Pertanika J. Soc. Sci. & Hum. 33 (3): 1083 - 1108 (2025)

PERTANIKA JOURNALS

SOCIAL SCIENCES & HUMANITIES

Journal homepage: http://www.pertanika.upm.edu.my/

Evaluate the Psychometric Properties of Chinese Version Social Media Use and Positive Body Image Scale Among High School Students in China

Yueyi Liu and Hooi Lian Lim*

School of Educational Studies, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia

ABSTRACT

The purpose of this study was to assess the psychometric properties of the Chinese versions of the Positive Body Image Scale for Adolescents (PBIAS) and the Social Media Use Integration Scale (SMUIS) using Item Response Theory, specifically the Rasch model to address the lack of validated instruments to assess positive body image and social media use among Chinese adolescents. This study revealed that C-PBIAS and C-SMUIS generally had good reliability and validity. Correlation analysis results revealed a significant relationship between positive body image and social media use among Chinese high school students, which is a negative correlation. This means that social media use has a negative effect on positive body image among high school students in China. This study contributes to the development of culturally relevant psychometric instruments and provides insights into the impact of social media on the physical and mental health of Chinese adolescents.

Keywords: Adolescent, Chinese version Positive Body Image Scale among Adolescents (PBIAS), Chinese version Social Media Use Integration Scale (SMUIS), high school students, psychometric properties, Rasch model

INTRODUCTION

Since the 21st century, adolescents, especially high school students growing up in the context of the Internet, have experienced changes in their behavioral characteristics, learning styles, ways of thinking and social participation due to their social media use (Luo, 2021). Moreover, studies have revealed that social media use also affects adolescents' socialization processes, such as interpersonal relationships, role-playing, social participation, media dependence and values (Jiang & Bai, 2023).

ARTICLE INFO

Article history:
Received: 30 April 2024
Accepted: 02 January 2025
Published: 26 June 2025

DOI: https://doi.org/10.47836/pjssh.33.3.07

E-mail addresses:
rae0601@foxmail.com (Yueyi Liu)
hllim@usm.my (Hooi Lian Lim)
*Corresponding author

As an important foundation for adolescents' healthy development, body image has a profound impact on high school students' well-being (Shi et al., 2020). Having a positive body image involves loving, respecting, accepting, and appreciating the body, as well as learning to interpret information to protect it (Tylka & Wood-Barcalow, 2015). Positive body image contributes to adolescents' well-being and enables healthy physical and mental development (Liu & Zhou, 2022).

In recent years, the physical and mental health of adolescents has received increasing attention in China, with positive body image becoming a hot topic. One hundred twenty million people have read the Weibo trending topic #How can young people relieve body anxiety, and more than 75,000 individuals have joined the conversation. Participating netizens expressed their dissatisfaction with the so-called ideal body shape and appearance, stating that more and more individuals are embracing their bodies and admitting their imperfections.

Adolescence is the age at which the sexual organs mature and secondary sexual characteristics appear. The exact age range of puberty varies slightly around the world, with the World Health Organization defining it as 10-19 years of age and China generally referring to 11–17 years (Cao et al., 2021). Adolescence constitutes a crucial period for the development of body image. Throughout this phase, bodily transformations manifest as some of the most rapid and diverse within human development. Embracing and adjusting to these changes proves essential to the body image perception of high school students (Chae, 2022). As representatives of adolescents, high school students not only have to cope with the physical and mental changes associated with adolescence but also face a great deal of pressure to enter higher education. In this context, the possession of a positive body image and a healthy mental state is crucial to students' study and daily life (Y. Wang, 2021).

In response to the research on adolescent body image in recent years, there have been studies focusing on negative body image and its emotional impact, and scholars have gradually recognized the importance of cultivating a positive body image, especially in terms of enhancing well-being and life satisfaction, which is important for the prevention of psychological problems (Chen, 2022). However, research on positive body image in China is still in its infancy, lacking systematic theories and measurement tools, as well as a clear understanding of its dimensions (Yang et al., 2023). Nonetheless, quantitative research is not intended to avoid these challenges but rather to fill specific gaps in current theory and practice. Through quantitative research, key dimensions of adolescents' positive body image can be effectively identified and measured, providing data support for future theory development and refinement of measurement tools (Yue et al., 2006). Therefore, exploring the positive body image of high school students in the context of Chinese culture not only contributes to a better understanding of the mental health needs of this group but also can lay the foundation for subsequent research in this area.

Maes et al. (2021) developed the Positive Body Image Scale among Adolescents (PBIAS) to assess positive body image among adolescents. The psychometric properties of the PBIAS were assessed by reliability and validity testing, as well as exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) via Classical Test Theory (CTT). Based on CTT, the observed score of a respondent on a survey item is the combination of their true score (representing their ability) and an error (attributable to luck or random factors; Lord, 1980). CTT suggests that the standard measurement error is uniform across all individuals and focuses on the whole test rather than individual test items. Despite its simplicity and ease of use, this method cannot predict the performance of a particular participant on a survey or test item (Hambleton et al., 1991).

In contrast, Item Response Theory (IRT), represented by Rasch's analysis, is able to estimate specific values of items' latent abilities by modeling the relationship between each item and the latent ability and simultaneously assessing both topic difficulty and discrimination (Embretson & Reise, 2000). The superiority of IRT lies in the fact that it provides invariant parameter estimates and allows for more precise individual ability assessments. Particularly during the process of item deletion or refinement, the length of the instrument can be shortened while maintaining sufficient accuracy (Hibbard et al., 2005). As a model representative of Item Response Theory, Rasch's analysis aligns all respondents and items on the same measure of the underlying trait. This measure determines the probability of respondents endorsing items that assess their level of the exhibited trait (Bond & Kirkham, 2003). Thus, applying the Rasch model to assess the psychometric properties of PBIAS can provide valuable information.

In addition, the original version of PBIAS was in English, translated and applied in Spanish and Catalan contexts in February 2023 (Tort-Nasarre et al., 2023). However, it has not been applied in Chinese contexts. To enhance the assessment of positive body image among adolescents in China and other Mandarin-speaking countries and regions, this study translated and adapted the PBIAS into a Chinese version to suit the local context and evaluated its psychometric properties.

Moreover, social media use is currently one of the most widespread leisure activities among teenagers, particularly those in high school. In China, adolescents have emerged as the most engaged demographic in the utilization of social networking sites (China Internet Network Information Center, 2023). Jenkins-Guarnieri et al. (2013) defined social media use as the degree to which individuals integrate social media into their social interactions and everyday routines, as well as the importance and emotional connection they have towards this usage. Despite the vast amount of information flowing on social media, the ability to accurately identify useful information from spam and to avoid negative influences on their body image is a huge challenge for adolescents during their adolescent period of development in the Internet era. Hence,

it is crucial to give more consideration to the various effects that social media use can have on the lives of adolescents, of which the impact on their positive body image should not be overlooked.

Meanwhile, researchers in adjacent domains have examined the influence of social media's popularity and ubiquity on individual body image, but the results have been inconsistent. For one thing, social websites are often cited in the media as a reason for the high rates of body dissatisfaction among adolescents (Milmo & Skopeliti, 2021). The findings of De Valle et al. (2021) suggest that social media overflows with photos that have been retouched and filtered, which can trigger individuals to feel dissatisfied with their bodies, leading to body image issues. In contrast, there has also been some research suggesting that passive social network use by university students can influence their body image through the mediating role of positive feedback online (D. Wang, 2021). It has been argued that social media use leads individuals to focus more on their positive mental qualities and desire to portray a positive self-image in social media, which helps individuals experience more positive emotions and shape positive body image, increasing levels of well-being (Jiang & Bai, 2023).

Jenkins-Guarnieri et al. (2013) developed the Social Media Use Integration Scale (SMUIS) to examine the use and contentment of the social media platform Facebook. Since its release, the SMUIS has been used in several studies. Following an exploratory factor analysis, the scale demonstrated satisfactory reliability in most reported trials (Maree, 2017). However, as with PBIAS, the SMUIS was determined to have psychometric properties based on Classical Test Theory (CTT) and therefore suffers from the same drawbacks.

CTT is based on total scores, relies mainly on reliability and validity indicators of the overall test, and cannot provide validity information for individual topics, which limits the ability to judge the validity of specific items (Embretson & Reise, 2000). Item Response Theory (IRT), on the other hand, examines the relationship between individual items and potential abilities, which can provide information on the difficulty and differentiation of each item as well as their performance at different ability levels. Therefore, IRT is able to assess the validity of the instrument more precisely, especially with parameter invariance despite different samples or test conditions, which gives IRT an advantage over CTT in validity assessment (Hambleton et al., 1991).

Rasch analysis, a form of item response theory (IRT), was developed to enhance the precision of measurement in ordinal-level scales (Narayanaswami & Burns, 2018). It is extensively employed in fields such as mathematics, science, education, and other areas.

A substantial and increasing number of Chinese adolescents are using social media platforms. Nevertheless, there is a scarcity of comprehensive theory and validation in the field of research examining the correlation between social media use and body image among adolescents. Hence, examining the

relationship between adolescents' social media use and their positive body image is imperative. The research objective of this study is to evaluate the psychometric properties of the Chinese version of the Social Media Use and Positive Body Image Scale and to examine the relationship between positive body image and social media use among high school students in China.

METHODS

Research Design

This study employs quantitative research. Data were collected once, and the study involved translating and culturally adapting the original version. It also provides evidence of the psychometric properties of the C-PBIAS and C-SMUIS.

Sample of Study

A multi-stage sampling method was used in this study. First, schools were selected using cluster sampling as the clustering unit. Random numbers were used for sampling. Students were selected from the 11th-grade classes of three middle schools in Handan City, Hebei Province, China, as most 16–17-year-old high school students were enrolled in this grade. Then, the stratified random sampling method was used. The sample was divided into two groups based on gender. This study involved 550 high school students. Data from 40 respondents were excluded due to missing data (e.g., some questions were not answered) or incorrect responses (e.g., all options were selected as A). Therefore, as shown in Table 1, the final sample size used for analysis was 510 respondent students (255 male and 255 female).

Instrument

Permission to translate and culturally adapt the instruments for this study was obtained from the original scale authors. PBIAS and SMUIS were initially translated into Chinese by a team of experts, including one lecturer in psychometrics and two lecturers in psychology. The translation process was conducted using the back-to-back translation approach. Initially, three English lecturers from Hebei University of Engineering in China translated the questionnaires independently. However, there were some differences in translation between the translators, i.e., they used different expressions when translating the

Table 1
Respondents by school, gender and age (N=510)

School	Male		Female		Total	
	Aged 16	Aged 17	Aged 16	Aged 17	Aged 16	Aged 17
Gangyuan Middle School	28	57	17	68	45	125
Handan No.3 Middle School	20	65	19	66	39	131
Handan No.12 Middle School	20	65	17	68	37	133
Total	68	187	53	202	121	389

questionnaire. For example, for item S4, two translators thought that “upset” should be translated as “anxious," as this would be more in line with the Chinese context than a direct translation. Subsequently, the translators met to agree on the final translation of the questionnaire and completed a professional translation.

In terms of content validity, the translated questionnaire also received comments and feedback from six experts with extensive experience and expertise at Hebei University of Engineering. After soliciting feedback from the experts, the suggestions were first categorized and discussed for decision-making, integrating modifications at the linguistic and cultural aspects. Then, a pilot study was conducted to validate the reliability and validity of the instrument. The instrument was adapted again based on the feedback and finalized to form a version suitable for the target culture. The experts recommended the use of all relevant items. In addition, according to the experts' suggestions, fewer items in the original SMUIS may lead to lower test reliability (Ziegler et al., 2014). After the discussion, the Social Media Engagement Scale (Ni et al., 2020) was deemed compatible with this study. Based on the experts' proposal, five items were added to the C-SMUIS, one in the SIEC subscale and four in the ISR subscale. Since the scale was developed by Chinese scholars, it will be more applicable to the current study of the cultural aspects. In addition, the scale can be complemented with the items of the C-SMUIS. According to the pilot study, the reliability and validity of the instrument were improved with the addition of items.

The instrument was refined and improved based on the comments and feedback provided by the experts. The C-PBIAS had item content validity (I-CVI) ranging from 0.83 to 1.00, while the scale content validity (S-CVI) was 0.94. The item content validity (I-CVI) for the C-SMUIS ranged from 0.67 to 1.00, and the scale content validity (S-CVI) was 0.91. The findings demonstrated that the C-PBIAS and C-SMUIS items possess good content validity, as indicated by Polit et al. (2007).

Positive Body Image Among Adolescents Scale (PBIAS)

The PBIAS comprises four dimensions: body Self-Appreciation, Body Other-Appreciation, Resilience Against Body Ideals in Media, and Resilience Against Negative Appearance Feedback. It consists of 15 items. Each item is evaluated using a 7-point Likert scale, with scores ranging from 1 (strongly disagree) to 7 (strongly agree). Table 2 illustrates descriptions of the subscales of the PBIAS.

Social Media Use Integration Scale (SMUIS)

The SMUIS comprises two aspects of social media usage: Social Integration and Emotional Connection (SIEC) and Integration into Social Routines (ISR). The original version of the SMUIS included 10 items, with an additional five items added based on expert recommendations to align with the Chinese context. All items were

Table 2
Descriptions of the subscales of the PBIAS

Number	Subscales	Description
1	Body Self-Appreciation	Refers to the intentional choice to appreciate one's unique beauty, accept and respect one's body, and protect it from narrow standards of beauty.
2	Body Other-Appreciation	Appreciating and respecting the (diverse) bodies and appearances of others is important, in particular, given the diversity of adolescent bodies.
3	Resilience Against Body Ideals in Media	The ability to respond rationally and positively to threats to body image (i.e., situations that direct attention to the body and provoke distress or shame) comes primarily from the sociocultural context, i.e., exposure to beauty ideals in traditional and social media.
4	Resilience Against Negative Appearance Feedback	The ability to respond rationally and positively to threats to body image (i.e., situations that direct attention to the body and provoke distress or shame) comes primarily from the interpersonal context, i.e., negative appearance feedback such as teasing and body-related talk.

Sources: Avalos et al. (2005), Maes et al. (2021), Tylka & Iannantuono (2016), Tylka & Wood-Barcalow (2015)

Table 3
Descriptions of the subscales of the SMUIS

Number	Subscales	Description
1	Social Integration and Emotional Connection (SIEC)	The level of relationship building, integration into an online community, emotional rewards related to social media use, and the negative cognitive impact on a user if they cannot use social media.
2	Integration into Social Routines (ISR)	Quantifies to what degree a social media user regularly interacts with platforms' various functions as part of their daily routines.

Source: Cain & Imre (2021)

scored using a 6-point Likert scale. Table 3 illustrates descriptions of the subscales of the SMUIS.

Data Collection

The data collection was carried out from October to November 2023. Before starting, the researchers obtained permission from the principals of selected schools in Hebei Province, China. First, respondents who met the inclusion and exclusion criteria were identified as eligible participants. Secondly, eligible participants were contacted through the Tencent QQ platform. An invitation message, including a link to the WPS online form, was sent via QQ. Next, respondents were provided with detailed information about the study through the WPS form. They consented by clicking the "Agree" option within the form. After providing consent, respondents were redirected to the Questionnaire Star platform (https://www.wjx.cn/) to complete the survey. The

first page of the survey on Questionnaire Star provided short and clear instructions on how to complete the questionnaire. Respondents were asked to complete two parts of the survey, C-PBIAS and C-SMUIS, within an estimated 10 to 15 minutes. Once respondents completed the survey, the researchers automatically collected the responses through the Questionnaire Star platform.

Data Analysis

The data analysis to evaluate the psychometric properties of the C-PBIAS and C-SMUIS was conducted using WINSTEPS 3.71, a Rasch analysis computer program. In this procedure, the rating scale structure, item and person reliability and separation indices, infit and outfit mean square (MNSQ), the unidimensionality, and Differential Item Function (DIF) were analyzed by using WINSTEPS. After this procedure, the data were analyzed using SPSS Statistics 27.0. The strength and direction of the correlation between positive body image and social media use were determined by correlation analysis.

RESULTS

Psychometric Properties of C-PBIAS

Rating Scale Category Structure of C-PBIAS

The rating scale structure of C-PBIAS was analyzed. As shown in Table 4, the average measures of rating categories 6 (Disagree) and 7 (Strongly Disagree) are not ordered monotonically. This trend of increase does not achieve the expectation of the Rasch Model, according to Linacre (2006). Meanwhile, the Outfit MNSQ of rating category 6 is 2.48, exceeding the cut-off value of 2.0, which shows that there is typically more misinformation than information, meaning that the category is introducing noise into the analyses (Bond & Fox, 2013; Linacre, 2006). In addition, the threshold estimates and category measures are not ordered, as shown in Table 4, suggesting that the data do not meet the Rasch Model (Linacre, 2006). In order to achieve the requirements for the Rasch Model estimate, it is essential to recode the scale to minimize misfits.

Based on the Comparison of Three Categorizations in Table 5 and the scale options meanings, the scale was recoded into

Table 4
Summary of category structure of C-PBIAS

Category		Observed		Obsvd Avrge	Sample Expect	Infit MNSQ	Outfit MNSQ	Structure Calibratn	Category Measure	
Label	Score	Count	%							
1	1	3641	48	-2.80	-2.73	1.05	1.00	None	(-3.09)	1
2	2	2053	27	-1.53	-1.68	0.85	0.65	-1.82	-1.48	2
3	3	816	11	-1.14	-1.01	1.12	1.75	-0.40	-0.54	3
4	4	822	11	-0.44	-0.49	0.90	1.10	-0.75	0.20	4
5	5	179	2	0.07	-0.03	0.88	0.84	1.27	0.81	5
6	6	69	1	0.03*	0.40	1.65	2.48	1.14	1.42	6
7	7	70	1	0.46	0.79	1.51	1.85	0.57	(2.38)	7

Table 5
Comparison of three categorizations of C-PBIAS

Categorization	Average Measures	Fit	Step Calibrations	Person Separation	Item Separation
1234567	Disordered	<2.0	Disordered	2.02	9.37
1223445	Ordered	>2.0	Ordered	2.42	9.77
1233445	Ordered	<2.0	Ordered	2.22	9.23

five options as shown in Table 6, collapsing the scale from the original 1–7 to recoded values of 1 (1 from the original scale), 2 (2 from the original scale), 3 (3–4 from the original scale), 4 (5–6 from the original scale) and 5 (7 from the original scale). For data rigor, all subsequent C-PBIAS data analyses were conducted using a collapsed 5-category scale.

As shown in Figure 1, each category has a definite peak. It can be concluded that recoding the seven-category measure to a five-category scale eliminates problems, producing a scale that functions acceptably. It can be concluded that recoding the seven-category measure to a five-category scale eliminates problems, producing a scale that functions acceptably.

Table 7 demonstrates that after collapsing scale categories, the average measure of each rating category was ordered monotonically. Namely, each scale increased monotonically from -3.42 to 0.71. This trend of increase achieved the expectation of the Rasch Model. In addition, the Infit and Outfit MNSQ were all less than the cut-off value of 2.0. The threshold estimates and category measures were ordered from Category 1 to Category 5, and the width between each threshold ranged from 1 logit to 5 logits (Bond & Fox, 2013; Linacre, 2006).

Table 6
Recoding of item responses of C-PBIAS

Original	Recoded
1	1
2	2
3	3
4	
5	4
6	
7	5

Table 7
Summary of category structure of C-PBIAS after collapsing scale categories

Category		Observed		Obsvd Avrge	Sample Expect	Infit Mnsq	Outfit Mnsq	Structure Calibratn	Category Measure	
Label	Score	Count	%							
1	1	3641	48	-3.42	-3.35	0.97	0.97	None	(-3.58)	1
2	2	2053	27	-1.82	-1.96	0.77	0.64	-2.29	-1.77	2
3	3	1638	21	-0.92	-0.87	1.10	1.58	-1.18	0.12	3
4	4	248	3	0.19	0.17	1.04	1.13	0.52	1.79	4
5	5	70	1	0.71	1.17	1.42	1.44	1.93	(3.36)	5

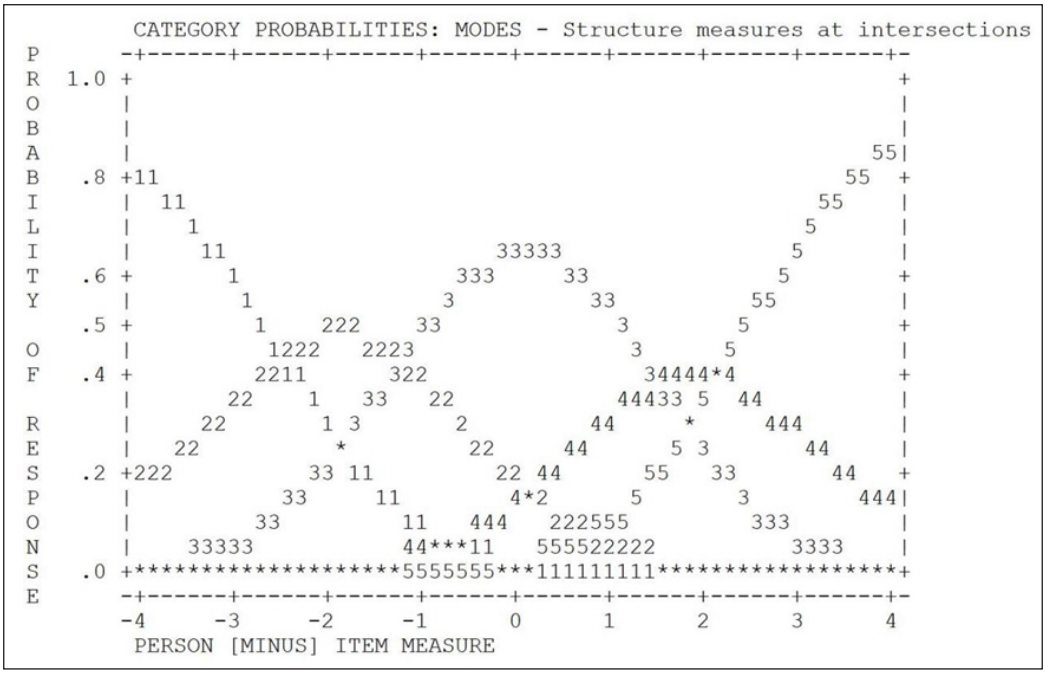

Figure 1. Rating category probability curve of C-PBIAS after collapsing scale categories

Item and Person Reliability of C-PBIAS

The item reliability coefficient is 0.99, and the item separation index is 9.23. These values are considered acceptable because the item reliability is higher than 0.90 and the item separation is greater than 3, indicating that the scale has a sufficiently wide range of item difficulty to accurately measure the underlying construct (Bond & Fox, 2013). The person reliability coefficient of 0.83 and the person separation index of 2.22 fall within the expected range. This suggests that the instrument has sufficient reliability to accurately differentiate between individuals' abilities, as indicated by person reliability greater than 0.80 and item separation greater than 2 (Linacre, 2006).

In addition, the result from Rasch analysis revealed that the Infit and Outfit MNSQ means of the item are 0.99 and 1.08, and the Infit and Outfit MNSQ means of the persons are 1.07 and 1.08, indicating that the items of revised C-PBIAS are probably fit to the Rasch model since the items' Infit and Outfit values are close to 1, indicative of a model fit (Linacre, 2006).

Furthermore, the item and person reliability for each subscale were analyzed separately. The item reliability indices for each subscale ranged from 0.95 to 0.99, indicating a good model fit. The item separation indices for the subscales ranged from 4.15 to 8.88, which is in the expected range (Bond & Fox, 2013). The Infit MNSQ score of 0.97 to 0.99 and Outfit MNSQ score of 0.90 to 1.05 are acceptable because a

value of Infit and Outfit MNSQ close to 1.00 is preferred (Linacre, 2006).

In addition, the Infit MNSQ score of 0.81 to 1.02 and Outfit MNSQ score of 0.81 to 1.00 are acceptable. The subscale Resilience Against Negative Appearance Feedback has a person reliability of 0.80 and a separation index of 2.03, which are in the expected range. The subscales Body Self-Appreciation, Body Other-Appreciation and Resilience Against Body Ideals in Media have person reliability between 0.72 to 0.76, with person separation indices between 1.62 and 1.78. This would indicate that these subscales are not able to differentiate a person into different levels. According to Linacre (2006), these values can be due to the narrow range of samples.

Item Fit of C-PBIAS

Table 8 presents the item fit analysis of the revised C-PBIAS. After removing the problematic responses associated with the identified misfitting items, the mean square (MNSQ) values for the Infit and Outfit of all items fell within the recommended range of 0.6 to 1.4. These results indicate that the data aligns well with the model, suggesting a good fit. Consequently, proceeding with the data analysis using the Rasch model is appropriate.

Unidimensionality of C-PBIAS

As shown in Figure 2, the raw variance explained by the measures was 53.7%, exceeding the desired value of 40% recommended by Linacre (2006). The Unexplained variance, in first contrast, has an eigenvalue of 3.0 and a percentage of 9.3%, which is less than the cut-off values of 5.0 and 15%. Hence, this result provides significant evidence that the revised C-PBIAS meets the unidimensional requirements in the Rasch model.

Different Item Functioning (DIF) of C-PBIAS

The DIF contrast value should be between the range of -0.5 logits to 0.5 logits, as shown in Table 9, which is a recommended range to identify any potential bias in the measurement items across genders, as Linacre (2006) suggested. Based on the results, no items in the revised C-PBIAS showed DIF with respect to gender (-0.5 logits < DIF contrast < 0.5 logits). Therefore, it can be assumed that no items with biases in the revised C-PBIAS need to be removed.

Table of STANDARDIZED RESIDUAL variance (in Eigenvalue units)

		-- Empirical --		Modeled
Total raw variance in observations	=	32.4 100.0%		100.0%
Raw variance explained by measures	=	17.4 53.7%		54.3%
Raw variance explained by persons	=	9.7 29.9%		30.2%
Raw Variance explained by items	=	7.7 23.8%		24.0%
Raw unexplained variance (total)	=	15.0 46.3%	100.0%	45.7%
Unexplned variance in 1st contrast	=	3.0 9.3%	20.0%	
Unexplned variance in 2nd contrast	=	1.9 5.9%	12.8%	
Unexplned variance in 3rd contrast	=	1.7 5.3%	11.4%	
Unexplned variance in 4th contrast	=	1.2 3.7%	7.9%	
Unexplned variance in 5th contrast	=	1.1 3.4%	7.3%	

Figure 2. Unidimensionality analysis of revised C-PBIAS

Table 8
Item fit statistic of revised C-PBIAS

Entry Number	Total Score	Total Count	Measure	Model S.E.	Infit		Outfit		Pt-Measure		Exactmatch		Item
					MNSQ	ZSTD	MNSQ	ZSTD	Corr.	Exp.	Obs%	Exp%	
1	1107	510	-0.95	0.07	1.29	4.0	1.37	4.7	A 0.70	0.76	53.2	53.9	P1
7	838	510	0.47	0.08	0.96	-0.6	1.35	3.3	B 0.65	0.65	69.6	60.7	P7
10	1137	506	-1.15	0.07	1.34	4.6	1.34	4.4	C 0.70	0.77	41.6	53.8	P10
8	737	510	1.14	0.09	1.06	0.7	1.25	1.8	D 0.58	0.58	66.4	66.0	P8
13	1095	510	-0.89	0.07	1.23	3.2	1.18	2.4	E 0.72	0.76	55.2	54.2	P13
3	874	510	0.26	0.08	0.98	-0.2	1.22	2.3	F 0.67	0.67	64.4	58.7	P3
11	1059	510	-0.71	0.07	1.14	2.0	1.14	1.9	G 0.71	0.75	56.1	54.3	P11
12	1033	510	-0.58	0.07	1.05	0.7	0.96	-0.5	H 0.74	0.74	60.8	55.0	P12
4	942	498	-0.20	0.07	0.91	-1.4	0.94	-0.8	g 0.72	0.70	60.6	56.6	P4
9	759	510	0.98	0.08	0.88	-1.7	0.92	-0.6	f 0.62	0.60	74.1	64.0	P9
6	747	500	0.96	0.08	0.90	-1.3	0.69	-2.8	e 0.63	0.59	73.5	63.7	P6
2	799	510	0.71	0.08	0.90	-1.4	0.73	-2.7	d 0.66	0.63	68.0	61.5	P2
5	796	499	0.66	0.08	0.87	-1.8	0.79	-2.1	c 0.67	0.63	72.8	60.9	P5
14	980	510	-0.32	0.07	0.74	-4.3	0.76	-3.3	b 0.77	0.72	73.9	56.2	P14
15	989	510	-0.36	0.07	0.74	-4.3	0.72	-3.9	a 0.77	0.72	68.0	56.0	P15
MEAN	926.1	507.5	0.00	0.08	1.00	-0.1	1.03	0.3			63.9	58.4	
S.D.	136.9	4.4	0.75	0.01	0.18	2.6	0.24	2.8			9.0	4.0	

Table 9
DIF analysis of revised C-PBIAS

Person Class	Dif Measure	Dif S.E.	Person Class	Dif Measure	Dif S.E.	Dif Contrast	Joint S.E.	Welch			Mantelhanzl		Item Number	Name
								T	D.F.	Prob.	Prob.	Size		
1	-0.92	0.10	2	-0.97	0.10	0.05	0.14	0.39	442	0.6941	0.9256	-0.01	1	P1
1	0.76	0.11	2	0.66	0.11	0.10	0.16	0.62	442	0.5335	0.8472	0.57	2	P2
1	0.18	0.11	2	0.34	0.11	-0.17	0.15	-1.10	442	0.2724	0.0579	-0.17	3	P3
1	-0.16	0.10	2	-0.24	0.10	0.08	0.15	0.56	437	0.5778	0.5712	0.17	4	P4
1	0.85	0.12	2	0.47	0.11	0.39	0.16	2.42	436	0.0161	0.0521	0.28	5	P5
1	1.16	0.12	2	0.75	0.11	0.41	0.17	2.44	435	0.0151	0.0288	-0.23	6	P6
1	0.51	0.11	2	0.43	0.11	0.09	0.15	0.56	442	0.5790	0.9808	-0.45	7	P7
1	1.14	0.12	2	1.14	0.12	0.00	0.17	0.00	442	1.000	0.9096	-1.04	8	P8
1	0.98	0.12	2	1.00	0.12	-0.02	0.17	-0.14	442	0.8907	0.9751	0.58	9	P9
1	-1.17	0.10	2	-1.11	0.10	-0.06	0.14	-0.44	438	0.6574	0.6595	0.25	10	P10
1	-0.82	0.10	2	-0.60	0.10	-0.21	0.14	-1.53	442	0.1272	0.0170	-0.07	11	P11
1	-0.58	0.10	2	-0.58	0.10	0.00	0.14	0.00	442	1.000	0.1292	0.19	12	P12
1	-1.07	0.10	2	-0.70	0.10	-0.37	0.14	-2.66	442	0.0081	0.3059	-0.26	13	P13
1	-0.29	0.10	2	-0.31	0.10	0.02	0.14	0.15	442	0.8805	0.4218	0.27	14	P14
1	-0.41	0.10	2	-0.31	0.10	-0.10	0.14	-0.67	442	0.5049	0.8960	0.24	15	P15
2	-0.97	0.10	1	-0.92	0.10	-0.05	0.14	-0.39	442	0.6941	0.9256	0.01	1	P1
2	0.66	0.11	1	0.76	0.11	-0.10	0.16	-0.62	442	0.5335	0.8472	-0.57	2	P2
2	0.34	0.11	1	0.18	0.11	0.17	0.15	1.10	442	0.2724	0.0579	0.17	3	P3
2	-0.24	0.10	1	-0.16	0.10	-0.08	0.15	-0.56	437	0.5778	0.5712	-0.17	4	P4
2	0.47	0.11	1	0.85	0.12	-0.39	0.16	-2.42	436	0.0161	0.0521	-0.28	5	P5
2	0.75	0.11	1	1.16	0.12	-0.41	0.17	-2.44	435	0.0151	0.0288	0.23	6	P6
2	0.43	0.11	1	0.51	0.11	-0.09	0.15	-0.56	442	0.5790	0.9808	0.45	7	P7
2	1.14	0.12	1	1.14	0.12	0.00	0.17	0.00	442	1.000	0.9096	1.04	8	P8
2	1.00	0.12	1	0.98	0.12	0.02	0.17	0.14	442	0.8907	0.9751	-0.58	9	P9

Table 9 *(Continue)*

Person Class	Dif Measure	Dif S.E.	Person Class	Dif Measure	Dif S.E.	Dif Contrast	Joint S.E.	Welch			Mantelhanzl		Item Number	Name
								T	D.F.	Prob.	Prob.	Size		
2	-1.11	0.10	1	-1.17	0.10	0.06	0.14	0.44	438	0.6574	0.6595	-0.25	10	P10
2	-0.60	0.10	1	-0.82	0.10	0.21	0.14	1.53	442	0.1272	0.0170	0.07	11	P11
2	-0.58	0.10	1	-0.58	0.10	0.00	0.14	0.00	442	1.000	0.1292	-0.19	12	P12
2	-0.70	0.10	1	-1.07	0.10	0.37	0.14	2.66	442	0.0081	0.3059	0.26	13	P13
2	-0.31	0.10	1	-0.29	0.10	-0.02	0.14	-0.15	442	0.8805	0.4218	-0.27	14	P14
2	-0.31	0.10	1	-0.41	0.10	0.10	0.14	0.67	442	0.5049	0.8960	-0.24	15	P15

Note. Size of Mantel-Haenszel slice: MHSLICE = 0.010 logits

Psychometric properties of C-SMUIS

Rating Scale Category Structure of C-SMUIS

The rating scale structure of C-SMUIS was analyzed. Figure 3 shows a category probability curve for the rating scale of C-SMUIS. Each rating category of the scale is functioning properly since the probability curve performs a distinct peak, and the series of curves resemble rolling hills. This can be interpreted as the probability of responding to each category in an expected manner.

Table 10 demonstrates that the average measure of each rating category of C-SMUIS was ordered monotonically, namely, each category scale increased monotonically from -1.68 (Strongly agree) to 0.84 (Strongly disagree). In addition, the Infit and Outfit MNSQ are all less than the cut-off value of 2.0. The threshold estimates and category measures are ordered from Category 1 to Category 6, and the width between each threshold ranges from 1 logit to 5 logits (Bond & Fox, 2013; Linacre, 2006). Thus, it can be concluded that the category structure of C-SMUIS fits the Rasch Model.

Item and Person Reliability of C-SMUIS

The item reliability coefficient is 0.98, and the item separation index is 6.65. These values are considered acceptable, indicating that the scale has a sufficiently wide range of items, making it difficult to accurately measure the underlying construct (Bond & Fox, 2013). The person reliability coefficient of 0.86 and the person separation index of 2.53 fall within the expected range. This suggests that the instrument has sufficient reliability to accurately differentiate between individuals' abilities (Linacre, 2006).

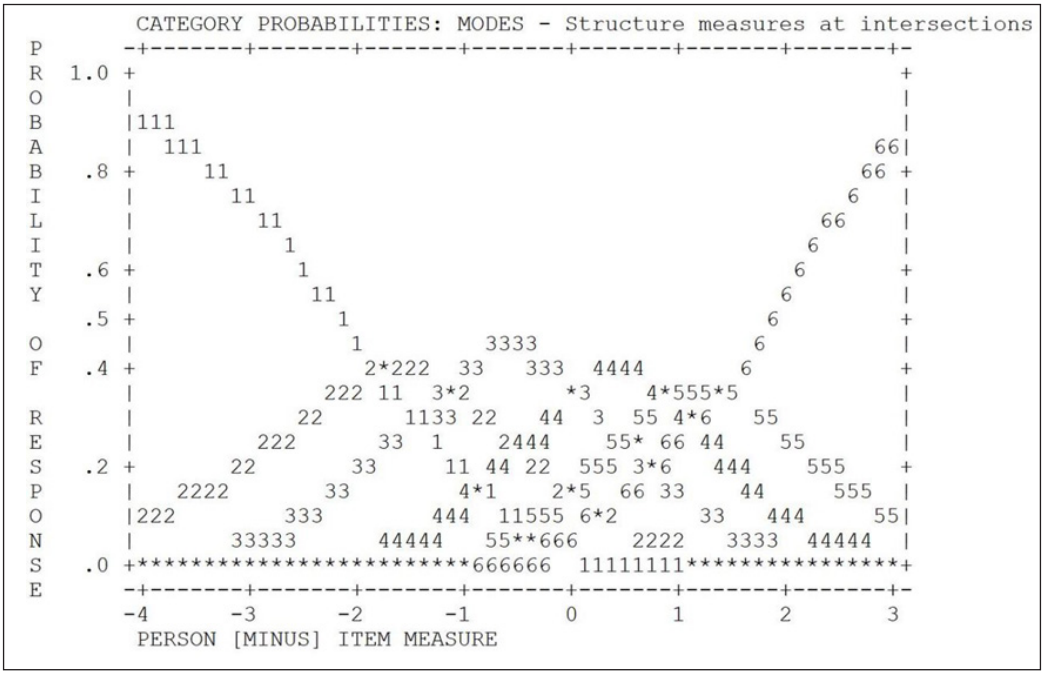

Figure 3. Rating category probability curve of C-SMUIS

Table 10
Summary of category structure of C-SMUIS

Category		Observed		Obsvd	Sample	Infit	Outfit	Structure	Category	
Label	Score	Count	%	Avrge	Expect	MNSQ	MNSQ	Calibratn	Measure	
1	1	1082	14	-1.68	-1.65	1.10	1.07	None	(-3.06)	1
2	2	1744	23	-0.85	-0.85	0.89	0.88	-3.71	-1.75	2
3	3	2470	32	-0.33	-0.32	0.86	0.93	-1.92	-0.59	3
4	4	1338	17	0.13	0.08	0.78	0.74	-0.50	0.58	4
5	5	616	8	0.44	0.45	1.02	1.10	1.04	1.40	5
6	6	400	5	0.84	0.91	1.17	1.81	2.45	(2.64)	6

In addition, the Rasch analysis result revealed that the Infit and Outfit MNSQ means of the items were 0.98 and 1.08, and the Infit and Outfit MNSQ means of the persons were 1.09 and 1.08, indicating that the items of C-SMUIS were probably fit to the Rasch model (Linacre, 2006).

Furthermore, the item reliability indices for each subscale ranged between 0.96 and 0.97, indicating a good model fit. The separation indices for each subscale are 4.77 and 5.55, which are in the expected range. The Infit MNSQ score of 0.98 to 0.99 and Outfit MNSQ score of 1.04 to 1.04 are acceptable.

The person reliability indices for each subscale ranged between 0.85 and 0.87, indicating a good model fit. The separation index for the subscale Social Integration and Emotional Connection (SIEC) was 2.40, while the subscale Integration into Social Routines (ISR) had a separation index of 1.83, less than the cut-off value of 2.0. It indicated that the subscale ISR was not able to differentiate persons into different levels. According to Linacre (2006), this value can be due to the narrow range of samples. The Infit MNSQ score of 1.01 to 1.06 and Outfit MNSQ score of 1.01 to 1.04 are acceptable.

Item Fit of C-SMUIS

Table 11 presents the revised C-SMUIS item fit analysis. After excluding all the problematic responses associated with misfit items, the MNSQ values for Infit and Outfit of all items fell within the recommended range of 0.6 to 1.4. These results indicate that the data aligns well with the model, suggesting a good fit.

Unidimensionality of C-SMUIS

As shown in Figure 4, the raw variance explained by the measures was 51.4%, exceeding the desired value of 40% recommended by Linacre (2006). The Unexplained variance, in the first contrast, has an eigenvalue of 2.9 and a percentage of 9.4%, which is less than the cut-off values of 5.0 and 15%. Hence, this result provides significant evidence that the revised C-SMUIS meets the unidimensional requirements in the Rasch model.

Different Item Functioning (DIF) of C-SMUIS

Based on the results, as shown in Table 12, no items in the revised C-SMUIS showed DIF with respect to gender (-0.5 logits < DIF contrast < 0.5 logits). Therefore, it can be assumed that no items with biases in the revised C-SMUIS need to be removed.

Table 11
Item fit statistic of revised C-SMUIS

Entry Number	Total Score	Total Count	Measure	Model S.E.	Infit		Outfit		Pt-Measure		Exactmatch		Item
					MNSQ	ZSTD	MNSQ	ZSTD	Corr.	Exp.	Obs%	Exp%	
11	1283	510	0.56	0.05	1.22	3.1	1.38	5.0	A 0.56	0.64	49.9	46.5	S11
2	1600	510	-0.24	0.05	1.16	2.5	1.37	5.2	B 0.62	0.68	46.1	41.7	S2
9	1398	487	0.15	0.05	1.28	3.9	1.32	4.4	C 0.43	0.66	43.0	43.8	S9
3	1693	510	-0.45	0.05	1.19	3.0	1.31	4.5	D 0.69	0.69	40.9	40.0	S3
1	1635	497	-0.38	0.05	1.22	3.3	1.22	3.2	E 0.70	0.68	37.4	40.5	S1
13	1283	510	0.56	0.05	0.95	-0.7	1.03	0.5	F 0.62	0.64	48.9	46.5	S13
7	1599	510	-0.23	0.05	0.94	-0.9	0.99	-0.2	G 0.71	0.68	46.7	41.7	S7
5	1638	510	-0.32	0.05	0.87	-2.1	0.93	-1.0	H 0.71	0.69	46.5	41.0	S5
15	1380	497	0.25	0.05	0.93	-1.0	0.92	-1.2	G 0.65	0.64	45.3	44.4	S15
14	1412	492	0.11	0.05	0.88	-1.9	0.89	-1.6	F 0.65	0.64	50.3	43.3	S14
12	1580	510	-0.19	0.05	0.86	-2.3	0.88	-1.9	E 0.72	0.68	47.1	42.0	S12
4	1706	492	-0.59	0.05	0.87	-2.2	0.88	-2.0	D 0.75	0.68	33.1	38.7	S4
8	1499	510	0.00	0.05	0.82	-3.0	0.81	-3.1	C 0.72	0.67	49.7	42.6	S8
10	1259	510	0.63	0.05	0.76	-3.8	0.76	-3.9	B 0.66	0.63	55.1	46.8	S10
6	1448	509	0.12	0.05	0.70	-5.2	0.71	-4.9	A 0.74	0.66	57.2	44.1	S6
Mean	1494.2	504.3	0.00	0.05	0.98	-0.5	1.03	0.2			46.5	42.9	
S.d.	148.4	8.3	0.37	0.00	0.18	2.8	0.22	3.3			6.0	2.4	

Table 12
DIF analysis of revised C-SMUIS

Person Class	Dif Measure	Dif S.E.	Person Class	Dif Measure	Dif S.E.	Dif Contrast	Joint S.E.	Welch			Mantelhanzl		Item Number	Name
								T	D.f.	Prob.	Prob.	Size		
1	-0.31	0.07	2	-0.45	0.07	0.14	0.10	1.49	483	0.1364	0.2062	-0.49	1	S1
1	-0.20	0.07	2	-0.27	0.07	0.06	0.10	0.67	496	0.5052	0.8526	-0.15	2	S2
1	-0.55	0.07	2	-0.34	0.07	-0.22	0.09	-2.32	496	0.0208	0.0218	0.07	3	S3
1	-0.57	0.07	2	-0.61	0.07	0.04	0.09	0.45	478	0.6554	0.7261	0.12	4	S4
1	-0.30	0.07	2	-0.34	0.07	0.04	0.10	0.47	496	0.6403	0.7365	0.17	5	S5
1	0.12	0.07	2	0.12	0.07	0.00	0.10	0.00	495	1.000	0.7471	0.11	6	S6
1	-0.31	0.07	2	-0.16	0.07	-0.15	0.10	-1.59	496	0.1131	0.2741	0.02	7	S7
1	0.10	0.07	2	-0.10	0.07	0.20	0.10	2.02	496	0.0443	0.0105	0.17	8	S8
1	0.15	0.07	2	0.15	0.07	0.00	0.10	0.00	483	1.000	0.2898	-0.06	9	S9
1	0.71	0.08	2	0.56	0.07	0.15	0.11	1.42	496	0.1573	0.5866	-0.16	10	S10
1	0.51	0.07	2	0.63	0.08	-0.12	0.11	-1.14	496	0.2564	0.6342	0.10	11	S11
1	-0.30	0.07	2	-0.08	0.07	-0.21	0.10	-2.22	496	0.0268	0.0371	0.03	12	S12
1	0.53	0.07	2	0.60	0.08	-0.08	0.11	-0.71	496	0.4764	0.3825	-0.15	13	S13
1	0.17	0.07	2	0.05	0.07	0.12	0.10	1.14	478	0.2528	0.3478	0.27	14	S14
1	0.28	0.07	2	0.22	0.07	0.06	0.10	0.61	483	0.5434	0.2126	0.12	15	S15
2	-0.45	0.07	1	-0.31	0.07	-0.14	0.10	-1.49	483	0.1364	0.2062	0.49	1	S1
2	-0.27	0.07	1	-0.20	0.07	-0.06	0.10	-0.67	496	0.5052	0.8526	0.15	2	S2
2	-0.34	0.07	1	-0.55	0.07	0.22	0.09	2.32	496	0.0208	0.0218	-0.07	3	S3
2	-0.61	0.07	1	-0.57	0.07	-0.04	0.09	-0.45	478	0.6554	0.7261	-0.12	4	S4
2	-0.34	0.07	1	-0.30	0.07	-0.04	0.10	-0.47	496	0.6403	0.7365	-0.17	5	S5
2	0.12	0.07	1	0.12	0.07	0.00	0.10	0.00	495	1.000	0.7471	-0.11	6	S6
2	-0.16	0.07	1	-0.31	0.07	0.15	0.10	1.59	496	0.1131	0.2741	-0.02	7	S7
2	-0.10	0.07	1	0.10	0.07	-0.20	0.10	-2.02	496	0.0443	0.0105	-0.17	8	S8
2	0.15	0.07	1	0.15	0.07	0.00	0.10	0.00	483	1.000	0.2898	0.06	9	S9

Table 12 *(Continue)*

Person Class	Dif Measure	Dif S.E.	Person Class	Dif Measure	Dif S.E.	Dif Contrast	Joint S.E.	Welch			Mantelhanzl		Item Number	Name
								T	D.f.	Prob.	Prob.	Size		
2	0.56	0.07	1	0.71	0.08	-0.15	0.11	-1.42	496	0.1573	0.5866	0.16	10	S10
2	0.63	0.08	1	0.51	0.07	0.12	0.11	1.14	496	0.2564	0.6342	-0.10	11	S11
2	-0.08	0.07	1	-0.30	0.07	0.21	0.10	2.22	496	0.0268	0.0371	-0.03	12	S12
2	0.60	0.08	1	0.53	0.07	0.08	0.11	0.71	496	0.4764	0.3825	0.15	13	S13
2	0.05	0.07	1	0.17	0.07	-0.12	0.10	-1.14	478	0.2528	0.3478	-0.27	14	S14
2	0.22	0.07	1	0.28	0.07	-0.06	0.10	-0.61	483	0.5434	0.2126	-0.12	15	S15

Note. Size of Mantel-Haenszel slice: MHSLICE = 0.010 logits

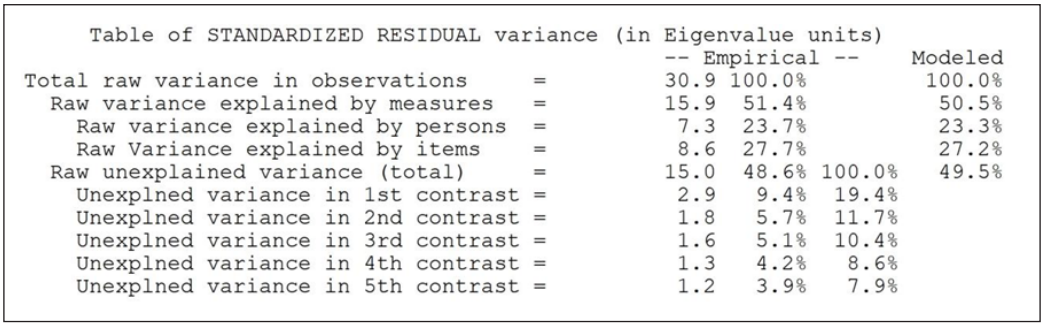

Table of STANDARDIZED RESIDUAL variance (in Eigenvalue units)				
		-- Empirical --		Modeled
Total raw variance in observations	=	30.9 100.0%		100.0%
Raw variance explained by measures	=	15.9 51.4%		50.5%
Raw variance explained by persons	=	7.3 23.7%		23.3%
Raw Variance explained by items	=	8.6 27.7%		27.2%
Raw unexplained variance (total)	=	15.0 48.6%	100.0%	49.5%
Unexplned variance in 1st contrast	=	2.9 9.4%	19.4%	
Unexplned variance in 2nd contrast	=	1.8 5.7%	11.7%	
Unexplned variance in 3rd contrast	=	1.6 5.1%	10.4%	
Unexplned variance in 4th contrast	=	1.3 4.2%	8.6%	
Unexplned variance in 5th contrast	=	1.2 3.9%	7.9%	

Figure 4. Unidimensionality analysis of revised C-SMUIS

Correlation Between PBI and SMU

A correlation analysis was conducted to determine the strength and direction of the correlation between PBI and SMU. Based on the previous analysis, the data will be analyzed using SPSS Statistics 27.0, removing all the bad responses.

Means will be derived for each of the revised C-PBIAS and C-SMUIS items separately to make them representative of PBI and SMU, which are defined as P_{mean} and S_{mean}, respectively. The correlations between P_{mean} and S_{mean} will be analyzed.

As shown in Table 13, since Sig. (2-tailed) value $p = 0.005$ ($p < 0.05$); thus, the null hypothesis can be rejected. There is a significant relationship between PBI and SMU.

The correlation coefficients ranged from -1 to 1, with close to -1 indicating a negative correlation, close to 1 indicating a positive correlation, and close to 0 indicating no correlation (Schober et al., 2018). Since the Pearson Correlation coefficient is -0.131, it can be indicated that in this study, there is a low negative correlation between positive body image and social media use among high school students.

DISCUSSION

The purpose of this study was to assess the psychometric properties of the Chinese version of the Positive Body Image Scale for Adolescents (PBIAS) and the Social Media Use Integration Scale (SMUIS) and to determine the relationship between

Table 13
Correlations between PBI and SMU

		P_{mean}	S_{mean}
P_{mean}	Pearson Correlation	1	-0.131*
	Sig. (2-tailed)		0.005
	N	455	455
S_{mean}	Pearson Correlation	-0.131*	1
	Sig. (2-tailed)	0.005	
	N	455	455

Note. *Correlation is significant at the 0.05 level (2-tailed)

positive body image and social media use among Chinese high school students using Item Response Theory, specifically the Rasch model. In order to achieve the research objectives, first, this study investigated five criteria in the Rasch model, i.e., rating scale, item and person reliability, item fit, unidimensionality, and different item functions (DIF). Second, through correlation analysis, this study concluded a low negative correlation between positive body image and social media use among high school students in China.

For the psychometric properties of the two scales, first, the probability of responding to each category in C-SMUIS is expectedly, while the categories of the rating scale of C-PBIAS are not all adequately presented. After recoding and collapsing scale categories, the average measure of each rating category in the revised C-PBIAS was ordered monotonically.

In addition, the item and person reliability coefficient and item separation index of revised C-PBIAS and C-SMUIS and their subscales are in an expected range, showing high reliability. After excluding the problematic responses associated with misfit items, infit MNSQ and outfit MNSQ of all items in revised C-PBIAS and C-SMUIS fell within the recommended range of 0.6 to 1.4, indicating that the data aligns well with the model and suggesting a good fit.

Next, the raw variance explained by the revised C-PBIAS and C-SMUIS measures exceeded the desired value of 40% and met the unidimensional requirements in the Rasch model. Furthermore, the DIF values of revised C-PBIAS and C-SMUIS were all between -0.5 logits and 0.5 logits, so no items with biases needed to be removed.

For the relationship between PBI and SMU, based on the correlation analysis of PBI and SMU, the Significance (2-tailed) value $p = 0.005$ ($p < 0.05$); thus, null hypothesis 1 can be rejected. There is a significant relationship between PBI and SMU. Since the Pearson Correlation coefficient is -0.131, it can be assumed that in this study, there is a low negative correlation between positive body image and social media use among high school students.

This finding contributes to the ongoing theoretical debate on the relationship between social media use and body image. While Saiphoo and Vahedi (2019) suggested that the overall effect of social media use on body image might be weaker than expected, this study highlights the nuanced nature of this relationship, particularly among adolescents. Specifically, the low negative correlation identified in this research suggests that the impact of social media use on positive body image may vary depending on developmental factors, such as the heightened self-awareness and body sensitivity characteristic of high school students (Zhang et al., 2017).

Additionally, the findings are consistent with Fardouly et al.'s (2015) study that social media use is positively associated with body image issues in young women and that social comparison may lead to negative body imagery. Tiggemann and Slater (2013) also noted that social media use by

adolescent girls is associated with negative body image, especially when compared to the idealized body image. From a theoretical perspective, the results of this study extend the existing framework of the Tripartite Influence Model (Thompson et al., 1999), in which family, peers, and media are the three initial sources of influence on body image disorders. This study further confirms that the media is one of the sources of influence for body imagery dissonance by examining it in a Chinese cultural context.

Furthermore, the authors argued that Western studies have placed more emphasis on social comparisons and the influence of idealized images, which may be related to cultural contexts and social expectations. As Jackson et al. (2016) pointed out, Chinese aesthetics have a more multifaceted impact on body image, and adolescents are not only influenced by traditional aesthetic standards such as slimness, but family and peer attitudes also play an important role. Therefore, social media use may not be the main source of influence on adolescents' body image, as cultural norms and values may mediate this relationship. By focusing on high school students, this study further enriches the understanding of the Tripartite Influence Model (Thompson et al., 1999) and provides a more nuanced perspective on the study of adolescent body image.

In addition, social media is still a new technology, and we cannot be sure of the long-term effects it may have on users (Saiphoo & Vahedi, 2019). An interesting and important direction for future research would be to explore whether social media use also has a negative effect on positive body image for users in other age groups. For example, does social media use have a negative effect on positive body image for adult users? According to Alleva et al. (2023), individuals typically experience peaks in body image during early adolescence, and it remains constant throughout adolescence and adulthood and even for the rest of their lives. It might be possible to provide support for this proposition by exploring the relationship between positive body images and social media use among adult users.

CONCLUSION

The results of the Rasch analysis proved that the Chinese version of the Positive Body Image among Adolescents Scale (C-PBIAS) and Social Media Use Integration Scale (C-SMUIS) demonstrated sufficient evidence of psychometric properties. In addition, the findings of this study showed that there is a significant relationship between positive body image and social media use. There is a negative correlation between positive body image and social media use. It shows that social media use has a negative effect on positive body image among high school students in China.

Determining the psychometric properties of an instrument helps researchers to better utilize the instrument to understand and explain psychological phenomena, providing strong support for theoretical constructs and practical applications in the field of psychology (Dai & Zhang, 2018). In this study, the psychometric properties of the C-PBIAS and C-SMUIS

questionnaires were evaluated using IRT and Rasch analyses, which provided evidence and more detailed information about the rating scales, reliability, unidimensionality, and different item functions. This might provide implications for the adaptation of measurement instruments in specific cultural contexts.

The findings of this study may have some practical implications, especially for policymakers, teachers, schools, students and parents. First, policymakers can utilize the results of comprehensive testing of these instruments among adolescents to inform educational policy reforms. Specifically, they could introduce nationwide or local initiatives that mandate schools to incorporate programs on body image awareness and healthy social media use, ensuring that students receive support through the education system.

Second, schools should be encouraged to establish dedicated mental health support services, creating specialized departments to address body image-related concerns. Schools can allocate resources to train teachers with experience in this area, enabling them to offer direct support to students dealing with body image issues. In curriculum design, educational institutions should consider integrating body image education into the regular curriculum, allowing teachers to help students develop healthy attitudes and perceptions toward their bodies.

Third, the results of this study can serve as a resource for parents, helping them better understand their children's psychological state. Parents should be encouraged to create a positive body environment at home, fostering recognition and reinforcement of a positive body image to support their children's healthy physical and mental development during adolescence. Offering workshops or parental guidance programs could also be a valuable step in this process.

It is important to recognize the limitations of this study to guide future research. First, the narrowness of respondents may lead to mismatched data (Dai & Zhang, 2018; Linacre, 2006). Since the sample of this study was drawn from only three high schools in Handan City, Hebei Province, geographic limitations and the homogeneity of cultural backgrounds may limit the generalizability of the findings. High school students from different regions may exhibit different attitudes and behaviors in body image perception and social media use due to differences in cultural, economic, and social environments. In addition, the school-specific nature of the sample and possible group bias (e.g., overrepresentation of a particular socioeconomic class) may also result in results that do not fully reflect students in other contexts. As a result, the findings may be less applicable to the broader population of Chinese high school students or students in other regions. To enhance the generalizability of the study, it is recommended that the sample be expanded to cover more geographical areas and school types to explore the applicability of the questionnaire to populations in different contexts. In addition, quantitative and qualitative methods can be combined.

The quantitative research method was used in this study. Due to using a specific research instrument, the analysis of the research variables was limited to specific dimensions. Therefore, the results of the study may have some limitations. Future research can be conducted together with qualitative research to ensure the completeness and rigor of the research data.

ACKNOWLEDGEMENT

We sincerely thank the reviewers for their valuable comments on the earlier version of this manuscript. We are also grateful to the participating schools and students for their time and effort in completing the questionnaires.

REFERENCES

Alleva, J. M., Tylka, T. L., Martijn, C., Waldén, M. I., Webb, J. B., & Piran, N. (2023). "I'll never sacrifice my well-being again:" The journey from negative to positive body image among women who perceive their body to deviate from societal norms. *Body Image*, *45*, 153-171. https://doi.org/10.1016/j.bodyim.2023.03.001

Avalos, L. C., Tylka, T. L., & Wood-Barcalow, N. (2005). The body appreciation scale: Development and psychometric evaluation. *Body Image*, *2*(3), 285-297. https://doi.org/10.1016/j.bodyim.2005.06.002

Bond, T. G., & Fox, C. M. (2013). *Applying the Rasch Model: Fundamental measurement in the human sciences* (2nd ed.). Psychology Press. https://doi.org/10.4324/9781410614575

Bond, T. G., & Kirkham, F. J. (2003). Applying the Rasch Model: Fundamental measurement in the human Sciences. *Journal of Educational Measurement*, *40*(2), 185-187. https://doi.org/10.1111/j.1745-3984.2003.tb01103.x

Cain, J. E., & Imre, I. (2021). Everybody wants some: Collection and control of personal information, privacy concerns, and social media use. *New Media & Society*, *24*(12), 2705-2724. https://doi.org/10.1177/14614448211000327

Cao, Y., Chen, R., Zheng, L., Zhang, Y., & Gou, P. (2021). Effectiveness of systematic sex education for adolescent students from the perspective of sexual mental health. *Chinese Journal of School Health*, *42*(11), 1744-1750. https://doi.org/10.16835/j.cnki.1000-9817.2021.11.033

Chae, H. (2022). Factors associated with body image perception of adolescents. *Acta Psychologica*, *227*, Article 103620. https://doi.org/10.1016/j.actpsy.2022.103620

Chen, J. (2022). A review of positive psychological intervention in adolescent mental health. *Journal of Qiqihar Teachers College*, *5*, 41-43. https://doi.org/10.16322/j.cnki.23-1534/z.2022.05.001

China Internet Network Information Center. (2023). *The 51st Statistical Report on China's Internet Development*. https://www.cnnic.com.cn/IDR/ReportDownloads/202307/P020230707514088128694.pdf

Dai, H., & Zhang, F. (2018). 心理与教育测量 *[Psychometrics and Educational Measurement]* (4th ed.). Jinan University Press.

De Valle, M. K., Gallego-García, M., Williamson, P., & Wade, T. D. (2021). Social media, body image, and the question of causation: Meta-analyses of experimental and longitudinal evidence. *Body Image*, *39*, 276-292. https://doi.org/10.1016/j.bodyim.2021.10.001

Embretson, S. E., & Reise, S. P. (2000). *Item response theory for psychologists multivariate*. Psychology Press. https://doi.org/10.4324/9781410605269

Fardouly, J., Diedrichs, P. C., Vartanian, L. R., & Halliwell, E. (2015). Social comparisons on social media: The impact of Facebook on young women's body image concerns and mood. *Body*

Image, 13, 38-45. https://doi.org/10.1016/j.bodyim.2014.12.002

Hambleton, R. K., Swaminathan, H., & Rogers, H. H. (1991). *Fundamentals of item response theory* (Vol. 2). SAGE Publications.

Hibbard, J. H., Mahoney, E. R., Stockard, J., & Tusler, M. (2005). Development and testing of a short form of the patient activation measure. *Health Services Research*, *40*(6p1), 1918-1930. https://doi.org/10.1111/j.1475-6773.2005.00438.x

Jackson, T., Jiang, C., & Chen, H. (2016). Associations between Chinese/Asian versus Western mass media influences and body image disturbances of young Chinese women. *Body Image, 17*, 175-183. https://doi.org/10.1016/j.bodyim.2016.03.007

Jenkins-Guarnieri, M. A., Wright, S. J., & Johnson, B. F. G. (2013). Development and validation of a social media use integration scale. *Psychology of Popular Media Culture*, *2*(1), 38-50. https://doi.org/10.1037/a0030277

Jiang, Y., & Bai, X. (2023). 青少年社交媒体使用与幸福感的关系：多重中介作用[The relationship between adolescents' social media use and well-being: Multiple mediating effects]. *Chinese Journal of Drug Dependence*, *32*(1), 61-64. https://doi.org/10.13936/j.cnki.cjdd1992.2023.01.012

Linacre, J. M. (2006). *A User's Guide to WINSTEPS MINISTEP Rasch-Model Computer Programs*. https://archive.org/details/B-001-003-730/page/n33/mode/2up

Liu, X., & Zhou, A. (2022). 以身心创幸福：促进积极身体意象的策略 [Creating well-being with your body and mind: Strategies to promote a positive body image]. *Journal of Southwest University for Nationalities (Humanities and Social Sciences), 43*(6), 213-220.

Lord, F. M. (1980). *Applications of item response theory to practical testing problems*. Routledge. https://doi.org/10.4324/9780203056615

Luo, Y. (2021). 高卷入，还是低卷入？青少年社交媒体使用状况研究 [High involvement or low involvement? A study on the use of social media by teenagers]. *Youth Journalists*, *738*(22), 47-49. https://doi.org/10.15997/j.cnki.qnjz.2022.22.043

Maes, C., Trekels, J., Tylka, T. L., & Vandenbosch, L. (2021). The positive body image among adolescents scale (PBIAS): Conceptualization, development, and psychometric evaluation among adolescents from Belgium. *Body Image*, *38*, 270-288. https://doi.org/10.1016/j.bodyim.2021.05.004

Maree, T. (2017). The social media use integration scale: Toward reliability and validity. *International Journal of Human-computer Interaction*, *33*(12), 963-972. https://doi.org/10.1080/10447318.2017.1301041

Milmo, D., & Skopeliti, C. (2021, September 18). Teenage girls, body image and Instagram's 'perfect storm.' *The Guardian*. https://www.theguardian.com/technology/2021/sep/18/teenage-girls-body-image-and-instagrams-perfect-storm

Narayanaswami, P., & Burns, T. M. (2018). Clinical outcome assessments: The "Rasch-Ionale" for improved accuracy. *Muscle & Nerve*, *58*(3), 327-329. https://doi.org/10.1002/mus.26155

Ni, X., Shao, X., Geng, Y., Qu, R., Niu, G., & Wang, Y. (2020). Development of the social media engagement scale for adolescents. *Frontiers in Psychology*, *11*, Article 701. https://doi.org/10.3389/fpsyg.2020.00701

Polit, D. F., Beck, C. T., & Owen, S. V. (2007). Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health*, *30*(4), 459-467. https://doi.org/10.1002/nur.20199

Saiphoo, A., & Vahedi, Z. (2019). A meta-analytic review of the relationship between social media use and body image disturbance. *Computers*

in Human Behavior, *101*, 259-275. https://doi.org/10.1016/j.chb.2019.07.028

Schober, P., Boer, C., & Schwarte, L. A. (2018). Correlation coefficients: Appropriate use and interpretation. *Anesthesia & Analgesia*, *126*(5), 1763-1768. https://doi.org/10.1213/ANE.0000000000002864

Shi, P., Huang, Y., Zhang, H., Leng, X., & Chen, H. (2020). Negative effect of negative body image on adolescents. *Advances in Psychological Science*, *28*(2), 294-304. https://doi.org/10.3724/SP.J.1042.2020.00294

Thompson, J. D., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. American Psychological Association. https://doi.org/10.1037/10312-000

Tiggemann, M., & Slater, A. (2013). NetGirls: The Internet, Facebook, and body image concern in adolescent girls. *International Journal of Eating Disorders, 46*(6), 630-633. https://doi.org/10.1002/eat.22141

Tort-Nasarre, G., Artigues-Barberà, E., Pollina-Pocallet, M., Espart, A., Roca, J., & Pollina-Pocallet, M. (2023). Translation, cross-cultural adaptation, and psychometric validation of the positive body image among adolescents scale (PBIAS) into Spanish and Catalan. *International Journal of Environmental Research and Public Health*, *20*(5), Article 4017. https://doi.org/10.3390/ijerph20054017

Tylka, T. L., & Iannantuono, A. C. (2016). Perceiving beauty in all women: Psychometric evaluation of the broad conceptualization of beauty scale. *Body Image*, *17*, 67-81. https://doi.org/10.1016/j.bodyim.2016.02.005

Tylka, T. L., & Wood-Barcalow, N. (2015). What is and what is not positive body image? Conceptual foundations and construct definition. *Body Image*, *14*, 118-129. https://doi.org/10.1016/j.bodyim.2015.04.001

Wang, D. (2021). 大学生社交网络使用、线上积极反馈与身体意象的关系研究 *[A study on the relationship between social network use, online positive feedback and body imagery among university students research]* [Master's thesis, Yunnan Normal University]. https://doi.org/10.27459/d.cnki.gynfc.2021.001470

Wang, Y. (2021). 高中体育教学中学生心理健康教育的现状 [The current situation of students' mental health education in high school physical education]. In *2021 Proceedings of the Seminar on Exchange of Achievements in Teaching Reform and Professional Development Strategy* (pp. 626-630). China National Knowledge Infrastructure. https://doi.org/10.26914/c.cnkihy.2021.074936

Yang, C., Dong, Z., Wen, H., Zhou, Y., Wang, Y., & Yuan, F. (2023). The determinants and consequences of positive body image and its promotion strategies. *Advances in Psychological Science*, *31*(5), 815-826. https://doi.org/10.3724/sp.j.1042.2023.00815

Yue, S., Zhang, W., Huang, H., & Li, D. (2006). The adolescent's subjective well-being and mental health and relationships with stress coping. *Psychological Development and Education*, *22*(3), 93-98.

Zhang, D., Cai, T., Liu, W., & Zou, X. (2017). Relationship between teenagers' body image and anxiety, depression: mediating role of self-esteem. *Chinese Journal of Clinical Psychology*, *25*(5), 911-914. https://doi.org/10.16128/j.cnki.1005-3611.2017.05.026

Ziegler, M., Kemper, C. J., & Kruyen, P. (2014). Short scales – Five misunderstandings and ways to overcome them. *Journal of Individual Differences, 35*(4), 185-189. https://doi.org/10.1027/1614-0001/a000148