

LI, Yun & TAN, Qinyi. Can preservice physical educators' implicit attitude toward students with disabilities be changed by adapted physical education training program? Based on an Implicit Association Test. *Quality in Sport*. 2022;8(1):39-54. eISSN 2450-3118. DOI <http://dx.doi.org/10.12775/QS.2022.08.01.004> <https://apcz.umk.pl/QS/article/view/40931>

The journal has had 20 points in Ministry of Education and Science of Poland parametric evaluation. Annex to the announcement of the Minister of Education and Science of December 21, 2021. No. 32582.

Has a Journal's Unique Identifier: 201398. Scientific disciplines assigned: Economics and finance (Field of social sciences); Management and Quality Sciences (Field of social sciences).

Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Edukacji i Nauki z dnia 21 grudnia 2021 r. Lp. 32582. Posiada Unikatowy Identyfikator Czasopisma: 201398.

Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).

© The Authors 2022;

This article is published with open access at Licensee Open Journal Systems of Nicolaus Copernicus University in Torun, Poland Open Access. This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author (s) and source are credited. This is an open access article licensed under the terms of the Creative Commons Attribution Non commercial license Share alike. (<http://creativecommons.org/licenses/by-nc-sa/4.0/>) which permits unrestricted, non commercial use, distribution and reproduction in any medium, provided the work is properly cited.

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 14.10.2021. Revised: 19.11.2022. Accepted: 19.11.2022.

## Can preservice physical educators' implicit attitude toward students with disabilities be changed by adapted physical education training program? Based on an Implicit Association Test

Yun Li\*

Institute of Sports Science, College of Physical Education, Southwest University, Chongqing, China [liyun777@swu.edu.cn](mailto:liyun777@swu.edu.cn) ORCID: 0000-0003-1160-8786

\*Corresponding Author

Qinyi Tan

Center for Studies of Education and Psychology of Ethnic Minorities in Southwest China, Southwest University, Chongqing, China [qinyi.tan@outlook.com](mailto:qinyi.tan@outlook.com) ORCID: 0000-0002-2291-4554

### Abstract

**Purpose:** Aim to explore whether preservice physical educators' implicit attitude toward students with disabilities could be improved by mid-term adapted physical education training program.

**Design:** A randomized and controlled trial was deployed in the current experiment. Subjects were randomly divided into two groups (Experimental group and control group) after pre-test of IAT. Post-test IAT was conducted for two groups after the training program for experimental group.

**Findings:** Chinese preservice physical educators' implicit attitudes toward students with disabilities were negative. They also had a prejudice against students with disabilities. But the implicit attitudes toward students with disabilities could be improved by mid-term adapted physical education training. Furthermore, gender and contact experience with disabilities had no significant influence on the change in their implicit attitude.

**Keywords:** preservice physical educator; student with disabilities; implicit attitude; adapted physical education; Implicit Association Test

## 1. Introduction

As early as 1960s, some researchers began to report teacher's attitude toward students with disabilities. Combs & Harper (1967) explored effects of clinical labels on 160 experienced and inexperienced educators' attitudes toward exceptional children, and found that labeling did affect the educator's perception of exceptional children. Legislations carried out by different countries and declarations advocated by international organizations during 1970s and 1990s set off generous research on teachers' attitudes toward students with disabilities. Researches of physical educators' attitudes toward students with disabilities were promoted under the setting. The theory of reasoned action has been widely used as a framework for understanding and predicting intentions and behaviors from attitudes in the area of education ( Stead, 1985; Fishbein & Middlestadt, 1987; Pryor, 1990; Becker & Gibson, 1998; Garg & Garg, 2008; Tsai et al., 2012; Asadi, 2014). According to this theory, Rizzo created an instrument called the Physical Educators' Attitude Toward Teaching the Handicapped (PEATH). PEATH has been used in many studies to evaluate physical educators' attitude toward students with disabilities in regular physical classes (Kim, 1987; Rizzo & Wright, 1987; Haegele, 2009).

There were many different variables influencing the evaluation of physical educators' attitudes toward teaching students with disabilities. At least three types of variables were studied in past literature: variables related to students with disabilities, variables related to teachers, and the similar variables related to preservice physical educators. Many teacher-related variables were explored in a lot of studies on preservice physical educators' attitudes toward teaching students with disabilities, such as gender, age, perceived competence in teaching students with disabilities, experience in teaching students with disabilities, academic preparation in special education or adapted physical education, training in adapted physical education, and other personality traits which might impact on the general physical education teacher's acceptance of the inclusion principle (Block & Rizzo, 1995b; Rizzo & Kirkendall, 1995; Cheen, 2007; Pedersen et al., 2014; Tant & Watelain, 2016).

Preservice physical educators have expressed mixed feelings about teaching individuals with disabilities (Rizzo & Kirkendall, 1995). Favorable attitudes of them toward individuals with disabilities were found in many studies (Martin & Kudláček, 2010; Mangope et al., 2013). But, negative attitudes about teaching individuals with disabilities expressed by them, also (Downs & Williams, 1994; Duchane et al., 2008).

Many studies focused on how to change and improve preservice physical educators' attitude toward students with disabilities by setting up inclusive physical education courses and training programs. Many findings reported that preservice physical educators' attitude toward students with disabilities can be changed and improved during their college life. But, other studies found that the effects of practicum experiences of the adapted physical education course on the attitudes of preservice physical educators were unclear. By using the instrument of The Attitudes Towards Individuals with Physical Disabilities in Physical Education (ATIPDPE) (Kudláček et al., 2002), Di Nardo et al. (2014) examined the effects of an undergraduate adapted physical education course on the attitudes of preservice physical educators toward individuals with disabilities in Italy, and found that positive attitudes and very high intentions of preservice teachers towards inclusion after the course. Many other studies also found the

similar positive attitude changed (Costello & Boyle, 2013; Varcoe & Boyle, 2014; Tindall et al., 2015).

There also have different findings. In Western America, Sofo et al. (2016) investigated the impact of an adapted physical education methods course on preservice teachers' (PTs') attitudes and intentions to teach students with disabilities, and the results indicated that the adapted methods course had significant positive impact on PTs' knowledge of instructional techniques, perceived comfort, and intentions to teach students with disabilities, but it did not significantly affect PTs' attitudes toward students with disabilities. Haegele (2009) also found that there was no significant difference in the preservice physical educators' attitudes toward teaching children with disabilities before and after an adapted physical education course, but there was a trend toward preservice attitudes becoming more favorable.

Most of the previous studies related to evaluate preservice physical educators' attitudes toward student with disabilities were focus on their explicit attitudes by questionnaires. However, explicit attitude means that more consciousness controls the processing process, and it is difficult to overcome the influence of social pressure and social approval effect. Therefore, preservice physical educators may pretend to demonstrate positive attitudes toward student with disabilities irrespective of their real attitude. So, Previous findings regarding preservice physical educators' explicit attitudes toward student with disabilities have been largely underestimated. Otherwise, implicit attitude performs as actions or judgments that are under the control of automatically activated evaluation without the performer's awareness of the causation according to Greenwald & Banaji (1995). Hence, implicit attitudes of preservice physical educators should be given more research in the field of inclusive education.

A large number of studies have shown that negative implicit attitudes towards people with disabilities generally exist in many fields of society, such as education and employment by using an implicit association test (IAT; Greenwald & Banaji 1995). Recently, many studies have examined implicit attitudes of college students (Chen et al., 2011; Jones et al., 2021; Lipson et al., 2020; Obeid et al., 2021; Yokota & Tanaka, 2022) including preservice teachers (Markova et al., 2015; Krischler & Pit-ten Cate, 2018; Glock & Kleen, 2020; Stephens et al., 2021) toward students with special needs. But few researches focused on preservice physical educators' implicit attitudes toward students with disabilities and on the changing possibility of their implicit attitudes (O'Brien et al., 2010; Lynagh et al., 2015; Lautenbach & Antoniewicz, 2018).

In this study, we focused on preservice physical educators' implicit attitudes toward student with disabilities and examined the influence of mid-term adapted physical education training program on it. Aim to explore whether preservice physical educators' implicit attitude toward students with disabilities could be improved, an intervention including a 20-week adapted physical education training program was carried out and Implicit Association Test (IAT) was used in current research.

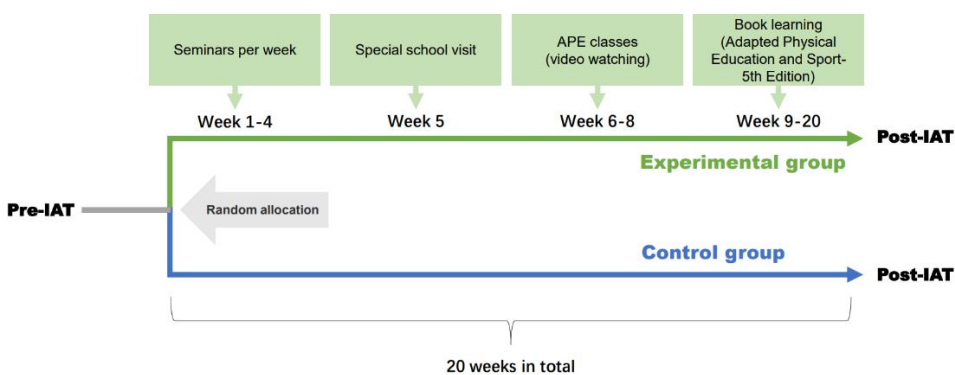
## **2. Materials and Methods**

### **2.1. Study Design**

A randomized and controlled trial was deployed in the current experiment to investigate the effects of adapted physical education training program on preservice physical educator's implicit attitudes toward students with disabilities (Figure 1). Subjects were randomly divided into two groups (Experimental group and control group) after pre-test

of IAT. Post-test IAT was conducted for two groups after the training program for experimental group.

The contents of the 20 weeks training program were basic knowledge and practice about inclusive education and adapted physical education, such as history, policies, teaching methods, and so on. Training forms included material reading, seminar, watching videos of adapted physical education classes, observation of adapted physical education classroom in regular school, and visited to special schools. The material reading throughout the program and the reading time was decided by students themselves. Four times seminars were assigned in the first four weeks and aimed to introduce the basic concepts and knowledge of inclusive education to participants. All of the three keynote speakers were major in inclusive education. The visiting of special school in 5th week aimed to develop the concept of participants on special students with disabilities. This study selected a special school in local place, called Beibei Special School, which aside to Southwest University. The times video watching of APE classes were relevant to the reading materials in the 6th, 7th, and 8th week and aimed to let participants to understand the teaching methods of adapted physical education. The training plan was showed in the following table. From the 9th week to 20<sup>th</sup> week, participants in experimental group read the book “Adapted Physical Education and Sport-5th Edition” wrote by Joseph P. Winnick and made notes in order to help them understand adapted physical education wholly.



**Figure 1.** Diagram of study design.

## 2.2. Participants

Participants were 85 preservice physical educators of the second academic year recruited from Southwest University. 51 of them were males and 34 were females, with age ranging from 17 to 23 years old (Mage-19.91, SD-1.16). All of them had normal eyesight and were right-handedness. All 85 participants attended the pre-test. 42 of them were assigned in the experimental group and 43 were in the control group. But 10 participants in the experimental group were ruled out from post-test analysis because they had not finished the training program. In the post-test, 4 participants of control group were also taken out since they did not attend the post-test. Therefore, 71 valid participants were retained (Table 1). The study was conducted in accordance with the Helsinki Declaration after approved and supervised by the Institute Research Ethics Committee (IREC) of Southwest University. The signed consent form for participating

in the experiment was obtained from all participants before the experiment. Each participant was informed that they could quit at their will during the experiment.

**Table 1.** Characteristics of the participants recruited in the study.

Group category	Number			Age (years)		
	male	female	total	Min	Max	M
Experimental group	16	16	32	18	22	19.88
Control group	22	17	39	17	22	20.04

### 2.3. Instrument

The IAT test procedure was written in E-Prime 1.1 produced by the company “Psychology Software Tools”. It was used to investigate the implicit attitudes of participants toward students with disabilities and normal students. Their reaction time and accuracy were automatically recorded. The experimental procedure was presented by Lenovo computers with Windows XP operating system and resolution ratio of 1024 x 768 pixels.

The experimental procedure consists of three parts, basic information page, instruction page and the formal test. The formal IAT test specifically included 7 steps. Step 1: the practice of target concept words including Chinese characters relevant to students with disabilities and normal students, try 20 times. Step 2: the practice of attribute words including commendatory and derogatory words, try 20 times. Step 3: compatible task including students with disabilities corresponding derogatory words and normal students corresponding commendatory words, try 20 times. Here the compatible task is to refer that the link between the concept words and the attribute words is consistent with the assumptions of implicit attitudes. The incompatible task is the opposite. Step 4: repeat step 3, but try 40 times. Step 5: practice target concept words again, but put the button reversely and aim to balance the position effect when target words appearing in step 1, try 20 times too. Step 6: incompatible task including students with disabilities corresponding commendatory words and normal students corresponding derogatory words, try 20 times. Step 7: repeat step 6, but try 40 times (Table 2). And then, take the record of step 3, 4, 6, and 7 as the original statistic data.

During the test, instructions were presented in each step, and the screen appeared red “ ” and when participant made a mistake and required to put the right button to change it. The exposure time of words is 250 milliseconds. The reaction time should be changed into 300 milliseconds if it was less than 300 milliseconds. The reaction time should be changed into 3000 milliseconds if it was more than 300 milliseconds. No any changing if there is an error reaction time and deleting any data of extreme participants.

**Table 2.** The design of IAT steps.

Steps	Task description	Function	Times	Key F	Key J
1	target concept discrimination	practice	20	Normal	Disability
2	attribute discrimination	practice	20	Commendatory	derogatory
3	compatible task	test	20	N + C	D + d
4	compatible task	test	40	N + C	D + d
5	reversed target concept	practice	20	Disability	Normal

	discrimination				
6	incompatible task	test	20	D + C	N + d
7	incompatible task	test	40	D + C	N + d

**2.4. Preparation of IAT material**

The test materials consisted of target concept characters and attribute characters. Target concept characters included two kinds of nouns, referring to students with disabilities and normal students, respectively. Attribute characters included two kinds of adjectives, commendatory and derogatory.

The first step was to select target concept characters and attribute characters. The concept of “students with disabilities” was according to the character “students with disabilities” in a special education dictionary. 10 alternative characters that represented the mean of “students with disabilities” and 10 alternative characters that represented the mean of “normal students” were selected by brainstorming of three psychological professors and 8 preservice physical educators. Class representative usually represents the excellent pupil of a course in the background of Chinese campus culture. So, the 10 alternative “normal students” characters were 10 courses’ name added up representative, such as “English representative”.

30 alternative commendatory characters related to “student with disabilities and normal student” and 30 alternative derogatory characters related to “student with disabilities and normal student” were selected by brainstorming of 8 preservice physical educators and then determined by three psychological professors.

The next step was to invite 77 preservice physical educators to evaluate the 20 alternative concept characters and 60 alternative attribute characters by three level (0 – not fit; 1 – fit; 2 – very fit) respectively. And summed the score of every character, and respective selected the top 5 target concept characters of student with disabilities, the top 5 target concept characters of normal students, the top 8 commendatory characters and the top 8 derogatory characters of student with disabilities, and the top 8 commendatory characters and the top 8 derogatory characters of normal students (Table 3).

**Table 3.** Target concept characters and attribute characters.

Student with disabilities	Concept word	Normal student																																				
1. Students with mild mental retardation	1. Physical education class representative																																					
2. Students with emotional and behavioural disorders	2. Chinese language class representative																																					
3. Students with mild mental disorders	3. Mathematics class representative																																					
4. students with autism	4. English class representative																																					
5. students with ADHD	5. Science class representative																																					
<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; border-bottom: 1px dashed black;">Commendatory characters</td> <td style="width: 33%; border-bottom: 1px dashed black;">Attribute characters</td> <td style="width: 33%; border-bottom: 1px dashed black;">Derogatory characters</td> </tr> <tr> <td>1. self-esteem</td> <td>2. Sincere</td> <td>1. introversive</td> </tr> <tr> <td>3. endeavour</td> <td>4. goodness</td> <td>2. inferior</td> </tr> <tr> <td>5. strong</td> <td>6.</td> <td>3. awkward</td> </tr> <tr> <td>righteousness</td> <td>5. fierce</td> <td>6. parsimonious</td> </tr> <tr> <td>7. generous</td> <td>7. burdensome</td> <td>8. unrefined</td> </tr> <tr> <td>9. sunshine</td> <td>8. careful</td> <td>9. arrogant</td> </tr> <tr> <td>11. youthful</td> <td>9. arrogant</td> <td>10. selfish</td> </tr> <tr> <td>confident</td> <td>10. active</td> <td>11. lazy</td> </tr> <tr> <td>13. motivated</td> <td>11. Self-</td> <td>12. indifferent</td> </tr> <tr> <td></td> <td>12. Self-</td> <td>13. childish</td> </tr> <tr> <td></td> <td>14.</td> <td>14. fraudulent</td> </tr> </table>			Commendatory characters	Attribute characters	Derogatory characters	1. self-esteem	2. Sincere	1. introversive	3. endeavour	4. goodness	2. inferior	5. strong	6.	3. awkward	righteousness	5. fierce	6. parsimonious	7. generous	7. burdensome	8. unrefined	9. sunshine	8. careful	9. arrogant	11. youthful	9. arrogant	10. selfish	confident	10. active	11. lazy	13. motivated	11. Self-	12. indifferent		12. Self-	13. childish		14.	14. fraudulent
Commendatory characters	Attribute characters	Derogatory characters																																				
1. self-esteem	2. Sincere	1. introversive																																				
3. endeavour	4. goodness	2. inferior																																				
5. strong	6.	3. awkward																																				
righteousness	5. fierce	6. parsimonious																																				
7. generous	7. burdensome	8. unrefined																																				
9. sunshine	8. careful	9. arrogant																																				
11. youthful	9. arrogant	10. selfish																																				
confident	10. active	11. lazy																																				
13. motivated	11. Self-	12. indifferent																																				
	12. Self-	13. childish																																				
	14.	14. fraudulent																																				

enthusiastic  
15. strive  
persevere

16. 15. dissolute

16. idle

---

## 2.5. Preliminary

Before the formal test, a preliminary test was conducted to 16 preservice physical educators selected randomly from Southwest University in order to test the usability of materials and procedure of the test. The result indicated that 75.6% preservice physical educators could clear distinguish the words represented “student with disabilities” and “normal student”. The time used during the whole test process was about 20 minutes. So, the test could be carried out.

## 2.6. Procedure

The test was conducted in a psychology laboratory which could hold 120 subjects at the same time. After being seated at a table with a desktop computer in the lab, subjects received all instructions from experimenters and provided all of their responses via the computer keyboard.

Half of the subjects performed the IAT test for “student with disabilities” and the other half subjects were tested on the IAT test for “normal student”, in order to balance the sequential effects of the experiment. The same experiment was repeated again when the mid-term adapted physical education training program was finished.

## 2.7. Data analysis

The data processing was according to the research of Greenwald, Nosek, and Banaji (2003), selected the data in step 3, 4, 6 and 7, then calculated the mean reaction time of every step, counted the inclusive SD between step 3, 6 and step 4, 7; and then calculated the difference (D1) of step 3 and step 6, and the difference (D2) of step 4 and step 7; finally took the value of D(D2-D1) as the effect value of IAT.

SPSS22.0 was used to carry out paired sample t test, single factor analysis of variance, paired-samples t test and correlation analysis.

## 3. Results

### 3.1 Participants' characteristics

In current study, 71 preservice physical educators' data were valid. Their average age was almost 20 years. 43.66% of them were females, and 59.15% of them had the contact experience with student with disabilities. Experimental group had 32 participants and female of them accounted for 50.00%, control group had 47 participants and female of them accounted for 38.46%.

**Table 4.** Results of descriptive statistics on demographic measures

Age	Gender	Contact experience	Group
19.98 1.0	Male (n=40; 56.34%)	Yes (n=42; 59.15%)	Experimental (n=32)
1	Female(n=31; 43.66%)	No (n=29; 40.85%)	Control (n=39)
Sum	N=71		

### 3.2 Implicit attitude before training

In order to investigate preservice physical educators' implicit attitude toward students with disabilities, paired-samples t test was conducted to analyse the data. Table 5 showed, in the current IAT, that preservice physical educators' reaction time on incompatible task was statistically significant more than their reaction time on

compatible task. So, the IAT effect was apparent. The result indicated that preservice physical educators preferred to the relationship between student with disabilities and derogatory words and the relationship between normal student and commendatory words when they carried out tasks using the same key in this IAT.

**Table 5.** Paired-samples t test of compatible and incompatible task.

Group	N	M	SD	t	p
compatible	71	455.80	83.63	-6.620	0.000
incompatible	71	640.07	235.08		

n. s. p .05; p .05; p .01; p .001

The homogeneity test was conducted to make sure there was no difference between experimental group and control group on IAT in the pre-test. The results (Table 6) indicated that there was no significant difference between experimental group and control group participants' reaction time on both the compatible and in compatible tasks.

**Table 6.** Descriptive statistics and T test on IAT in different demographic measures.

Measures	Group	M	SD	t	p
compatible	Experimental group (n=32)	453.54	73.35	-.204 n. s.	.839
	Control group(n=39)	457.65	92.12		
incompatible	Experimental group (n=32)	614.27	259.60	-.836 n. s.	.406
	Control group(n=39)	661.24	214.01		
prejudice	Experimental group (n=32)	160.73	266.89	-.764 n. s.	.448
	Control group(n=39)	203.59	205.85		

n. s. p .05; p .05; p .01; p .001

### 3.3 The influence of demographic measures on IAT

To examine the influence of gender, contact experience with disabilities and group on preservice physical educators' reaction during the compatible and incompatible tasks in IAT, Independent-Samples T test was applied in this study. Table 7 showed that gender, contact experience and group had no statistically significant influence on preservice physical educators' reaction time on both compatible and incompatible tasks. The results indicated that male preservice physical educators' had the same implicit attitude toward student with disabilities and was negative, the implicit attitude toward students with disabilities of preservice physical educators who had the contact experience with student with disabilities was no statistically difference with that of preservice physical educators who had no the contact experience with student with disabilities and was negative too, experimental group's implicit attitude toward students with disabilities was no statistically difference with that of control group and all were negative also.



**Table 7.** Results of descriptive statistics and T test on IAT in different demographic measures.

Measures	Category		M	SD	t	p
Gender	compatible	male (n = 40)	465.50	90.62	.480 n. s.	.632
		female (n = 31)	456.02	81.33		
	incompatible	male (n = 40)	669.17	240.92	1.563 n. s.	.122
		female (n = 31)	594.84	183.88		
Contact experience	compatible	Yes (n = 42)	454.20	82.31	-1.071 n. s.	.287
		No (n = 29)	476.90	94.12		
	incompatible	Yes (n = 42)	649.34	211.91	.612 n. s.	.560
		No (n = 29)	617.23	240.73		
Group	compatible	Experimental (n = 32)	440.03	74.65	-1.898 n. s.	.061
		Control (n = 39)	476.73	91.69		
	incompatible	Experimental (n = 32)	619.60	208.30	-.639 n. s.	.527
		Control (n = 39)	651.78	230.87		

n. s. p .05; p .05; p .01; p .001

### 3.4 The change of implicit attitude after training

The same IAT was conducted again on the same subjects in last IAT after the experimental group participants attended a 20-week adapted physical education training program. The following Tables showed significant difference on implicit attitudes between the experimental and control groups in the post-test.

The descriptive statistics and t test in Table 8 showed that the experimental group's reaction time on compatible and incompatible tasks were statistically significant changed before and after training. But the control group's reaction time on compatible and incompatible tasks did not change between the pre-test and the post-test. This indicated that the implicit attitude toward student with disabilities of preservice physical educators in experimental group was statistically significant influenced by the mid-term adapted physical education training program, and their attitude was changed from prejudice into positive ( $t = 4.671, p = 0.000 - 0.001$ ).

**Table 8.** Paired-sample T test of reaction time before and after training.

Group	Category		M	SD	t	p
Experimental	compatible	pre (n = 32)	453.54	73.35	-2.710	.011
		post (n = 32)	540.39	180.69		
	incompatible	pre (n = 32)	614.27	98.98	4.458	.000
		post (n = 32)	421.38	154.18		
	prejudice	pre (n = 32)	160.73	266.89	4.671	.000
		post (n = 32)	-119.01	197.06		
Control	compatible	pre (n = 39)	457.65	92.12	.659 n. s.	.514
		post (n = 39)	442.46	99.19		
	incompatible	pre (n = 39)	661.24	214.01	.432 n. s.	.668
		post (n = 39)	637.49	220.85		
	prejudice	pre (n = 39)	203.59	205.85	.159 n. s.	.875
		post (n = 39)	195.03	213.70		

n. s. p .05; p .05; p .01; p .001

After received 20 weeks training program and compared with control group, the reaction time of preservice physical educators in experimental group was statistically significant different not only on compatible task but also on incompatible task (Table 9). This indicated that, lateral compared with control group, the mid-term adapted physical education training program had statistically significant positive changed preservice physical educator's implicit attitude toward student with disabilities.

**Table 9.** Descriptive statistics and t test of reaction time after training.

Task	Group	N	M	SD	t	p
Compatible	experimental	32	540.39	180.69	2.745	.009
	control	39	442.46	99.19		
Incompatible	experimental	32	421.38	98.98	-5.477	.000
	control	39	637.49	220.85		
Prejudice	experimental	32	-119.01	197.06	.771	.000
	control	39	195.03	213.70		

n. s. p .05; p .05; p .01; p .001

In short, by vertical and horizontal comparison, preservice physical educators' implicit attitudes toward students with disabilities were statistically significant positively influenced by mid-term adapted physical education training program.

#### 4. Discussion

##### 4.1 Preservice physical educators had prejudice on student with disabilities

The major finding of pre-IAT was that preservice physical educators preferred the relationship between student with disabilities and derogatory words and the relationship between normal student and commendatory words when they carried out tasks using the same key. This indicated that preservice physical educators' implicit attitude toward normal students were positive, while negative attitude was revealed when coming to the

disabilities group. In other words, preservice physical educators had prejudice on students with disabilities.

Few previous researches focused on preservice physical educators' implicit attitude toward students with disabilities. But many studies reported implicit attitude of preservice educators from different majors. The result of this finding provide support for previous work. Liu (2017) reported that teacher candidates showed negatively implicit stereotypes towards students with disabilities in both the positively implicit association test and the negatively implicit association test. In fact, many studies reported that college students hold negatively implicit attitudes towards individuals with disabilities in China (Chen et al., 2011; Chen & Zhang, 2012; Ma et al., 2012; Wu, 2014; Zhang, 2012).

This study also found that gender was not related to preservice physical educators' implicit attitude toward students with disabilities. The result was supported by past researchers (Chen & Zhang, 2012; Chen, 2016; Liu, 2017; Ma et al., 2012). But, Wu (2014) found that the implicit attitude of male college student were more negative than that of female college student toward students with disabilities.

No significant difference was found on implicit attitudes toward students with disabilities between preservice physical educators who had contact experience and preservice physical educators who had no contact experience. This result was supported by previous researchers. Chen & Zhang (2012) reported that contact experience had no significant influence on college students' implicit attitudes toward individuals with disabilities. The same result was also found in the research of Zhang (2012) and the study of Liu (2017).

#### **4.2 Preservice physical educators' implicit attitude was changed**

An important finding of this study was that preservice physical educators' implicit attitude toward students with disabilities was changed by a mid-term (20 weeks) adapted physical education training program. This indicated that their implicit attitude toward student with disabilities could be changed in a semester. So, the Ha5 was proved.

Compared with explicit attitude, the forming of implicit attitude is a slow and long-time process. Liu (2014) reported that there was no significant difference of preservice educators' implicit attitude toward individuals with disabilities between the pre-test and the post-test, after they attended a 6-week special education training program. It reflected an associative system characterized by a slower process of repeated pairings between an attitude object and related evaluations and was not affected by explicit processing goals, uniquely predicted spontaneous behaviours, and was exclusively affected by associative information about the attitude object that was not available for higher order cognition (Rydell & McConnell, 2006). In other words, implicit attitudes are relatively less consciously accessible, less controllable, and more automatic than their explicit counterparts (De et al., 2009; Greenwald & Banaji, 1995; Kim, 2003). So, the change of implicit attitude need more time than that of explicit attitude according to the findings of current study.

### **5. Conclusions**

In China, the launch of the Action Plan for the development and enhancement of special education during the Fourteenth Five-Year period in China aims to promote the high-quality development of education, effectively guarantee the right of students with disabilities to equal access to education, and let them and regular students understand and respect each other, grow and progress together in an inclusive environment (Ministry of Education, 2022). Even though a series of international agreements were

published to develop inclusion these years, and some of the important international agreements above signed since 1989 have promoted inclusive education in the global context (Tan, 2021), this experimental research proved some challenges. The Chinese preservice physical educators' implicit attitudes toward students with disabilities were negative. They also had a prejudice against students with disabilities. But the implicit attitudes toward students with disabilities could be improved by mid-term adapted physical education training. Furthermore, the current study also found that gender and contact experience with disabilities had no significant influence on the change of preservice physical educators' implicit attitude toward students with disabilities. This study only focused on the situation of Southwest University in China, with a limited sample size and relevant variables may affect the research results during the training process. We suggest more researches should be focus on related variables which influence the implicit attitudes of preservice physical educators in the future.

### Funding

This work was supported by the Social Science Planning Project of Chongqing in the year of 2020 (No. 2020BS31), and the Fundamental Research Funds for the Central Universities of China (No. SWU1805109).

### References

- Asadi, Z. (2014), "The effect of educational intervention based on Theory of Reasoned Action (TRA) on selected delivery method, for selective cesarean section in pregnant women", *Iranian Journal of Obstetrics Gynecology & Infertility*, Vol. 13, Issue 13, pp. 235-241. <https://doi.org/10.1007/s004970000061>
- Becker, E. A., & Gibson, C. C. (1998), "Fishbein and Ajzen's Theory of Reasoned Action: Accurate Prediction of Behavioral Intentions for Enrolling in Distance Education Courses", *Adult Education Quarterly*, Vol. 49, Issue 1, pp. 43-55. <https://doi.org/10.1177/0747171369804900105>
- Block, M. E., & Rizzo, T. L. (1995), "Attitudes and attributes of physical educators associated with teaching individuals with severe and profound disabilities", *Research & Practice for Persons with Severe Disabilities*, Vol. 20, Issue 1, pp. 80-87. <https://doi.org/10.1177/154079699502000108>
- Cheen, J. R. (2007), *Attitudes of elementary physical educators toward teaching students with disabilities in Taiwan*, Doctor degree dissertations, Texas Woman's University. Retrieved from <https://www.proquest.com/docview/304742171?parentSessionId=gCW%2BZn98SsZzcHYWwYwekaMyCgvzFVmcmdDHwvEFqJg%3D> (accessed 2 June 2022).
- Chen, G., & Zhang, Z. (2012), "On College Students' Explicit and Implicit Attitudes Towards People with Disabilities", *Chinese Journal of Special Education*, Vol. 146, Issue 8, pp. 22-29. Retrieved from [https://202.202.113.50/piskns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbn\\_ame=CJFD2012&filename=ZDTJ201208006&uniplatform](https://202.202.113.50/piskns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbn_ame=CJFD2012&filename=ZDTJ201208006&uniplatform) (accessed 2 June 2022).
- Chen, J. (2016), *Research on Implicit Attitudes of College Students toward People with Disabilities*, Master thesis, Zhengzhou University, pp. 25-31. Retrieved from <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201701&filename=1016232528.nh> (accessed 27 September 2022).
- Chen, S., Ma, L., & Zhang, J. X. (2011), "Chinese Undergraduates' Explicit and Implicit Attitudes toward Persons with Disabilities", *Rehabilitation Counseling Bulletin*, Vol. 55, Issue 1, pp. 38-45. <https://doi.org/10.1177/0034355211410705>

- Costello, S., & Boyle, C. (2013), “Pre-Service Secondary Teachers’ Attitudes towards Inclusive Education”, *Australian Journal of Teacher Education*, Vol. 38, Issue 4, pp. 129-143. <https://doi.org/10.14221/ajte.2013v38n4.8>
- Combs, R. H., & Harper, J. L. (1967), “Effects of labels on attitudes of educators toward handicapped children”. *Exceptional Children*, Vol. 33, Issue 6, pp. 399-403. <https://doi.org/10.1177/001440296703300607>
- De, H. J., Teige-Mocigemba, S., Spruyt, A., & Moors, A. (2009), “Implicit measures: A normative analysis and review”, *Psychological Bulletin*, Vol. 135, Issue 3, pp. 347-368. <https://doi.org/10.1037/a0014211>
- Di Nardo, M., Kudláček, M., Tafuri, D., & Sklenaříková, J. (2014), “Attitudes of Preservice Physical Educators toward Individuals with Disabilities at University Parthenope of Napoli”, *Acta Gymnica*, Vol. 44, Issue 4, pp. 211-221. <https://doi.org/10.5507/ag.2014.022>
- Downs, P., & Williams, T. (1994), “Student attitudes toward integration of people with disabilities in activity settings: A European comparison”, *Adapted Physical Activity Quarterly*, Vol. 11, Issue 1, pp. 32-43. <https://doi.org/10.1123/apaq.11.1.32>
- Duchane, K. A., Leung, R. W., & Coulter-Kern, R. (2008), “Preservice physical educator attitude toward teaching students with disabilities”, *Clinical Kinesiology*, Vol. 62, Issue 3, pp.16-20. Retrieved from <https://www.researchgate.net/publication/289916559> (accessed 11 June 2022).
- Fishbein, M., & Middlestadt, S. E. (1987), “Using the theory of reasoned action to develop educational interventions: applications to illicit drug use”, *Health Education Research*, Vol. 2, Issue 4, pp. 361-371. <https://doi.org/10.1093/her/2.4.361>
- Garg, D., & Garg, A. K. (2008), “General Education Courses at the University of Botswana: Application of the Theory of Reasoned Action in Measuring Course Outcomes”, *Journal of General Education*, Vol. 56, Issue 3, pp. 252-277. <https://doi.org/10.1353/jge.0.0005>
- Glock, S., & Kleen, H. (2020), “Preservice teachers’ attitudes, attributions, and stereotypes: Exploring the disadvantages of students from families with low socioeconomic status”, *Studies in Educational Evaluation*, Issue 67, pp. 100929. <https://doi.org/10.1016/j.stueduc.2020.100929>
- Greenwald, A. G., & Banaji, M. R. (1995), “Implicit social cognition: attitudes, self-esteem, and stereotypes”, *Psychological Review*, Vol. 102, Issue 1, pp. 4-27. <https://doi.org/10.1037//0033-295X.102.1.4>
- Haegele, J. A. (2009), *The Effects of Education and Experience on the Attitudes of Pre-service Physical Educators Toward Teaching Children with Disabilities*, Master thesis, The College at Brockport, Retrieved from [http://digitalcommons.brockport.edu/pes\\_theses/6/](http://digitalcommons.brockport.edu/pes_theses/6/) (accessed 10 June 2022).
- Jones, D. R., DeBrabander, K. M., & Sasson, N. J. (2021), “Effects of autism acceptance training on explicit and implicit biases toward autism”, *Autism*, Vol. 25, Issue 5, pp. 1246–1261. <https://doi.org/10.1177/1362361320984896>
- Kim, D. Y. (2003), “Voluntary Controllability of the Implicit Association Test (IAT)”, *Social Psychology Quarterly*, Vol. 66, Issue 1, pp. 83-96. <https://doi.org/10.2307/3090143>
- Kim, K. (1987), *Analysis of Korean physical educators’ attitudes toward teaching handicapped students in regular classes*, Master thesis, Oregon State University, Retrieved from

- [https://ir.library.oregonstate.edu/concern/graduate\\_thesis\\_or\\_dissertations/gh93h22\\_0b?locale=en](https://ir.library.oregonstate.edu/concern/graduate_thesis_or_dissertations/gh93h22_0b?locale=en) (accessed 10 June 2022).
- Krischler, M., & Pit-ten Cate, I. M. (2018), “Inclusive education in Luxembourg: implicit and explicit attitudes toward inclusion and students with special educational needs”, *International Journal of Inclusive Education*, pp. 1–19. <https://doi.org/10.1080/13603116.2018.1474954>
- Kudláček, M., Valkova, H., Sherrill, C., Myers, B., & French, R. (2002), “An inclusion instrument based on planned behavior theory for prospective physical educators”, *Adapted Physical Activity Quarterly*, Vol. 19, Issue 3, pp. 280-299. <https://doi.org/10.1123/apaq.19.3.280>
- Lautenbach, F., & Antoniewicz, F. (2018), “Ambivalent implicit attitudes towards inclusion in preservice PE teachers: The need for assessing both implicit and explicit attitudes towards inclusion”, *Teaching and Teacher Education*, Issue 72, pp. 24–32. <https://doi.org/10.1016/j.tate.2018.01.003>
- Lipson, J., Taylor, C., Burk, J. A., & Dickter, C. L. (2020), “Perceptions of and behavior toward university students with autism”, *Basic and Applied Social Psychology*, Vol. 42, Issue 5, pp. 354–368. <https://doi.org/10.1080/01973533.2020.1785468>
- Liu, J. (2014), *A Study on Normal University Students' Stereotypes toward Students with Disabilities*, Doctoral degree dissertation, East China Normal University. Retrieved from <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CDFD1214&filename=1014326229.nh> (accessed 20 September 2022).
- Liu, J. (2017), “The Features of the Implicit Stereotypes Towards Students with Disabilities among Teacher Candidates from a Normal University”, *Chinese Journal of Special Education*, Vol. 207, Issue 9, pp. 3-8+14. Retrieved from <https://202.202.113.50/piskns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2017&filename=ZDTJ201709002&uniplatform> (accessed 10 July 2022).
- Lynagh, M., Cliff, K., & Morgan, P. J. (2015), “Attitudes and Beliefs of Nonspecialist and Specialist Trainee Health and Physical Education Teachers Toward Obese Children: Evidence for ‘Anti-Fat’ Bias”, *Journal of School Health*, Vol. 85, Issue 9, pp. 595–603. <https://doi.org/10.1111/josh.12287>
- Ma, Z., Zhang, D., & Wang, J. (2012), “College Students’ Explicit Attitude and Implicit Attitude to the Disabled”, *China Journal of Health Psychology*, Vol. 20, Issue 3, pp. 444-446. Retrieved from <https://202.202.113.50/piskns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFD2012&filename=ZDTJ201208006&uniplatform> (accessed 10 July 2022).
- Mangope, B., Mannathoko, M. C., & Kuyini, A. B. (2013), “Pre-Service Physical Education Teachers and Inclusive Education: Attitudes, Concerns and Perceived Skill Needs”, *International Journal of Special Education*, Vol. 28, Issue 3, pp.82-92. Retrieved from <https://www.researchgate.net/publication/262009046> (accessed 10 October 2022).
- Markova, M., Pit-Ten Cate, I., Krolak-Schwerdt, S., & Glock, S. (2015), “Preservice Teachers’ Attitudes Toward Inclusion and Toward Students with Special Educational Needs from Different Ethnic Backgrounds”, *The Journal of Experimental Education*, Vol. 84, Issue 3, pp. 554-578. <https://doi.org/10.1080/00220973.2015.1055317>
- Martin, K., & Kudláček, M. (2010), “Attitudes of pre-service teachers in an Australian university towards inclusion of students with physical disabilities in general

- physical education programs”, *European Journal of Adapted Physical Activity*, Vol. 3, Issue 1, pp. 30-48. Retrieved from <https://www.researchgate.net/publication/289066451> (accessed 5 May 2022)
- Ministry of Education (MOE). (2022), *Action Plan for the development and enhancement of special education during the Fourteenth Five-Year period in China*. Retrieved from [http://www.gov.cn/zhengce/content/2022-01/25/content\\_5670341.htm](http://www.gov.cn/zhengce/content/2022-01/25/content_5670341.htm) (accessed 15 October 2022).
- O’Brien, K. S., Puhl, R. M., Latner, J. D., Mir, A. S., & Hunter, J. A. (2010), “Reducing Anti-Fat Prejudice in Preservice Health Students: A Randomized Trial”, *Obesity*, Vol. 18, Issue 11, pp. 2138–2144. <https://doi.org/10.1038/oby.2010.79>
- Obeid, R., et al. (2021), “Do implicit and explicit racial biases influence autism identification and stigma? An implicit association test study”, *Journal of Autism and Developmental Disorders*, Vol. 51, Issue 1, pp. 106–128. <https://doi.org/10.1007/s10803-020-04507-2>
- Pedersen, S. J., Cooley, P. D., & Hernandez, K. (2014), “Are Australian Pre-Service Physical Education Teachers Prepared to Teach Inclusive Physical Education?”, *Australian Journal of Teacher Education*, Vol. 39, Issue 8, pp. 53-62. <https://doi.org/10.14221/ajte.2014v39n8.4>
- Pryor, B. W. (1990), “Predicting and Explaining Intentions to Participate in Continuing Education: An Application of the Theory of Reasoned Action”, *Adult Education Quarterly*, Vol. 40, Issue 40, pp. 146-157. <https://doi.org/10.1177/0001848190040003003>
- Rizzo, T. L., & Kirkendall, D. R. (1995), “Teaching Students with Mild Disabilities: What Affects Attitudes of Future Physical Educators?”, *Adapted Physical Activity Quarterly*, Vol. 12, Issue 3, pp. 205-216. <https://doi.org/10.1123/apaq.12.3.205>
- Rizzo, T. L., & Wright, R. G. (1987), “Secondary school physical educators’ attitudes toward teaching students with handicaps”, *American Corrective Therapy Journal*, Vol. 41, Issue 2, pp. 52-55. <https://psycnet.apa.org/record/1988-28017-001>
- Rydell, R. J., & McConnell, A. R. (2006), “Understanding implicit and explicit attitude change: a systems of reasoning analysis”, *Journal of Personality and Social Psychology*, Vol. 91, Issue 6, pp. 995-1008. <https://doi.org/10.1037/0022-3514.91.6.995>
- Sofa, S., Ramos, A., & Beard, D. H. (2016), “Physical Education Preservice Teachers’ Attitudes and Intentions to Teach Students with Disabilities”, *Journal of Sports and Physical Education*, Vol. 3, Issue 5, pp. 45-51. <https://doi.org/10.9790/6737-03054551>
- Stead, K. (1985), “An exploration, using Ajzen and Fishbein’s theory of reasoned action, of students’ intentions to study or not to study science”, *Research in Science Education*, Vol. 15, Issue 1, pp. 76-85. <https://doi.org/10.1007/BF02356528>
- Stephens, J. M., Rubie-Davies, C., & Peterson, E. R. (2021), “Do preservice teacher education candidates’ implicit biases of ethnic differences and mindset toward academic ability change over time?”, *Learning and Instruction*, pp. 101480. <https://doi.org/10.1016/j.learninstruc.2021.1014>
- Tan, Q. (2021), *Barriers to Inclusive Education in Chinese Primary Schools*, Routledge. Retrieved from <https://www.routledge.com/Barriers-to-Inclusive-Education-in-Chinese-Primary-Schools-Culture-Policy/Tan/p/book/9781032000268> (accessed 25 October 2022).

- Tant, M., & Watelain, E. (2016), "Forty years later, a systematic literature review on inclusion in physical education (1975–2015): A teacher perspective", *Educational Research Review*, Issue 19, pp. 1-17. <https://doi.org/10.1016/j.edurev.2016.04.002>
- Tindall, D., MacDonald, W., Carroll, E., & Moody, B. (2015), "Pre-Service Teachers' Attitudes towards Children with Disabilities: An Irish Perspective", *European Physical Education Review*, Vol. 21, Issue 2, pp. 206-221. <https://doi.org/10.1177/1356336X14556861>
- Tsai, M. T., Chen, K. S., & Chien, J. L. (2012), "The factors impact of knowledge sharing intentions: the theory of reasoned action perspective", *Quality & Quantity*, Vol. 46, Issue 5, pp. 1479-1491. <https://doi.org/10.1007/s11135-011-9462-9>
- Varcoe, L., & Boyle, C. (2014), "Pre-service primary teachers' attitudes towards inclusive education", *Educational Psychology*, Vol. 34, Issue 3, pp. 323-337. <https://doi.org/10.1080/01443410.2013.785061>
- Wu, Q. (2014), *Research on Implicit Attitude and Influence of Undergraduates toward Disabilities*, Master thesis, Guizhou Normal University, pp. 35-38. Retrieved from <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201702&filename=1014052202.nh> (accessed 27 September 2022).
- Yokota, S., Tanaka, M. (2022), "Less Negative Implicit Attitudes Toward Autism Spectrum Disorder in University Students: A Comparison with Physical Disabilities", *Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s10803-022-05749-y>
- Zhang, Z. (2012), *The Experimental Study on Explicit and Implicit Attitude of College Students towards People with Disability*, Master thesis, Shenyang Normal University, pp. 23-28. Retrieved from <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201502&filename=1012364033.nh> (accessed 27 September 2022).