QUBAHAN ACADEMIC JOURNAL
VOL. 5, NO. 2, May 2025
https://doi.org/10.48161/qaj.v5n2a1594

Personal Social Responsibility Scale for Adolescence: Development and Psychometric Properties

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ABSTRACT: Personal social responsibility is extremely crucial to promoting the quality of life and leads to sustainable social development. The promotion of personal social responsibility is particularly important during adolescence, as adolescents start to see the importance of society and prioritize the collective interest over personal ones, which helps them grow into socially responsible adults. Accurate and precise data are essential for promoting personal social responsibility, highlighting the need for reliable measurement tools. This research aims to develop and examine psychometric properties of the Adolescence's Personal Social Responsibility Scale (APSRS). The APSRS was created in accordance with the personal social responsibility concept by Davis and colleagues. For psychometric properties, item parameters, content validity, construct validity, reliability, and measurement invariance were examined. The participants for the psychometric property's examination are 600 secondary school students from grades 7 – 12 in Nonthaburi, a province in the metropolitan region of Thailand. The developed APSRS is a five-point Likert scale containing 19 items and is divided into five dimensions, namely economic, legal, environmental, ethical, and philanthropic. The APSRS demonstrates strong psychometric properties and measurement invariance across sexes and educational levels. The APSRS can be used to measure personal social responsibility in adolescents in an accurate and precise way. Its scores can be used to compare the differences of personal social responsibility in adolescents across sexes and educational levels in a meaningful way and with no margin of error. Moreover, the APSRS can be used in various cultural contexts, as many items are based on situations that are culturally neutral and contain general contexts that are not specific to any particular culture.

Keywords: social responsibility, personal social responsibility, individual social responsibility, personal social responsibility scale, social responsibility in adolescence.

I. INTRODUCTION

Social responsibility is a moral principle or duty that an organization or an individual should commit to in order to protect the society or improve the quality of the society, as well as to promote sustainable development to respond to the needs of people of today and future generations [1 - 4]. Social responsibility is divided into three levels, namely (1) government social responsibility (2) corporate social responsibility or organizational social responsibility, and (3) personal social responsibility or individual social responsibility [5, 6]. Government social responsibility (GSR) refers to the government's duty to promote welfare, human rights, education, public health, environmental protection, legislation, and other relevant social issues to serve the needs of people in the country and elevate the quality of the country [6 - 8]. Corporate social responsibility (CSR) refers to an organization's duty to determine policies and the implementation of policies for the benefit of the organization and society, which contributes to societal improvement. An organization takes responsibility for the outcomes of the

implementation of policies by taking into account ethical principles, laws, society, the economy, and environment. An organization may be a private firm, government agency, non-profit organization, or educational institution [9 - 12]. Personal social responsibility (PSR) refers to an individual's daily lifestyle as a member of society with an aim to reduce negative impacts and promote social, environmental, and economic factors in the long run by acting as a good citizen that takes into consideration the economic, legal, environmental, ethical, and philanthropic dimensions to improve the society, so that everyone can live in harmony and take responsibility for their actions [10, 13 - 16]. These actions include protecting the environment, consuming sustainably, spending within one's means, reusing materials, paying heed to essential needs of the society, being aware of issues that affects society and finding solutions, helping others, caring for the wellbeing of others, being empathetic to others, trusting others, supporting social and cultural activities by participating in one or making a donation, becoming a member of social organization, complying with other people's or societal terms, conducting oneself according to moral and ethical principles, and working efficiently by taking into account the collective interest over personal one [4, 10, 12 - 14, 17].

All three levels of social responsibility support one another. That is, PSR is key to CSR due to the fact that an organization is formed by a group of individuals. CSR is, thus, driven by PSR of the individuals in the organization. Moreover, CSR enhances the efficiency of GSR [4, 18]. PSR is also crucial to promoting the quality of life and fostering a harmonious, stable and progressive society, which leads to sustainable societal development [16]. However, currently there is relatively little research on PSR since most scholars primarily attach importance to studying CSR [6, 19].

Promoting PSR is extremely crucial during the teenage years, during which adolescents are in their secondary school and start to see the importance of being in the society, complying with social rules, and championing the collective interest over personal one in order to co-exist with other people in harmony. Such acts will help adolescents grow into responsible adults. That being said, the concept of PSR is in line with Kohlberg's theory of moral development. Kohlberg divides moral development into six continuous stages, which can further be categorized into three levels, each containing two stages. Level 1 is preconventional level, which is the level where an individual complies with rules to avoid punishment or to respond to personal needs. That is, an individual becomes self-centered and does not take into consideration other members of society. An individual stays in this level of morality until the age of nine. Level 2 is conventional level, which is the level where an individual lives their lives with consideration for other members of society and has a good conscience. They accept and comply with social rules, build good relationships and empathize with others. Most adolescents are in this level. Level 3 is postconventional level, which is the level where an individual complies with the rules upheld by each society, as they believe people belong to their society with rules that differ from other societies. They follow social rules in order to protect their own social rights and understand the reasons for following rules and respecting the dignity of other human beings. Only a few members of society have morality of this level and most of them are over the age of 20 [20]. It can be observed that the higher the level of morality, the more PSR one exhibits. However, moral reasoning of individuals is not necessarily hierarchical. This means that older individuals may provide a lower level of moral reasoning than younger individuals. The importance of promoting PSR during adolescence is in line with Erikson's theory of psychosocial development, which suggests adolescents find their identity during the teenage years through interactions with other members of society as well as seek acceptance and social support [21]. Teenagers, thus, need to discover their own identity, which leads to socially desirable behaviors.

Another reason why promoting PSR is highly crucial during adolescence is because adolescence is a period with rapid physical, social, cognitive, and emotional changes. Teenagers, thus, face challenges in understanding and dealing with changes, including those linked to relationships and responsibilities [22, 23]. Teenagers have a high chance of engaging in risky behaviors, such as relationship instability, emotional disability, drug and alcohol abuse, use of violence, suicide attempts, and premature sexual intercourse, all of which can affect teenagers' future quality of life. These risky behaviors arise from adolescents living in adverse social conditions or environments that pose risks to their ways of living, a condition that can be called socially toxic environment [24]. Adolescents with risky behaviors exhibit low PSR [25]. One of the factors that can reduce these behaviors in adolescents is promoting PSR. It fosters desirable social habits that persist into adulthood. When members of society are socially responsible, the society will be a better place and the quality of life will improve [24, 26].

Most studies on PSR adhere to Hellison's concept, which presents PSR in tandem with personal responsibility under the Teaching Personal and Social Responsibility Model (TPSR) [27]. The TPSR is used as an approach to design programs for promoting PSR and personal responsibility in the context of physical education. However, the TPSR model does not clearly divide the dimensions of PSR and does not cover all social contexts. Hellison

divides PSR into two dimensions: (1) respect for others' rights and (2) feelings and caring about others [27]. In addition, other scholars divide the dimensions of PSR differently. Hatch and Stephen divide PSR into two dimensions, namely (1) internal moral identity and (2) symbolic moral identity [28]. Berei divides PSR into four dimensions, namely (1) learning (2) legal (3) ethical, and (4) philanthropic [19]. Liu and colleagues divide PSR into four dimensions, namely (1) nation (2) nature (3) others, and (4) organization [16]. Davis and colleagues, meanwhile, developed the concept of PSR that is more elucidated and more extensive, one that is supported by theories and empirical data [13, 14]. They applied the conceptual framework of Caroll's CSR, which is accepted the most in terms of dividing the dimensions of PSR. It is divided into five dimensions, namely (1) economic (spending and consuming only what is necessary, only the required amount, and within one's means), (2) legal (the act of complying with laws and regulations, including basic social norms, not committing frauds and paying taxes properly), (3) environmental (an act that promotes environmental protection, choosing eco-friendly products, and avoiding any actions that will cause negative impacts on the environment), (4) ethical, (an act that demonstrates fairness and adherence to moral principles, especially the demonstration of honesty and respect for others, as well as not causing harm to others and instilling moral principles in children), and (5) philanthropic (helping others with physical monetary devotion, which can be done by making donations or volunteering for social activities and organizations). That is, the concept by Davis and colleagues represents a holistic framework that encompasses every dimension of social responsibility, rendering it the most accurate way to measure personal social responsibility in the real-world setting in which adolescents live.

Promoting PSR requires accurate and precise data with a low margin of error. A quality tool is, thus, essential to measuring PSR in order to use the information obtained to design programs aimed at promoting the achievement of desirable level of PSR in people. Most of the existing PSR measurement tools were developed in accordance with the TPSR model, with PSR functioning as a subscale under the tools and is suitable for physical education, such as those developed by Watson and colleagues [29], Li and colleagues [30], and Filiz and Demirhan [17]. However, there are two general PSR scales available. One was developed by Liu and colleagues [16], but it focuses on situations specific to China, making it less suitable for use in other countries. The other was developed by Davis and colleagues, whose set of items is contextually appropriate for adults but not quite relatable to adolescents [14]. That is, these tools do not measure personal social responsibility in adolescents as effectively as it should, resulting in unfitting interpretations of the scores and an ineffective use of the results to promote the development of adolescents, all of which are crucial to the tools.

This research aims to develop the Adolescence's Personal Social Responsibility scale (APSRS) to appropriately measure PSR in adolescents. The psychometric properties of the APSRS that are examined are item parameters, content validity, construct validity, and reliability. Measurement invariance is analyzed by sexes and educational levels to obtain information that allows the APSRS to be used and interpreted fairly based on the adolescents' demographic backgrounds. This is because some studies found that female adolescents show statistically significantly higher PSR compared to their male counterparts [26, 31]. Adolescents with different educational levels show statistically significantly different PSR. Adolescents that are in lower educational levels demonstrate higher PSR compared to those in higher educational levels [26, 32]. That is, PSR may show different structures based on adolescents' sexes and educational levels. Moreover, we developed the APSRS based on the concept of PSR of Davis and colleagues [13, 14], as the dimensions are divided in such a way that covers different lifestyles the most, which demonstrates the harmonious way of living in society and the improvement of society. This concept is also supported by theoretical and empirical data, but we adjust the definitions of all five dimensions of PSR to fit the context of adolescents. The five dimensions are redefined as follows: (1) economic referring to the act of spending and consuming only what is necessary and within one's means and consume frugally, (2) legal referring to the act of following rules, schools' regulations, and basic social norms, (3) environmental referring to the act of promoting and protecting the environment, using eco-friendly products/avoiding using products that harm the environment, and avoiding actions that cause negative impacts to the environment, (4) ethical referring to conducting oneself according to moral principles, demonstrating honesty and fairness, respecting others, not causing harm to others, and seeing the collective interest over one's own, and (5) philanthropic referring to helping others with empathy by devoting time, physical efforts, and budgets for the surrounding environments, whether they are for families, schools, or communities, as well as being aware of issues that cause social impacts and finding solutions to those issues. We aim to develop personal social responsibility for teenager adolescents to create an effective personal social responsibility tool for them, interpret the scores correctly, and promote the development of adolescents in every dimension of social life in accordance with personal social responsibility.

II. MATERIAL AND METHOD

1. PARTICIPANTS

We determined sample size for confirmatory factor analysis (CFA) using Soper's calculation tool [33]. A minimum of 138 participants was required. We also analyzed measurement invariance by sexes and educational levels, which required at least 276 participants. That is, participants included at least 138 males and 138 females, and 138 individuals from lower secondary school and another 138 from upper secondary school. The calculation of the above-mentioned participants takes into account the structure of the measurement model. To ensure sufficient data analysis using the rating scale model (RSM), participants should include at least 500 individuals [34]. We, thus, set the sample size at 600 participants to prevent sample loss caused by participants' unwillingness to answer the APSRS or incomplete responses. The participants were obtained through multi-stage random sampling. The first stage is a random selection of two schools in Nonthaburi, a province in the metropolitan region of Thailand. The second stage is a random selection of two classrooms per grade in each school. The third stage is a random selection of 25 students of each sex per educational level per school.

Based on the data collection, it was found that all 600 participants gave consent to fill out the APSRS and completed their responses, which is in line with the sampling frame. The 600 participants were sufficient for the data analysis using CFA and RSM. The participants included students from grades 7 to 12, whose ages range 12 to 18. The participants consisted of 300 students from lower secondary school (early adolescence) and 300 from upper secondary school (middle adolescence). There were 300 male students and 300 female students, as showed in Table 1. The participants were students in public schools located in the metropolitan area of Thailand, which are well-developed areas with infrastructure availability. Most participants came from relatively high socioeconomic status. In other words, they came from families with good educational backgrounds, relatively high incomes, and life stability, all of which support their academic learning and lifestyles.

Table 1. Numbers of participants according to their sexes and grades.

	Lower secondary school			**Upper secondary school**			
Sex	Seventh	Eighth	Ninth	Tenth	Eleventh	Twelfth	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Male	50 (8.33)	50 (8.33)	50 (8.33)	50 (8.33)	50 (8.33)	50 (8.33)	300 (50.00)
Female	50 (8.33)	50 (8.33)	50 (8.33)	50 (8.33)	50 (8.33)	50 (8.33)	300 (50.00)
Total	100 (16.67)	100 (16.67)	100 (16.67)	100 (16.67)	100 (16.67)	100 (16.67)	600 (100.00)

2. PROCEDURE

The development of the APSRS started with creating 32 items to measure PSR. It comprises items intended to measure economic (3 items), legal (3 items), environmental (4 items), ethical (5 items), and philanthropic dimensions (4 items). There are 13 reserve items to measure economic (2 items), legal (2 items), environmental (3 items), ethical (4 items), and philanthropic (2 items) dimensions. The APSRS developed is a five-point Likert scale, with 1 referring to least like me, 2 referring to somewhat like me, 3 referring to moderately like me, 4 referring to very like me, and 5 referring to most like me. Subsequently content validity was assessed by three experts in educational psychology and two in educational measurement and evaluation. Items that are consistent with the operational definition of PSR were tested with the participants. Before responding to the APSRS, the participants were instructed about the research and gave consent to responding the APSRS voluntarily. No personal data that can be used to identify the participants were collected. The data were collected in February 2024. The responses of the APSRS were used to examine its psychometric properties.

3. DATA ANALYSIS

According to Sözer and Kahraman [35] and Yamashita [36], we analyzed the data to examine the following psychometric properties of the APSRS, which can be explained as follows: (1) item parameters were analyzed using the rating scale model (RSM), as the APSRS is a Likert scale with equal intervals between each scale, making it suitable to use the RSM in analyzing item parameters of the APSRS. The RSM has principles for estimating item parameters as follows: the intervals between each scale are equal, and each item has the same interval. The data

were analyzed using the TAM R package. (2) Content validity was analyzed using the I-CVI and S-CVI indices. (3) Construct validity was analyzed using CFA by Mplus program. (4) Internal consistency reliability was analyzed using Cronbach's alpha coefficient by the SPSS program. (5) Measurement invariance was analyzed across sexes and educational levels using the Mplus program. The educational levels were divided into two groups: lower secondary school and upper secondary school. Sexes were divided into two groups: male and female.

III. RESULTS

The completely developed version of the APSRS is a five-point Likert scale containing 19 items, which measure economic (3 items), legal (3 items), environmental (4 items), ethical (5 items), and philanthropic (4 items) dimensions, as shown in the appendix. The psychometric properties of the APSRS included analyses of item parameters, content validity, construct validity, reliability, and measurement invariance. The results of these examinations are detailed below.

1. THE RESULTS OF CONTENT VALIDITY ANALYSIS

All 32 items developed have an I-CVI index ranging 0.60 – 1.00. Items must have an I-CVI index of over 0.78 to be considered in consistent with the operational definition [37]. We removed one item with an I-CVI index of 0.60, so there were only 31 items to pilot for examining psychometric properties of the APSRS. The APSRS used for piloting had an S-CVI index of 0.95, meaning the APSRS has content validity.

2. THE RESULTS OF ITEM PARAMETERS AND RELIABILITY ANALYSIS

Prior to the interpretation of the item parameters, we considered the fit of the response to each item with the RSM using fit statistics, namely OUTFIT, standardized unweighted mean square, and INFIT, standardized weighted mean square. The INFIT and OUTFIT values should range from 0.60 - 1.40 in order to be considered fit with the RSM [38]. The review found that the responses to LEG 5 were a misfit with the RSM and should, therefore, be removed, as shown in Table 2. Then, items parameters, namely item's location, threshold 1, threshold 2, threshold 3, and threshold 4 are considered for the selection of quality items. Item's location is PSR value of the item. Threshold 1 is PSR in adolescents, or person's location, with a 50% chance of switching from category 1 (least like me) to category 2 (somewhat like me). Threshold 2 is PSR in adolescents with a 50% chance of switching from category 2 (somewhat like me) to category 3 (moderately like me). Threshold 3 is PSR in adolescents with a 50% chance of switching from category 3 (moderately like me) to category 4 (very like me). And threshold 4 is PSR in adolescents with a 50% chance of switching from category 4 (very like me) to category 5 (most like me).

The value of item's location ranges from -1.19 to 0.99, indicating that all items, except LEG 5, are of good quality and meet the acceptable range of -2.00 to 2.00 [39]. The value of threshold 1, threshold 2, threshold 3, and threshold 4 of every item are arranged from the lowest to the highest, which is suitable, and demonstrated that the categories are arranged in a suitable order from the lowest to highest, as shown in Table 2. It can be concluded that every item, except LEG 5, is of quality, reflecting the thorough selection of items that cover the operational definition of PSR. The items are divided so that they can measure economic (3 items), legal (3 items), environmental (4 items), ethical (5 items), and philanthropic (4 items) dimensions to form a complete APSRS. The APSRS was found to have internal consistency reliability with a Cronbach's Alpha coefficient of 0.78.

Table 2. Results of estimating item parameters of the APSRS using RSM.

	Fit statistics			**Item parameter**			
Item	OUTFIT	INFIT	Item's location	Threshold 1	Threshold 2	Threshold 3	Threshold 4
ECO 1	0.74	0.74	-0.54	-1.88	-0.98	-0.15	0.82
ECO 2	1.35	1.34	-0.66	-2.00	-1.09	-0.26	0.70
ECO 3	1.24	1.21	-0.74	-2.08	-1.17	-0.33	0.62
ECO 4	1.18	1.17	-0.22	-1.56	-0.66	0.18	1.14
ECO 5	1.35	1.33	0.09	-1.24	-0.35	0.48	1.46
LEG 1	0.87	0.87	-0.50	-1.83	-0.94	-0.10	0.87
LEG 2	0.72	0.72	-0.88	-2.18	-1.29	-0.44	0.51
LEG 3	0.77	0.78	-0.81	-2.14	-1.24	-0.40	0.55
LEG 4	1.18	1.17	-0.31	-1.64	-0.75	0.10	1.05

LEG 5	1.77	1.77	-1.03	-2.36	-1.47	-0.63	0.34
ENV 1	1.12	1.13	-0.29	-1.63	-0.74	0.11	1.07
ENV 2	0.70	0.70	-0.30	-1.64	-0.75	0.10	1.06
ENV 3	0.68	0.68	-0.12	-1.46	-0.55	0.29	1.24
ENV 4	0.96	0.96	-0.50	-1.83	-0.94	-0.11	0.87
ENV 5	1.07	1.06	-0.05	-1.38	-0.48	0.35	1.32
ENV 6	0.70	0.70	0.15	-1.18	-0.29	0.55	1.51
ENV 7	0.93	0.92	-0.01	-1.35	-0.44	0.39	1.36
ETH 1	0.85	0.86	-0.85	-2.19	-1.29	-0.45	0.51
ETH 2	0.95	0.96	-0.76	-2.10	-1.20	-0.36	0.59
ETH 3	0.83	0.82	-0.43	-1.76	-0.87	-0.03	0.93
ETH 4	1.11	1.17	-1.23	-2.57	-1.66	-0.83	0.14
ETH 5	1.07	1.06	-0.54	-1.87	-0.97	-0.14	0.83
ETH 6	0.82	0.82	-0.63	-1.96	-1.06	-0.23	0.74
ETH 7	1.07	1.05	0.05	-1.28	-0.38	0.45	1.42
ETH 8	1.10	1.09	0.02	-1.32	-0.41	0.42	1.39
PHI 1	0.87	0.87	-0.54	-1.94	-1.04	-0.21	0.76
PHI 2	1.25	1.20	0.94	-0.40	0.50	1.34	2.30
PHI 3	1.09	1.07	0.49	-0.84	0.06	0.90	1.86
PHI 4	1.12	1.12	0.35	-0.98	-0.09	0.76	1.71
PHI 5	1.38	1.33	-0.51	-1.84	-0.95	-0.11	0.86
PHI 6	1.40	1.32	1.00	-0.33	0.56	1.41	2.36

Note. Removed items are displayed in a grey-shaded area.

3. THE RESULTS OF CONSTRUCT VALIDITY ANALYSIS

Out of 171 pairs of items, 117 pairs show a significant correlation with one another at the significance level of .05, with correlation coefficients ranging from -0.21 to 0.59. The correlation matrix is shown in Table 3. The result of analyzing CFA found that the measurement model of PSR is fit with empirical data, as the CFI, TLI, RMSEA, SRMR, and $\chi 2/df$ are within acceptable ranges. The criteria for consideration are as follows: CFI and TLI values should not be lower than 0.90. RMSEA and SRMR values should not be higher than 0.08. And $\chi 2/df$ values should not be higher than 3.00 [40, 41]. Chi-square is sensitive to a large sample size, which resulted in chi-square having a statistical significance level of .05. Therefore, $\chi 2/df$ was considered instead of chi-square. The $\chi 2/df$ value is 2.20, which is less than 3.00. The fit indices of the measurement model are shown in Table 4. Moreover, it was found that the data used for analyzing CFA are in line with the assumptions of data analysis, which are multivariate normality (Shapiro-Wilk = 0.83, p = .13) and multicollinearity (VIF = 1.13 – 1.86).

Table 3. Correlation matrix for all items.

Ite	EC	EC	EC	LE	LE	LE	E	E	E	E	ET	ET	ET	ET	ET	P	P	P	P
EC	1.0																		
EC	0.2	1.0																	
EC	0.1	0.2	1.0																
LE	0.2	0.1	0.0	1.0															
LE	0.2	0.1	0.0	0.4	1.0														
LE	0.1	0.2	0.1	0.3	0.2	1.0													
E	0.1	0.0	-	0.1	0.1	0.0	1.0												
E	0.1	0.0	0.0	0.1	0.1	0.0	0.2	1.0											
E	0.1	0.0	0.0	0.1	0.1	0.0	0.3	0.2	1.0										
E	0.1	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.3	1.0									
ET	0.1	0.1	0.0	0.1	0.3	0.1	0.1	0.1	0.2	0.3	1.0								
ET	0.1	0.0	0.0	0.1	0.2	0.0	0.1	0.1	0.2	0.2	0.4	1.0							
ET	0.1	0.1	0.1	0.1	0.3	0.0	0.0	0.1	0.1	0.2	0.3	0.4	1.0						
ET	-	0.1	0.0	0.0	-	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0					
ET	0.2	0.0	0.0	0.2	0.2	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	-	1.0				
P	0.2	0.0	0.0	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	1.			

P	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.1	0.0	0.	1.		
P	-	0.0	0.1	-	-	-	-	-	-	-	0.0	-	-	-	0.0	-	-	1.	
P	-	-	-	0.0	0.0	-	0.0	0.0	0.1	0.0	-	-	-	-	0.0	0.	0.	-	1.

Note. Correlation coefficients that are not statistically significant are displayed in a grey-shaded area.

The measurement model of PSR is in the form of second-order measurement model. The first-order factors comprise 19 items. The second-order factors consist of five dimensions of PSR. We considered the first-order factor loadings and found that most of the items show relatively high factor loadings, with standardized factor loadings ranging from 0.23 to 0.71 and a statistical significance level of .05, as shown in Table 4. This shows that every item can be used for the measurement and is a significant indicator of PSR. When considering the second-order factor loadings, we found that factor loadings are statistically significant at .05 significance level. The factor loadings of legal, environmental, and ethical dimensions are similarly high, followed by the economic dimension. The philanthropic dimension has the least factor loadings, which are relatively low, as shown in Table 4 and Figure 1. The result of the analysis of CFA supports that the APSRS has construct validity.

Table 4. Confirmatory factor analysis results of measurement model of personal social responsibility.

Indicator	Unstandardized factor loading		Standardized factor loading		R^2	Factor score coefficient
	b (*SE*)	*t*	β (*SE*)	*t*		
First-order factors						
Economic dimension (ECO)						
ECO 1	1.00	-	0.59 (0.08)	7.35	0.34	0.26
ECO 2	0.71 (0.18)	3.98	0.33 (0.06)	5.71	0.11	0.07
ECO 3	0.46 (0.14)	3.34	0.23 (0.06)	3.96	0.05	0.04
Legal dimension (LEG)						
LEG 1	1.00	-	0.58 (0.04)	16.69	0.34	0.13
LEG 2	1.04 (0.09)	11.32	0.71 (0.03)	23.25	0.50	0.23
LEG 3	1.07 (0.10)	11.29	0.69 (0.03)	22.37	0.47	0.19
Environmental dimension (ENV)						
ENV 1	1.00	-	0.36 (0.05)	7.23	0.13	0.04
ENV 2	1.26 (0.19)	6.72	0.55 (0.04)	13.13	0.31	0.10
ENV 3	1.14 (0.19)	6.01	0.51 (0.05)	11.22	0.26	0.08
ENV 4	1.26 (0.22)	5.70	0.50 (0.05)	10.90	0.25	0.07
Ethical dimension (ETH)						
ETH 1	1.00	-	0.65 (0.03)	19.37	0.42	0.18
ETH 2	1.04 (0.09)	11.03	0.63 (0.03)	18.45	0.40	0.13
ETH 3	0.93 (0.09)	9.88	0.56 (0.04)	15.19	0.32	0.09
ETH 4	1.00 (0.09)	11.15	0.64 (0.03)	19.41	0.41	0.19
ETH 5	0.46 (0.08)	5.49	0.27 (0.05)	5.92	0.07	0.04
Philanthropic dimension (PHI)						
PHI 1	1.00	-	0.28 (0.05)	5.78	0.08	0.03
PHI 2	2.04 (0.41)	5.01	0.56 (0.04)	13.20	0.31	0.08
PHI 3	2.22 (0.44)	5.03	0.58 (0.04)	13.66	0.34	0.08
PHI 4	2.71 (0.53)	5.08	0.66 (0.04)	15.82	0.44	0.10
Second-order factors						
ECO	1.00	-	0.62 (0.08)	7.38	0.38	-
LEG	1.53 (0.24)	6.50	0.84 (0.04)	19.91	0.71	-
ENV	1.11 (0.22)	5.14	0.86 (0.05)	15.86	0.74	-
ETH	1.50 (0.24)	6.32	0.79 (0.04)	19.24	0.63	-
PHI	0.29 (0.09)	3.16	0.33 (0.06)	5.34	0.11	-
$\chi^2(133, N = 600) = 292.30, p < .001$			$\chi^2/df = 2.20$			
CFI = 0.93		TLI = 0.90	RMSEA = 0.05			SRMR = 0.06

Note. All factor loadings were significant at the .05 level.

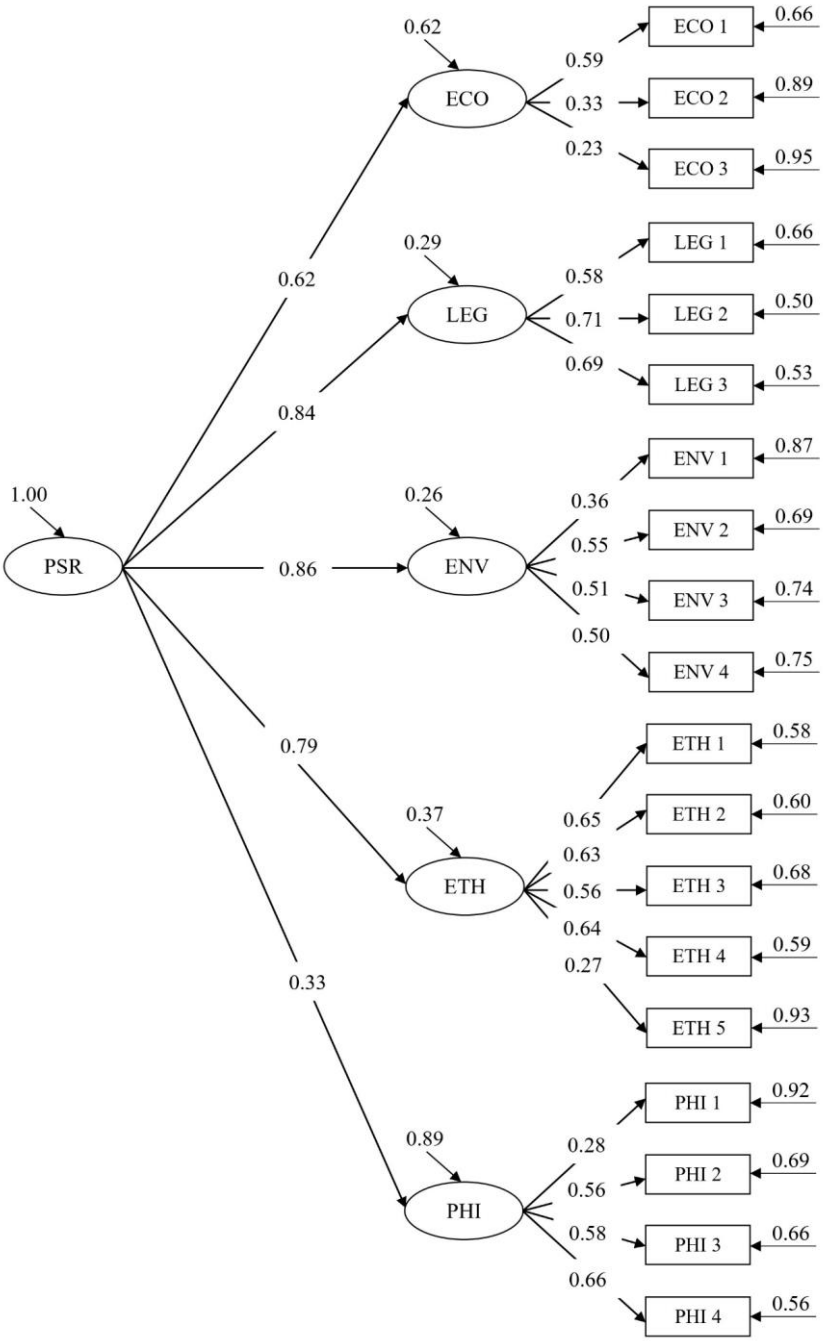

FIGURE 1. Measurement model of personal social responsibility.

4. THE RESULTS OF MEASUREMENT INVARIANCE ANALYSIS

We analyzed measurement invariance of the APSRS across educational levels and sexes. For each analysis, we analyzed a total of four models in order, as follows: (1) configural invariance model, which is the examination of invariance of model forms and was analyzed by simultaneously estimating each parameter value in the measurement model in an independent manner in each group. The model must be fit with empirical data, so that the next model can be analyzed; (2) metric invariance model, which is the examination of invariance of factor loadings and was analyzed by constraining factor loadings equal in all groups; (3) scalar invariance model, which is the examination of invariance of intercepts. The analysis was conducted by constraining intercepts equal in all groups, as well as constraining factor loadings equal in all groups; and (4) strict invariance model, which is the

examination of invariance of errors. The analysis was conducted by constraining the value of errors equal in all groups, on top of constraining the value of factor loadings and intercepts equals in all groups.

The analysis of four measurement invariance models requires comparing the fit of the model being analyzed with that of the previous model. The two models must be fit with empirical data indifferently, so that the next model can be analyzed. The criteria for comparison are as follows: The CFI values should differ by no more than 0.010 and the RMSEA values should differ by no more than 0.015 [42].

The results of the analysis of measurement invariance of the APSRS by educational level found that the APSRS is strict invariance. That is, the measurement model of PSR in students in lower and upper secondary school are structurally alike. Moreover, the first- and second-order factors have equal factor loadings, intercepts, and errors. The results of the analysis are presented in Table 5.

Table 5. Results of the analysis of measurement invariance of the APSRS by educational level.

Model	CFI	ΔCFI	RMSEA	ΔRMSEA
1. Configural invariance model	0.93	-	0.04	-
2. Metric invariance model	0.92	0.01	0.05	0.01
3. Scalar invariance model	0.92	0.00	0.05	0.00
4. Strict invariance model	0.92	0.00	0.05	0.00

The result of the measurement invariance analysis of the APSRS by sex found that the APSRS is scalar invariance. That is, the measurement model of PSR of male and female students are structurally alike. The first- and second-order factors have equal factor loadings and intercepts. The results of the analysis are presented in Table 6.

Table 6. Results of the analysis of measurement invariance of the APSRS by sex.

Model	CFI	ΔCFI	RMSEA	ΔRMSEA
1. Configural invariance model	0.93	-	0.05	-
2. Metric invariance model	0.92	0.01	0.05	0.00
3. Scalar invariance model	0.91	0.01	0.05	0.00
4. Strict invariance model	0.89	0.02	0.05	0.00

IV. DISCUSSION AND CONCLUSION

The APSRS developed is a five-point Likert scale containing 19 items, which measure economic (3 items), legal (3 items), environmental (4 items), ethical (5 items), and philanthropic (4 items) dimensions. Unlike previous personal social responsibility tools, the APSRS is specifically designed for adolescents. The items are culturally neutral and contextually broad, making them relevant to everyday adolescent experiences. More importantly, the APSRS is developed based on the personal social responsibility concept that covers all dimensions of social life. It effectively measures PSR across multiple dimensions: economic, legal, environmental, ethical, and philanthropic, providing a holistic assessment of adolescent social responsibility. The APSRS demonstrates good psychometric properties supported by the following evidence: item parameters, content validity, constrict validity, and reliability. Furthermore, it also contains measurement invariance. The research can be discussed as follows:

The APSRS is fit with RSM, which means the interval of each scale is equal and every item has the same equal interval. This goes in line with the Likert scale [43]. In other words, the responses to each item are on the interval scale level, making it possible to find the summation and arithmetic means of the items within the scale without violating the scale of measurement of the data [44]. In addition, the APSRS shows a high level of relevance and covers the operational definition of all five dimensions of PSR, as content validity is high and able to measure PSR in adolescents with a low margin of error since reliability is over 0.70 [45].

Based on the result of the CFA done to examine construct validity, it was found that legal, environmental, and ethical dimensions demonstrated similarly high factor loadings, followed by the economic dimension. The philanthropic dimension showed the lowest factor loadings and relatively low values. Using Kohlberg's theory of moral development, the finding can be explained as follows: most adolescents show moral development in the preconventional and conventional levels, while less than 10% of adolescents are in the postconventional level [46]. In other words, most adolescents comply with rules, expectations, and norms in the society, as they do not want to

be punished; they want to be accepted socially and perceived as good human beings. Efforts to establish good relationships with others or complying with rules are what need to be practiced for one's own benefit, even though they don't have to actually understand the reason behind following such rules [20]. Those with high morality will make an effort to volunteer to help others without asking anything in return [47]. This phenomenon can be explained through the perspective of Generation Z people, which are the participants in this study. Gen Z people demonstrate less social sensitivity and higher egocentrism compared to the older generations [48, 49]. In short, Gen Z people primarily put their needs first and show irresponsible attitude towards others [50]. In addition, using the Maslow's hierarchy of needs, it can be explained that adolescents haven't fulfilled the needs in stage 3 (belongingness and love needs), which is the stage where individuals seek acceptance from their group and love from those around them. When the needs in this stage are fulfilled, they will give priority to people who are close to them over those who are unfamiliar and will do good deeds for others and society without expecting anything in return [47, 51]. This does not, however, mean that adolescents lack volunteer spirit, do not want to help others, or do not want to engage in social activities. Today's adolescents, however, must be wary of hazards and scammers, which are prevalent in society, as scammers pose a threat to one's belongings and personal safety/security, belonging to stage 2 (safety), and opt to not help others to protect their own belongings. Based on the aforementioned reason, legal, environmental, and ethical dimensions are the most crucial in indicating PSR, while the economic dimension is less emphasized when it comes to compliance to social rules compared to the three other dimensions, and is thus less important. The philanthropic dimension is the least important when it comes to indicating PSR, as adolescents primarily prioritize their own self-interests. However, the economic, legal, environmental, ethical, and philanthropic dimensions are the elements that shape adolescents' personal social responsibility, which lead to the promotion of a peaceful society. In other words, these five dimensions collectively reflect personal social responsibility in adolescents, forming a holistic framework that fosters a sense of social responsibility in them.

In addition, when considering the items' standardized factor loading, it was found that the five items with relatively low factor loadings are (1) ECO 2 "I buy goods and services beyond my means", (2) ECO 3 "I buy goods that I end up throwing them away", (3) ENV 1 "I reuse materials, such as refilling water bottles, using both sides of the pater, and reusing plastic bags", (4) ETH 5 "I prioritize my own tasks", and (5) PHI 1 "I help relieve my family's burden, such as by doing household chores and assisting with family's tasks". The reason why five items have low factor loadings is likely because the items are unclear and do not reflect adolescents' personal social responsibility as effectively as they should, leading to high errors. The five items can be revised as follows: (1) ECO 2 "I buy goods and services that exceed my budget", (2) ECO 3 "I buy food or goods more than necessary to the point where I have to throw some away", (3) ENV 1 "I reuse used materials or repurpose them, such as refilling a water bottle, using both sides of the paper, and reusing plastic bags", (4) ETH 5 "I complete my own assigned tasks before helping with group work", and (5) PHI 1 "I choose to help with household chores or do things my family asks me to do, even though I don't have much free time". These items should be revised to improve their quality, so that PSR can be measured with a low margin of error.

The APSRS shows measurement invariance between adolescents in lower secondary school and upper secondary school in the form of strict invariance, meaning the APSRS measures PSR with a consistent structure, divided into five dimensions: economic (3 items), legal (3 items), environmental (4), ethical (5), and philanthropic (4 items) dimensions. Each item is equally important in measuring PSR across different groups. The measurement uses the same unit and zero point and has equal measurement error. This enables meaningful and accurate comparisons of different PSR between adolescents in lower secondary school and upper secondary school without a margin of error [52, 53].

In addition, the APSRS also shows measurement invariance between males and females in the form of scalar invariance, which is sufficient to compare the differences of PSR across the two sexes in a meaningful and accurate way without a margin of error. Strict invariance is not necessary when it comes to comparing the differences of scores between groups, as errors of items are not part of the latent variable or construct. So, invariance of errors has no effect on the interpretation of the differences in construct's average [53, 54]. It can be observed that the APSRS can be applied in various contexts because the APSRS exhibits measurement invariance across educational levels and sexes. Besides, the APSRS can be used in various cultural contexts, as many items are based on situations that are culturally neutral and contain general contexts that are not specific to any particular culture. Furthermore, adolescents in all societies will likely encounter situations in the items in their daily lives.

However, the APSRS examines psychometric properties in adolescents in Thailand, where collectivism is a prevalent cultural trait. That is, cultural norms are defined by interdependent self-identity and holistic thinking, and places importance on collective goals and relationships among group members, which is different from

countries whose individualism is a prevalent trait, where cultural norms are defined by independent self-identity and short-term thinking. They also place importance primarily on personal interest [31, 55]. Members of collectivist cultures are willing to sacrifice self-interest for collective interests, promote harmony, and define their identities in relation to social tendencies. Individuals view themselves as part of a larger society, fostering a sense of belonging [14]. In contrast, individualist cultures prioritize personal values, dignity, and autonomy. Therefore, a person should be the one who determines their personal needs and manage their thoughts and behaviors without the interference of external factors. Even though individualism puts an emphasis on personal rights and values, an individual still has responsibilities towards society, as personal values would not exist without their connection to society [56]. It can be said that members of collectivist cultures show a higher level of personal social responsibility than those in individualist cultures [14, 57]. However, collectivist and individualist tendencies may be perceived as personality traits. Adolescents that are collectivists show a higher level of PSR than individualists [58]. Future studies should analyze measurement invariance across cultures to enable meaningful cross-cultural comparisons of adolescent PSR. Moreover, conducting a standard setting is recommended to establish levels of PSR among adolescents for the interpretation of scores obtained from the APSRS to promote appropriate PSR levels among adolescents, which will help them grow into socially responsible adults and contribute positively to society.

In conclusion, the APSRS developed contains good psychometric properties supported by the following evidence: item parameters, content validity, construct validity, and reliability. It also shows measurement invariance across educational levels and sexes and can be used to measure PSR in adolescents in an accurate and precise way. The scores obtained can also be used to compare the differences of PSR in adolescents with different educational levels and sexes in a meaningful and accurate way. However, to improve the quality of APSRS, some of the items should be revised, and measurement invariance across cultures should be analyzed, in order to broaden the applicability of the APSRS for measuring PSR across diverse contexts.

Funding Statement

This study was supported by research funds provided by the Faculty of Education, Chulalongkorn University, and the Special and Inclusive Education Research Unit.

Author Contributions

Kittitas Wancham: conceptualization, methodology, validation, formal analysis, data curation, writing original draft preparation, and writing review and editing; Chanakida Thummanond: conceptualization, methodology, validation, investigation, writing original draft preparation, writing—review and editing, and project administration; Laphatphitcha Surawatakul and Dusida Tinmala: conceptualization, methodology, validation, and writing review and editing; Kanit Sriklaub: conceptualization, methodology, validation, writing—review and editing, and supervision.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data are available from the authors upon request.

Acknowledgments

The authors would like to acknowledge the assistance of the Editor and Reviewers in the preparation of the article for publication.

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Appendix. The Adolescence's Personal Social Responsibility Scale (APSRS)

Please consider the following statements and evaluate how much your behavior aligns with the statements. Then, mark an ✓ in the box that best represents your behavior in accordance with reality. There are five levels of opinion as follows:

- 1 refers to least like me
- 2 refers to somewhat like me
- 3 refers moderately like me
- 4 refers to very like me

- 5 refers to most like me

Item	Statement	Levels of opinion				
		1	2	3	4	5
ECO 1	1. I buy goods and services only as necessary.					
ECO 2	2. I buy goods and services beyond my means.					
ECO 3	3. I buy goods that I end up throwing them away.					
LEG 1	4. I follow school's rules.					
LEG 2	5. I don't dare break the law.					
LEG 3	6. I conduct myself in accordance with socially accepted practices, such as following dress codes, dining etiquette, and adhere to religious principles.					
ENV 1	7. I reuse materials, such as refilling water bottles, using both sides of the pater, and reusing plastic bags.					
ENV 2	8. I conserve energy, both at home and in public places, such as saving electricity, water, and fuel.					
ENV 3	9. I buy goods or consume foods that are environmentally-friendly, such as using containers made of papers and buying products with eco-friendly labels.					
ENV 4	10. I help the society reduce environmental pollution, such as by separating waste before disposal and avoiding dumping waste into rivers.					
ETH 1	11. I conduct myself with honesty and do not deceive anyone.					
ETH 2	12. I treat everyone equally.					
ETH 3	13. I treat everyone without bias.					
ETH 4	14. I accept how other people are.					
ETH 5	15. I prioritize my own tasks.					
PHI 1	16. I help relieve my family's burden, such as by doing household chores and assisting with family's tasks.					
PHI 2	17. I volunteer to improve the community, such as teaching children in the community and cleaning the community.					
PHI 3	18. I volunteer to help improve the school, such as by running a campaign to save school resources and renovating the school.					
PHI 4	19. I try to find ways to solve problems in the society I'm in.					

Note. The APSRS originally developed in Thai and was translated into English for international use.