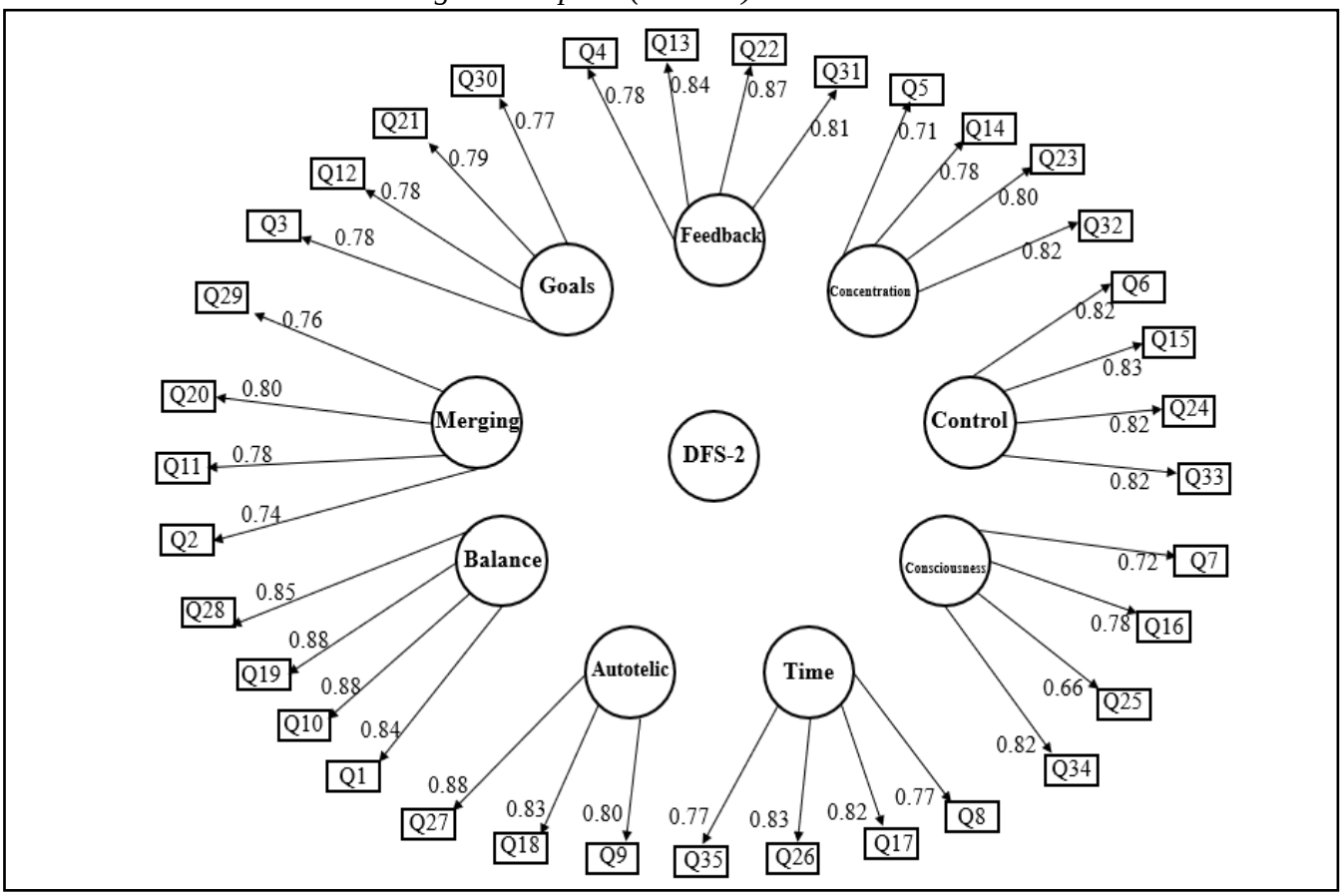
Construct Validity

The examination of CFA, convergent validity, and discriminant validity were used to evaluate construct validity. To determine whether the Chinese version model fit the observed data, correlation matrices were analyzed and Maximum-likelihood (ML) estimation was performed (Kawabata et al., 2008). Hu and Bentler (1998) recommended using a two-index presentation strategy when applying the ML method. Convergent validity was evaluated by examining factor loadings, average variance extracted (AVE), and composite reliability (CR) (Chin et al., 2018). Discriminant validity was evaluated by comparing the values of AVE and shared variance (SV, the square of correlation coefficient) and the correlation coefficient between factors. AVE values greater than SV values indicated an acceptable level of discriminant validity (Chin et al., 2018).

A nine-factor structure was found in the CFA results for 35 items in sample 2. Goodness-of-fit indices were as follows: $\chi 2$ =1075.52 (p < .001); df = 524; CFI = .95; TLI = .95; BL89 = .95; RMSEA = .04 (95% CI = .04 to .05); and SRMR = .04. Both RMSEA value (less than .05) and SRMR value (less than .06) were met the criterion of model adequacy as suggested by Hu and Bentler (1998). The standardized factor loadings of nine factors were all positive and significant (p < .001) (see Figure 1).

Figure 1

CFA Standardized Factor Loadings in Sample 2 (n = 534)



An AVE value greater than .50 and a CR value greater than .60 are required for convergence validity (Chin et al., 2018). Table 2 shows that all AVEs in nine factors were greater than .50, and all CRs were greater than .60. High factor loadings (greater than .60) suggest that latent variables are related to the items. All the AVE values of nine factors were greater than their SV values, as presented in Table 2. All the correlation coefficients between nine factors were lower than .85 (Chin et al., 2018), which indicated high discriminant validity (see Table 3).

Internal Consistency

The overall Cronbach's alpha of the Chinese DFS-2 was .95 > .90, indicating excellent internal consistency. Cronbach's alpha for every factor was above the criterion of .70 (see Table 2). It was suggested that all of the items measured the same latent variable.

Item Analysis

Item analysis was employed to determine the adequacy of the scale (Kline, 2013). Corrected item-total correlations were used to estimate item-score reliability. Higher corrected item-total correlations result in a higher Cronbach's alpha (Zijlmans et al., 2019). A value below .30 indicates item inappropriateness (Kline, 2013)

In the current study, all the corrected item-total correlations were positive and above .30: balance .62 – .67; merging .52 – .56; goals .49 – .59; feedback .53 – .60; concentration .61 – .69; control .57 – .59; consciousness .43 – .62; time .45 – .62; and autotelic .57 – .64. It was suggested high correlations among all the 35 items. All the 35 items were sufficiently reliable.

Concurrent Validity

As shown in Table 3, positive correlations exist between the nine dimensions of the Chinese DFS-2 and the HP subscale. All the correlations were significant ($p < .001$) and had high values (Mean = .53). Correlations between the Chinese DFS-2 and the HP subscale indicate that the Chinese DFS-2 has a satisfactory concurrent validity.

Table 2

Convergent Validity and Discriminant Validity (n = 534)

Factors	Cronbach's alpha	AVE	CR	SV by factor								
				1	2	3	4	5	6	7	8	9
1	.92	.74	.92	1								
2	.85	.59	.85	.32	1							
3	.86	.61	.86	.29	.30	1						
4	.89	.68	.90	.25	.26	.12	1					
5	.87	.62	.87	.36	.34	.32	.41	1				
6	.89	.68	.89	.26	.23	.23	.19	.33	1			
7	.83	.56	.83	.17	.16	.22	.26	.40	.25	1		
8	.87	.64	.87	.14	.14	.14	.13	.23	.15	.38	1	
9	.87	.79	.87	.34	.17	.27	.23	.30	.28	.30	.30	1

Note. The values of SV were the square of correlation coefficient between factors.

Table 3

Correlations Between the Chinese DFS-2 Factors and the Harmonious Passion Subscale (n = 534)

Factors/Subscale	1	2	3	4	5	6	7	8	9	HP
1	1									
2	.57	1								
3	.54	.55	1							
4	.50	.51	.35	1						
5	.60	.58	.57	.64	1					
6	.51	.48	.48	.43	.57	1				
7	.41	.40	.46	.51	.63	.50	1			
8	.38	.37	.37	.37	.48	.39	.61	1		
9	.58	.41	.52	.48	.55	.53	.55	.55	1	
Harmonious Passion (HP)	.71	.66	.68	.63	.72	.62	.62	.57	.66	1

Stage 3 Analyses (Sample 3, *n* = 41)

Test-retest Reliability

After two weeks, forty-one leisure-time runners (from sample 2) who left their contact information were received the same questionnaires. Since repeated measurements cannot be regarded as randomized samples, the 2-way mixed-effects approach should also be used for test-retest reliability assessments (Koo & Li, 2016). It is also essential to use the absolute agreement definition for the test-retest, since repeated measurements are worthless if there is no agreement (Koo & Li, 2016). Therefore, the test-retest reliability was assessed by the two-way mixed-effects model leading to absolute agreement. The cutoff value of ICC should be .50 (values between .50 and .75 indicate moderate reliability) which was suggested by Koo and Li (2016).

In this study, the test-retest reliability was excellent (ICC = .92, $p < .001$, 95% CI = .84 to .96). ICC for every factor ranged from .53 to .79 (M = .66) over a 2-week period: balance = .64; merging = .71; goals = .74; feedback = .70; concentration = .69; control = .79; consciousness = .54; time = .53; and autotelic = .64.

Discussion and Conclusion

The study included two phases according to the objectives. In the translating phase, the DFS-2 was adapted to Chinese following WHO translation protocol (Kalfoss, 2019). To enhance the accuracy of the translation process, a focus group discussion and a pretest were conducted with leisure-time runners. In the validating phase, the EFA and CFA were performed to examine the structure of the Chinese DFS-2 (Arafat et al., 2016). The validity and reliability assessments indicated a reliable instrument for measuring dispositional flow among Chinese leisure-time runners, with 35 items. Additionally, the Chinese DFS-2 demonstrated adequate stability across time according to result from test-retest reliability assessment.

The removed item, item 36 (“The experience is extremely rewarding”), is supposed to belong to the Autotelic dimension. This dimension represents the intrinsically-rewarding nature of flow. According to Jackson and Csikszentmihalyi (1999), individuals constantly engage in related activities to experience flow instead of seeking material rewards. However, a low factor loading was observed for item 36 in the " autotelic" dimension and it overlapped with the " consciousness" dimension. There are two possible explanations for this. First, it is in line with the findings of a German study that suggests flow depends on how individuals perceive the importance of activities (Engeser & Rheinberg, 2008). It would be easier for individuals to experience flow if they engaged in a less important activity rather than a more important activity. Since most flow studies have been conducted in sports, the current finding suggests a different flow experience in leisure-time running.

Secondly, responses from the pretest indicated that Chinese leisure-time runners perceive rewarding experiences differently from other cultures. These three items in the “autotelic” dimension are more specific in asking leisure-time runners to reflect on their flow experience (i.e., “I really enjoy the experience”; “I love the feeling of the performance and want to capture it again”; and “the experience leaves me feeling great"). Six respondents agreed that experiencing flow brings pleasure; however, they argued that they did not mean “extremely rewarding”. This finding is in line with a study by Moneta (2004). He argued that Chinese individuals display greater intrinsic motivation in situations with low challenges than those with high challenges. Regardless, challenge and skill should be equally high in flow conditions, according to Csikszentmihalyi et al. (2005). As Moneta (2004) noted, this conflict can be explained by the difference between collectivist and individualistic cultures. In other words, the present findings suggest that Chinese runners experience flow in low-challenge situations (e.g., leisure-time running).

The positive and significant connections between nine dimensions of dispositional flow and harmonious passion are consistent with previous studies (e.g., Schellenberg et al., 2021). Individuals with

harmonious passion are associated with an adaptive accomplishment process defined by focus and positive motivation when engaged in a task, according to Vallerand et al. (2003). In the current study, runners with high HP have the tendency to experience flow.

In spite of the modification made to the original scale in this study, the 35 items were still clustered under the same nine factors, as confirmed by CFA. The same dispositional flow constructs were found in the Chinese DFS-2 which align with flow theory (Csikszentmihalyi et al., 2005). The Chinese DFS-2 has strong content validity, as indicated by the model fitness, which is consistent with previous cross-cultural studies (e.g., Kawabata et al., 2008). The 35-item scale exhibited reasonable construct validity, as supported by goodness-of-fit indices, convergent validity, and discriminant validity. None of the correlations among the factors exceeded .80. An excellent internal consistency was also found for the whole scale. Cronbach's alpha for every factor was above .80. Additionally, the Chinese DFS-2 showed stability over time. Finally, a significant positive correlation between harmonious passion and dispositional flow was found. Therefore, as hypothesized, the Chinese DFS-2 has adequate psychometric properties for leisure-time runners in the current study.

Limitations

This study has its limitations due to its cross-sectional nature. It would be necessary to apply the Chinese DFS-2 to other leisure-time activities (such as square dancing) since it was only tested on Chinese leisure-time runners. Additionally, one of the purposes of exercise psychology is to promote PA. There is a need to develop intervention for flow to enhance PA behavior among adults.

Implications for Behavioral Science

This study contributes to exercise psychology by providing a reliable and valid measure of dispositional flow among leisure-time runners. Health educators can use the Chinese DFS-2 to measure and develop flow interventions for adults to advance studies on PA enhancement. This study also contributes to the field of motivation field as flow is associated with motivation in a variety of contexts, including music, video games, and business (Goddard et al., 2021).

Conclusion

In conclusion, there is enough evidence to support the Chinese DFS-2 as a reliable and valid tool for measuring dispositional flow in the Chinese context. Its applicability to leisure time running shows that it is not limited to sports. It is recommended to conduct intervention studies in PA settings with the Chinese DFS-2 to enhance dispositional flow.

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