International Journal of Evaluation and Research in Education (IJERE)
Vol. 13, No. 5, October 2024, pp. 2944~2956
ISSN: 2252-8822, DOI: 10.11591/ijere.v13i5.28063

Exploratory factor analysis of two most widely used materialism measurements

Kuni Saffana[1,3], Valendra Granitha Shandika Puri[2,3], Rahmat Hidayat[3]
[1]Department of Psychology, Faculty of Social Sciences, Universitas Muhammadiyah Purworejo, Purworejo, Indonesia
[2]Department of Psychology, Faculty of Psychology, Universitas Islam Negeri Syarif Hidayatullah Jakarta, Tangerang, Indonesia
[3]Faculty of Psychology, Universitas Gadjah Mada, Sleman, Indonesia

Article Info

Article history:

Received Jul 14, 2023
Revised Dec 29, 2023
Accepted Feb 13, 2024

Keywords:

Aspiration index
Construct validation
Exploratory factor analysis
Material value scale
Materialism

ABSTRACT

The material value scale (MVS) and the aspiration index (AI) are among the most prominent measurements of materialism in research. As the names indicate, the MVS measures materialism in terms of materialistic values, whereas AI measures it in the matter of aspirations. Although both instruments have been widely used in research, the question of whether materialistic values and aspirations are independent of each other remains open for examination. The answer to this question is important, considering the inconsistencies in the results of past research. Therefore, this study aims to assess the construct's similarity and dissimilarity between both self-report materialism measurements resulting from exploratory factor analysis (EFA). The study was conducted online in Indonesia in 2019, with 610 participants, Indonesian version of MVS and AI, the software of Jamovi and R Studio. The analysis consisted of the Bartlett test, Kaiser-Meyer-Olkin test, parallel analysis, minimum rank factor analysis, EFA, and reliability (Cronbach's α). The result showed there was an intersection, but each measurement had a portion of each independence higher, hence was no sufficient evidence of similarity between both materialism constructs. The construct of materialism as value and materialism as aspiration is proposed as different. Limitations of the study and implications for research were discussed.

Corresponding Author:

Kuni Saffana
Department of Psychology, Faculty of Social Sciences, Universitas Muhammadiyah Purworejo
Jalan KH. Ahmad Dahlan 3 Purworejo 54111, Jawa Tengah, Indonesia
Email: k.saffana@umpwr.ac.id

1. INTRODUCTION

The word "materialism" has two logically independent doctrines [1]. Philosophy is the field that initially study materialism. It refers to materialism as the worldview according to which everything real is material, while ordinary language refers to materialism as synonymous with hedonism or the pursuit of pleasure and material possessions [1]. Materialism then became an important construct in various fields. It has surged worldwide since consumer culture emerged in the 20th century [2] as the study of economy and psychology. Recent literature on the construct demonstrates continued interest in various studies, including environmental sustainability [3], and consumer behavior [4].

Materialism is a complex construct [5] and concept [6]. There are various definitions of its concept in the different studies [6] and each seems to be narrowly restricted to its research purposes [7]. There is a summary of materialism concepts that are widely cited by studies and instruments to measure materialism. First, several researches [8], [9] conceptualized materialism as a consumer trait that has been subject to widespread criticism throughout history [10] and developed a measurement of materialism traits [11].

Recently, questionnaire of dispositional materialism (QDM) was developed to measure materialism as an individual psychological trait based on Belk's approach [12]. Robert and Clement [13] considered the concept of materialism as a trait and concluded that it had limitations, then decided to use the concept of materialism as a value for their study. Second, materialism as consumer value was conceptualized [14], [15] and measured by the material value scale (MVS; for a shortened scale) [16], which then underlie the development of materialism measurement for children [17]–[19]. Further, Gurel-Atay *et al*. [20] developed the measure of materialism motives (MMM) that was built on the materialism value concept, but distinguished motives of materialism from the "state" of materialism itself. Combining both concepts, the youth materialism scale (YMS), based on both materialism as a personal value and to some extent, a personality trait was developed [21], [22]. Third, other research [23], [24] conceptualized financial success as the aspiration to attain wealth and material success. Materialism as extrinsic aspiration was then widely measured by the aspiration index (AI) [25]. Lastly, Muñiz-Velázquez *et al*. [26] shed some light on the complicated measurement of materialism by developing an implicit assessment of materialism. Among those concepts, we found materialism as value and materialism as aspiration had lots of intersections hence chosen as the topic of discussion in this study.

First is the intersection in the concept. Kasser [27] stated that materialistic values reflect the priority that individuals give to goals such as money, possessions, image, and status. Further, Kasser [24] combined value and goals focused on wealth, possessions, image, and status comprised materialism, whilst Wong *et al*. [7] proposed expanding the view of materialism. Dittmar and Isham [28] conceptualized materialistic value orientation (MVO), an orientation that people have toward money and material goods that can be measured by MVS and AI. Then in the study of the consumer goal system, Hidayat [29] stated that needs, wants, desires, motives, and values may become parts of them. Second, is the intersection of measurement used in the studies.

Lekavičienė *et al.* [30] combined both materialism concepts for their study, defined materialism as a value system oriented towards material wealth whilst perceiving it as a major indicator of an individual's success and a means to attain happiness and use MVS and AI to measure materialism for their study. Reyes *et al*. [31] also used both instruments in their study (AI or MVS) and the result showed that higher materialism prospectively predicts lower gratitude, which in turn prospectively predicts lower need satisfaction and higher need frustration. Third is the intersection of terms in which the term of value is used but the instrument used was AI [32]–[35], whereas AI was developed to measure aspirations.

The aforementioned intersection then might be the underlying cause of the inconsistencies in its measurement and result of the related study. Whether the terms of value and aspiration with each measurement should be mixed in a study or not still needs exploration. Two meta-analysis studies explore both concepts of materialism with varied results [2], [36]. Other studies showed that materialism as a value is more sensitive to personality than materialism as a pursuit of extrinsic goals [37].

We wanted to assess if items from scales purporting to measure the same (or similar) constructs loaded on the same factors. We were interested in the measurement construct between both measurements. If we would find evidence for the dissimilarity between measurements, this could postulate measurement misuse in the self-report materialism measurement study. We attempted to answer the question by conducting an exploratory factor analysis (EFA) on self-report materialism items.

The research hypothesized that factors that consisted of items from both measurements would emerge. The goals were to assess the similarity and dissimilarity between both self-report materialism measurements, observe whether similar items would load on the same factors, and observe other emergent factors from other items. It was not our intention to propose a new factor structure for materialism.

2. METHOD

2.1. Participants

All participants (n=610, mean age=21.78, 74.77% female) were Indonesian. They were mostly students (73.11%) at Universitas Gadjah Mada, Indonesia. To be eligible, the participant's age must be 18 years old and above. Approximately 75% reported as students, 21.8% as workers, and 2.62% listed their occupation as "other".

2.2. Procedures

All data collection occurred via an online survey in 2019. We used two surveys to ease the data collection process. The first was for the community of Universitas Gadjah Mada, and the second was for self-selected participants spread throughout Indonesia because the link was broadcast through social media. Participants were required to agree on informed consent to continue on the following sections. Participants completed a short demographics questionnaire, followed by a set of questionnaires that included materialism

value (MVS), and materialism aspiration (AI). After the data collection finished, a reward of e-money was given to randomly selected eight participants.

2.3. Measures

2.3.1. Material value scale

The MVS [14] was constructed based on qualitative research and literature reviews by Richins and Dawson. It is an 18-item self-report questionnaire that consists of 7 items on centrality, 6 items on success, and 5 items on happiness. Items were responded to on a scale of 1-5, with higher scores indicating higher agreement. Eight items are reverse-coded. Examples of the items include "I admire people who own expensive homes, cars, and clothes" (success), "I enjoy spending money on things that aren't practical" (centrality), and "My life would be better if I owned certain things I don't have" (happiness). The MVS was translated into Indonesian for the study by Hidayat and Husna (unpublished) [15]. Past researchers have found that MVS in Indonesian was reliable in the level of dimension and scale (construct reliability was .77-.91, all above .6), and has a good convergent validity (average variance extracted was .53-.66, all above .5) [38]. In our sample, Cronbach's α was .825 for the single MVS scale, and per subscale ranged from .5 to .7.

2.3.2. Aspiration index

The AI, initially developed by Kasser and Ryan [23], was designed to measure 11 different goal domains [25]. It is a 57-item self-report questionnaire that consists of 6 items on affiliation, 4 items on community feeling, 4 items on conformity, 4 items on financial success, 5 items on hedonism, 5 items on image, 5 items on physical health, 4 items on popularity, 5 items on safety, 9 items on self-acceptance, and 6 items on spirituality. According to Grouzet *et al*. [25], extrinsic aspiration consisted of financial success, image, popularity, and conformity; intrinsic aspiration consisted of self-acceptance, affiliation, community feeling, physical health, and safety; self-transcendence aspiration was most represented by spirituality; and physical self was most represented by hedonism. For this study, items were responded to on a scale of 1-10 with higher scores indicating higher importance. No item is reverse-coded. Examples of the items include "I will be financially successful" (financial success), "I will be admired by many people" (popularity), and "I will experience a great deal of sensual pleasure" (hedonism). The AI was translated into Indonesian for the study by Hidayat and Husna (unpublished) [15]. There was no reliability and validity of AI Indonesian's version reported, but Grouzet *et al*. [25] suggested that 11 goal domains assessed herein each had acceptable internal reliability, measurement equivalence, and notable cross-culturally across the 15 cultures. In our sample, Cronbach's α was .948 for the single AI scale, and per subscale ranged from .65 to .87.

2.4. Data analysis

The computer software used for the study was Jamovi Version 2.3, an online analysis tool [39] and R [40], [41] with packages consisting of psych (version 2.3.3) and EFA.MRNA (version 1.1.2). Two techniques to determine if data were adequate for factor analysis included Bartlett's test of Sphericity and the Kaiser-Meyer-Olkin (KMO) test [42]. The procedure proceeded twice for all MVS items with the combination of: i) including all 57 items of AI, and ii) including 17 items of external aspiration of AI. The KMO result was .928 (75 items) and .924 (35 items) which was categorized as marvelous. Bartlett's test of sphericity was significant, $\chi 2$ (2,775)=24,889, p<.001 (75 items) and $\chi 2$ (595)=8,365, p<.001 (35 items), which means that the rejection of the hypothesis is taken as an indication that the data are appropriate for analysis. In short, the data (75 items and 35 items) were adequate for factor analysis.

Two methods to determine the number of factors in this study were parallel analysis [43], [44] and minimum rank factor analysis (MRFA) [45], [46]. The parallel analysis is an objective criterion in determining how many factors to retain [47] combined with the suggestion from Lim and Jahng [48] of the number of factors within ±1 range of the estimate to consider the interpretational validity of the competing model. MRFA was reported to be a good choice for identification of the number of the common factor [49] that yields optimal communalities [50]. The number of factors, then would be determined based on both results with ±1 range of each estimate according to the suggestion from Watkins [51]. Parsimony and theoretical convergence were also considered.

Common factor analysis, principal axis factoring (PAF) was selected as the method to estimate the common factor of the study because it has no distributional assumption [52] that accommodates the non-normal data distribution of this study. The study used Pearson-based matrix correlation. The oblimin rotation which is known as one of the most popular oblique rotation methods [51] was chosen for the study. It allows correlation between the produced factor solutions, hence providing a more accurate and realistic representation of how constructs are likely to be related to one another [53]. A total of 75 items of the

measures (18 items MVS and 57 items AI) and 35 items of the measures (18 items MVS and 17 items external aspirations of AI) were used for analysis.

Criteria for determining factor adequacy were established a priori. Because the method of determining critical value (CV) for loadings by taking sample size into account according to Norman and Streiner [54] (≥.21) showed many complex items (cross-loadings) that contrast the simplicity, hence irrespective to sample size, this study used cutoff .3 for interpretative purposes. The description measures of fit to be reported consisted of Chi-square ($\chi 2$), root mean square error of approximation (RMSEA), and Tucker–Lewis's index (TLI) as provided by the default from the software. The reliability of each factor was then calculated with Cronbach's α.

3. RESULTS AND DISCUSSION

3.1. Exploratory factor analysis from 75 items combined material value scale and aspiration index

Figure 1 shows the result of parallel analysis and MRFA for 75 items. Actual eigenvalues superimposed over eigenvalues simulated by parallel analysis are shown in Figure 1(a). Further, the actual eigenvalues for the first 9 factors are greater than the corresponding simulated eigenvalues, indicating that up to a nine-factor model could be valid. Figure 1(b) shows the real-data percentage of explained common variance superimposed over the mean of random percentage and 95 percentiles of random of explained common variance by MRFA. Further, the real data for the first 5 factors were greater than the corresponding mean of random and 95 percentiles percentage of explained common variance, indicating that up to a 5-factor model was recommended.

Evidence from parallel analysis and MRFA indicated that 75 items of self-report materialism measurement could be summarized by 5 up to 9 factors. Hence for this study, the number of factors to be explored was 4 to 10. The summary of the EFA model and each factor is found in Table 1.

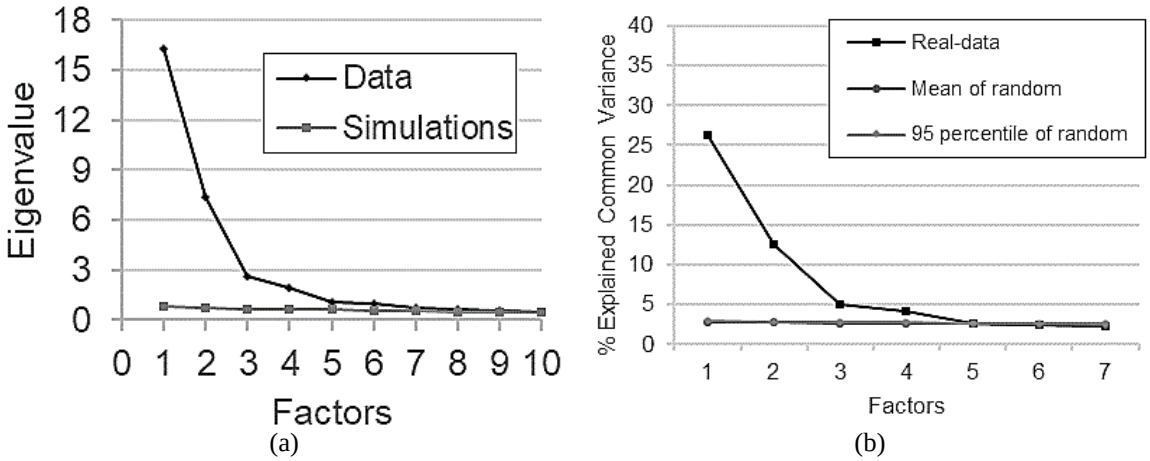


Figure 1. Number of factor determination for 75 items: (a) parallel analysis and (b) MRFA

Although we do not get a satisfactory fit model, the result will still be explored anyway since the purpose of the study was not to get the fit model. Models based on 75 items from 7-10 number of factors had RMSEA<.05 and TLI>.8, while the 4-6 number of factors model had RMSEA>.05 and TLI<.8. The consensus is that a larger RMSEA and smaller TLI values indicate a worse fit [55]. Hence, we focus on the model of 7-10 number of factors in detail. EFA of 75 items produced salient items, complex items (cross-loading), and loadings below the cutoff (.3). Among those 7-10 factor model, the 9-factor model (57 out of 75 items have salient loading, explained 46.5% of the variance, all item had item-rest correlation >.3, each factor had salient item ≥3) met the reliability requirement, hence was chosen for examination. The other factor models aside from what is presented in the study are not presented in full detail, more information is available from the first author upon request.

Table 2 (see Appendix) shows the factor loading for the 75 items in the 9-factor model after oblimin rotation. Table 3 summarizes the sum of squared loadings (SS loadings), percentage of variance, and reliability for the 75 items in the 9-factor model. The explanation is given in Tables 2 and 3.

Table 1. EFA model summary (75 items)

Model based on number of factor	Fit index value	Name of factor	Additional information
4	RMSEA=.0562 [90% CI:.0548 - .0578]; TLI=.756; χ^2(7,272)=2,481, p< .001	F1: Dominated by internal aspiration F2: Dominated by external aspiration F3: MVS and financial success F4: Dominated by spirituality	Salient loadings=62 items; Explained variance=39%; 3 factors (F2, F3, F4) had total 4 items with item-rest correlation <.3
5	RMSEA=.0532 [90% CI:.0517 - .0548]; TLI=.782; χ^2(6,567)=2,410, p< .001	F1: Dominated by internal aspiration F2: Dominated by external aspiration F3: MVS and financial success F4: Dominated by spirituality F5: Self-acceptance and physical health	Salient loadings=59 items; Explained variance=40.8%; 1 factor (F3) had 2 items with item-rest correlation <.3
6	RMSEA=.0510 [90% CI:.0495 - .0526]; TLI=.799; χ^2(6,055)=2,340, p< .001	F1: Dominated by external aspiration F2: MVS and financial success F3: Dominated by internal aspiration F4: Dominated by spirituality F5: Dominated by affiliation F6: Physical health and hedonism	Salient loadings=61 items; Explained variance=42.4%; 1 factor (F6) had 1 salient item (<3 items)
7	RMSEA=.0467 [90% CI:.0451 - .0484]; TLI=.831; χ^2(5,298)=2,271, p< .001	F1: Dominated by external aspiration F2: MVS and financial success F3: Spirituality F4: Dominated by affiliation F5: Physical health and self-acceptance F6: Self-acceptance and hedonism F7: Dominated by community feeling	Salient loadings=58 items; Explained variance=44.1%; 2 factors (F2 and F7) had each 2 items with item-rest correlation <.3
8	RMSEA=.0446 [90% CI:.0430 - .0463]; TLI=.846; χ^2(4,877)=2,203, p< .001	F1: Dominated by external aspiration F2: Spirituality F3: Dominated by financial success F4: Dominated by affiliation F5: Dominated by self-acceptance F6: Physical health and self-acceptance F7: MVS F8: Dominated by community feeling	Salient loadings=59 items; Explained variance=45.3%; 1 factor (F8) had 2 items with item-rest correlation <.3
9	RMSEA=.0428 [90% CI:.0411 - .0446]; TLI=.858; χ^2(4,528)=2,136, p< .001	F1: Dominated by external aspiration F2: Spirituality F3: Dominated by financial success F4: MVS F5: Dominated by affiliation F6: Dominated by physical health F7: Self-acceptance and safety F8: Dominated by community feeling F9: Hedonism	Salient loadings=57 items; Explained variance=46.5%; all items had item-rest correlation >.3
10	RMSEA=.0415 [90% CI:.0398 - .0434]; TLI=.866; χ^2(4,249)=2,070, p< .001	F1: Dominated by external aspiration F2: Spirituality F3: Dominated by financial success F4: MVS F5: Dominated by physical health F6: Dominated by affiliation F7: Dominated by community feeling F8: Dominated by safety F9: Hedonism F10: Safety	Salient loadings=57 items; Explained variance=47.6%; 1 factor (F10) had 2 salient items (<3 items)

Note: salient loadings are the item with loading ≥.3 that load only on 1 factor; the item-rest correlation is calculated from reliability for each factor.

Table 3. Summary of SS loadings, percentage of variance and reliability (75 items) for 9-factor model

Factor	SS loadings	% of variance	Cumulative (%)	Reliability (Cronbach's α)
1	5.17	6.90	6.90	.90
2	4.59	6.11	13.01	.93
3	4.40	5.87	18.89	.86
4	3.73	4.97	23.86	.83
5	4.10	5.47	29.33	.84
6	3.69	4.92	34.25	.82
7	3.34	4.45	38.70	.83
8	3.51	4.68	43.38	.79
9	2.35	3.14	46.52	.77

According to Table 2, 10 items had loadings below the cutoff (.3) (AI 29, 33, 38, 43, 47, 48, 49, MVS 3, 13, 15), and 8 complex items (AI 1, 19, 21, 36, 57, MVS 9, 12, 17). The items of AI spread to eight factors, while the items of MVS spread to three factors. Combined with the information in Table 3, the first

factor explained 6.9% of the variance, had Cronbach's α .90 and consisted of 12 items of AI (external aspiration) and 1 item of MVS (success), hence named as external aspiration. The second factor explained 6.11% of the variance, had Cronbach's α .93, and consisted of 5 items AI (spirituality), hence named spirituality. The third factor explained 5.87% of the variance, had Cronbach's α .86, and consisted of 6 items of AI (4 items financial status, 1 item hedonism, 1 item safety), and 3 items of MVS (2 items happiness, 1 item success), hence named financial success. The fourth factor explained 4.97% of the variance, had Cronbach's α .83, and consisted of 14 items of MVS (6 items centrality, 2 items happiness, 6 item success), hence named MVS. The fifth factor explained 5.47% of the variance, had Cronbach's α .84, and consisted of 8 items of AI (6 items affiliation, 1 item hedonism, 1 item popularity), hence named affiliation. The sixth factor explained 4.92% of the variance, had Cronbach's α .82, and consisted of 4 items of AI (3 items physical health, 1 item self-acceptance), hence named physical health. The seventh factor explained 4.45% of the variance, had Cronbach's α .83, and consisted of 7 items of AI (4 items self-acceptance, 3 items safety), hence named self-acceptance & safety. The eighth factor explained 4.68% of the variance, had Cronbach's α .79, and consisted of 8 items of AI (4 items community feeling, 2 items spirituality, 1 item affiliation, 1 item conformity), hence named community feeling. The ninth factor explained 3.14% of the variance, had Cronbach's α .77, and consisted of 5 items of AI (hedonism), hence named hedonism.

Table 4 shows the inter-factor correlation matrix of the 9-factor model. Although most factors were positively intercorrelated, there were exceptions. The spirituality factor correlated negatively with the MVS factor (r=-.14) and hedonism factor (r=-.02). The MVS factor correlated negatively with the physical health factor (r=-.05) and community feeling factor (r=-.14).

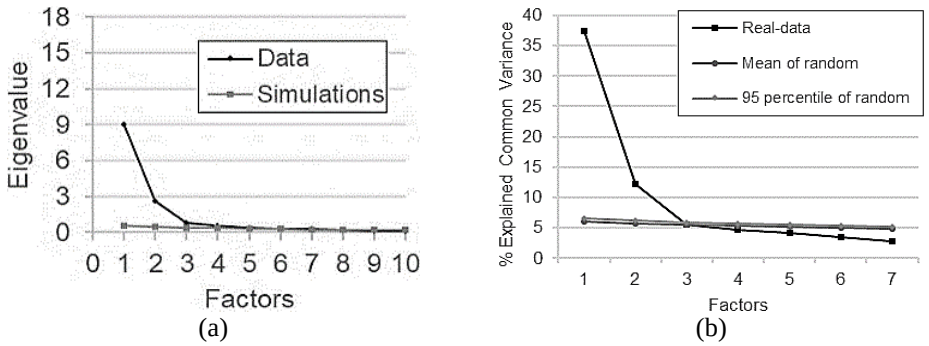
3.2. Exploratory factor analysis results from 35 items combined material value scale and aspiration index external aspiration

Figure 2 shows the result of parallel analysis and MRFA for 35 items. Actual eigenvalues superimposed over eigenvalues simulated by parallel analysis for 35 items are shown in Figure 2(a). Further, the actual eigenvalues for the first 5 factors are greater than the corresponding simulated eigenvalues, indicating that up to a five-factor model could be valid. Figure 2(b) shows the real-data percentage of explained common variance superimposed over the mean of random percentage and 95 percentiles of random of explained common variance by MRFA. Further, the real data for the first 2 factors were greater than the corresponding mean of random and 95 percentiles percentage of explained common variance, indicating that up to a 2-factor model was recommended.

Evidence from parallel analysis and MRFA indicated that 35 items of self-report materialism measurement could be summarized by 2 up to 5 factors. Hence for this study, the number of factors to be explored was 1 to 6. The summary of the EFA model and each factor is found in Table 5.

Table 4. Inter-factor correlations, 9-factor model of 75 items

	1	2	3	4	5	6	7	8	9
1. External aspiration	—	.17	.44	.29	.30	.04	.16	.18	.33
2. Spirituality		—	.11	-.14	.34	.38	.09	.38	-.02
3. Financial success			—	.43	.31	.22	.28	.17	.31
4. MVS				—	.08	-.05	.03	-.14	.19
5. Affiliation					—	.38	.33	.41	.19
6. Physical health						—	.30	.36	.11
7. Self-acceptance and safety							—	.30	.20
8. Community feeling								—	.05
9. Hedonism									—



(a) (b)

Figure 2. Number of factor determination for 35 items: (a) parallel analysis and (b) MRFA

Table 5. EFA model summary (35 items)

Model based on number of factor	Fit index value	Name of factor	Additional information
1	RMSEA=.0875 [90% CI:.0847 – .0906]; TLI=.642; Ϫ2(3,178)=560, p< .001	F1: external aspiration and MVS	Salient loadings=27 item; Explained variance=25.9%; Two items had item-rest correlation <.3
2	RMSEA=.0640 [90% CI:.0609 – .0672]; TLI=.808; Ϫ2(1,840)=526, p< .001	F1: all external aspiration F2: MVS and financial success	Salient loadings=30 item; Explained variance=33.8%; 1 factor (F2) had 2 items with item-rest correlation <.3
3	RMSEA=.0542 [90% CI:.0509 – .0577]; TLI=.862; Ϫ2(1,378)=493, p< .001	F1: dominated by external aspiration F2: MVS F3: dominated by financial success	Salient loadings=30 item; Explained variance=36.8%; All item had item-rest correlation >.3
4	RMSEA=.0512 [90% CI:.0477 – .0548]; TLI=.877; Ϫ2(1,199)=461, p< .001	F1: dominated by external aspiration F2: dominated by financial success F3: dominated by success F4: dominated by centrality	Salient loadings=29 item; Explained variance=38.9%; 1 factor (F3) had 1 item with item-rest correlation <.3
5	RMSEA=.0487 [90% CI:.0451 – .0526]; TLI=.888; Ϫ2(1,054)=430, p< .001	F1: dominated by external aspiration F2: dominated by financial success F3: dominated by centrality F4: happiness and success F5: contentment	Salient loadings=30 item; Explained variance=40.9%; 1 factor (F5) had 3 items with item-rest correlation <.3
6	RMSEA=.0463 [90% CI:.0425 – .0503]; TLI=.899; Ϫ2(924)=400, p< .001	F1: dominated by external aspiration F2: dominated by financial success F3: dominated by centrality F4: happiness and success F5: MVS F6: conformity	Salient loadings=29 item; Explained variance=42.4%; 1 factor (F6) had no salient item

Note: salient loadings are the item that load only on 1 factor; the item-rest correlation is calculated from reliability for each factor.

The 1 and 2-factor models had the RMSEA>.06 (Table 5). The 1-factor model had TLI<.8, while the models based on 35 items from 2-6 number of factors had TLI>.8. The 6-factor model produced a factor with less than 3 items with salient loading (indication of over-factoring). EFA of 35 items produced salient items, complex items (cross-loading), and loadings below the cutoff (.3). Among those 6-factor models, the 3-factor model (30 out of 35 items have salient loading, explained 36.8% of the variance, all items had item-rest correlation >.3, each factor had salient item ≥3) met the reliability requirement, hence was chosen for examination. The other factor models aside from what is presented in the study are not presented in full detail, more information is available from the first author upon request.

Table 6 shows the factor loading for the 35 items in the 3-factor model after oblimin rotation. Table 7 summarizes the sum of squared loadings (SS loadings), percentage of variance, and reliability for the 35 items in the 3-factor model. The explanation is given in Tables 6 and 7.

Table 6. Oblimin-rotated pattern matrix for 3-factor model (35 items)

Item	F1	F2	F3	h^2	Item	F1	F2	F3	h^2
Ai 11 (conformity)	**.47**	-.29	.06	.26	MVS 1 (centrality)	-.02	**.47**	-.08	.19
Ai 12 (conformity)	**.61**	-.07	.00	.36	MVS 2 (centrality)	-.04	**.44**	.11	.23
Ai 13 (conformity)	**.59**	.00	-.05	.32	MVS 3 (centrality)	.12	.09	.02	.03
Ai 14 (conformity)	**.53**	-.25	.10	.33	MVS 4 (centrality)	-.08	**.48**	.09	.25
AI 15 (financial success)	.27	.02	**.57**	.60	MVS 5 (centrality)	.18	**.45**	.05	.31
AI 16 (financial success)	.09	.03	**.72**	.62	MVS 6 (centrality)	.07	**.47**	.21	.39
AI 17 (financial success)	.03	.06	**.81**	.73	MVS 7 (centrality)	-.17	**.47**	.22	.30
AI 18 (financial success)	.01	-.03	**.76**	.57	MVS 8 (success)	.22	**.40**	.06	.29
AI 24 (image)	**.68**	.10	.06	.57	MVS 9 (success)	.01	**.44**	**.32**	.42
AI 25 (image)	**.59**	.09	.15	.53	MVS 10 (success)	-.04	**.49**	.05	.26
AI 26 (image)	**.51**	.27	-.01	.40	MVS 11 (success)	.21	**.39**	.07	.29
AI 27 (image)	**.63**	.12	-.03	.43	MVS 12 (success)	**.37**	**.43**	-.09	.33
AI 28 (image)	**.68**	.00	-.02	.44	MVS 13 (success)	.13	**.44**	-.17	.18
AI 34 (popularity)	**.82**	.10	-.03	.69	MVS 14 (happiness)	.10	.14	-.19	.03
AI 35 (popularity)	**.71**	-.12	.07	.53	MVS 15 (happiness)	.12	**.30**	.20	.24
AI 36 (popularity)	**.53**	-.06	.17	.40	MVS 16 (happiness)	-.15	.14	**.37**	.15
AI 37 (popularity)	**.65**	-.08	.18	.57	MVS 17 (happiness)	-.01	**.42**	**.37**	.44
					MVS 18 (happiness)	.08	**.41**	.06	.22

Note: 'Principal axis factoring' extraction method was used in combination with an 'oblimin' rotation. h^2=communality. Salient pattern coefficients ≥.3 in boldface.

Table 7. Summary of SS loading, percentage of variance and reliability (35 items) for 3-factor model

Factor	SS loadings	% of variance	Cumulative (%)	Reliability (Cronbach's α)
1	5.92	16.92	16.9	.90
2	3.56	10.17	27.1	.84
3	3.39	9.69	36.8	.84

According to Table 6, 2 items had loadings below .3 (MVS 3, 14), and 3 complex items (MVS 9, 12, 17). The items of AI spread to two factors, while the items of MVS spread to three factors. The first factor explained 16.92% of the variance, had Cronbach's α .9, and consisted of 13 items of AI (4 items conformity, 5 items image, 4 items popularity) and 1 item of MVS (success), hence named as external aspiration. The second factor explained 10.17% of the variance, had Cronbach's α .84, and consisted of 15 items of MVS (6 items centrality, 3 items happiness, 6 items success), hence named as MVS. The third factor explained 9.69% of the variance, had Cronbach's α .84, and consisted of 4 items of AI (financial success) and 3 items MVS (2 items happiness, 1 item success), hence named as financial success.

Table 8 shows the inter-factor correlation matrix of the 3-factor model. Further, all factors were positively intercorrelated. The highest correlation was found between external aspiration and financial success (r=.6). The correlation between MVS and financial success was .41 and the correlation between external aspiration and MVS was .24.

Table 8. Inter-factor correlations, 3-factor model of 35 items

	1	2	3
1. External aspiration	—	.24	.60
2. MVS		—	.41
3. Financial success			—

3.3. Discussion

The use of both measurements in materialism study was vast. However, in the study, there were found intersections that could not be ignored as they could affect further research and suggestions. Whether materialism as value and as aspiration was similar or not led to questions of the measurement construct of materialism. To answer the question, we assessed both measurements through EFA.

The primary purpose of EFA is to arrive at a more parsimonious conceptual understanding of a set of measured variables by determining the number and nature of common factors needed to account for the pattern of correlations among the measured variables [53]. In this study, materialism value in MVS and materialism aspiration in AI were expected to load on the same factors if they measured the same or similar construct of materialism. The result showed there are items from both measurements that loaded on the same factor, but in both the EFA results of 75 items and 35 items, dissimilarity was more dominant than their similarity.

The EFA pattern result of MVS was similar in both 75 items and 35 items. In EFA 75 items, out of 15 items MVS that had loadings ≥.3, 11 salient loadings items were grouped to F4 MVS, 1 salient loading item spread into F3 financial success (happiness of MVS 16; Indonesian "*Saya tidak akan lebih bahagia sekalipun memiliki barang-barang yang lebih bagus.**"; English "I wouldn't be any happier if I owned nicer things.* "), 3 complex (cross-loaded) items all loaded in F4 MVS where two of them also loaded in F3 financial success (MVS 9; Indonesian "*Harta dan kekayaan adalah salah satu ukuran keberhasilan yang penting dalam hidup ini.*"; English "Some of the most important achievements in life include acquiring material possessions." happiness of MVS 17; Indonesian "*Hidup ini akan lebih bahagia seandainya saya mampu membeli apa pun yang saya inginkan.*"; English "I'd be happier if I could afford to buy more things.") and 1 item loaded in F1 external aspiration (MVS 12; Indonesian "*Saya suka memiliki sesuatu yang membuat orang lain terpesona.*"; English "I like to own things that impress people."). In EFA 35 items, out of 16 items MVS that had loadings ≥.3, 12 salient loadings item was grouped to F2 MVS, 1 salient loadings item spread into F3 financial success (MVS 16), 3 complex items all loaded in F2 MVS where two of them also loaded in F3 financial success (MVS 9 and MVS 17), and 1 item loaded in F1 external aspiration (MVS 12). From the perspective of the factor for EFA 75 items, four items of MVS suspected to have a latent variable for different construct aside value materialism where MVS 16, MVS 9, and MVS 7 might contain a latent variable for financial success, and MVS 12 might contain a latent variable for external aspiration.

As for AI, it claimed to measure 11 different goal domains, hence underlying our decision to proceed with EFA twice (with all items, and with external aspiration items only). We focused more on the external aspiration item for both EFAs. In EFA 75 items, all 17 items of external aspiration had loadings ≥.3, 11 salient loadings item was grouped to F1 external aspiration, 4 salient loadings item was grouped to F3

financial success, 1 salient loadings item spread to F8 community feeling (AI 11; Indonesian "*Menjadi orang yang sopan dan patuh.*"; English "I will be polite and obedient."), 1 complex item loaded in F1 external aspiration and also in F5 affiliation (AI 36; Indonesian "*Disukai oleh orang-orang yang mengenal saya.*"; English "Most everyone who knows me will like me."). In EFA 35 items, all 17 items had loadings ≥.3 and salient, 13 of them loaded in F1 external aspiration, and 4 of them loaded in F3 financial success. The results pattern was slightly different in AI where two items (AI 11 and AI 36) that were loaded in different factors in EFA 75 items were loaded in the same factor with other external aspirations in EFA 35. However, the overall result pattern was still similar in AI. From the perspective of the factor for EFA 75 items, two items were suspected to have a latent variable for different constructs aside from materialism where AI 11 might contain a latent variable for construct community feeling, and AI 36 might contain a latent variable for construct affiliation. Both of the constructs were labelled as an internal aspiration in AI, hence in EFA 35 items, both items loaded saliently in F1 external aspiration.

Financial success alone was reported as the representation of the measurement of the importance of having money and possession for its absoluteness, and also for its relativeness along with other aspiration domains in AI [28]. According to the EFA 35-items, out of 15 items of MVS, only 3 items loaded in the same factor of financial status (F3). Hence there was still not enough evidence of construct similarity between both materialism measurements. Further, if Financial Success was used alone, it did not represent the materialism concept it had (external aspiration), and as for its relativeness along other aspiration domains in AI, the dissimilarity was shown more than its similarity both in the result of EFA 75 items and EFA 35 items.

Overall, the result was far from showing that materialism as value was similar construct to materialism as aspiration. It was indeed some items intersected, but the proportion was smaller than the part of each independent measurement construct. To make it simple, if we refer to the result of EFA 35 items, out of 33 salient items from both measurements, there were 8 items (5 salient items, and 3 complex items) that intersected. Further, the independent external aspiration of AI consisted of 13 salient items (F1), and MVS consisted of 15 items (12 salient items and 3 complex items) (F2). Because there was no reference as guidance to infer the result we tried to make, we proposed that the construct of materialism between value (MVS) and aspiration was different. Lastly as the material of contemplation, there were quotations from each expert:

> "*Based on qualitative research and a literature review, Richins and Dawson define materialism as the importance ascribed to the ownership and acquisition of material goods in achieving major life goals or desired states, and they conceptualize material values as encompassing three domains: the use of possessions to judge the success of others and oneself, the centrality of possessions in a person's life, and the belief that possessions and their acquisition lead to happiness and life satisfaction.*" [16].
> "*Materialism comprises a set of values and goals focused on wealth, possessions, image, and status. These aims are a fundamental aspect of the human value/goal system, standing in relative conflict with aims concerning the well-being of others, as well as one's own personal and spiritual growth.*" [24].

On the level of concept, the aforementioned quote showed that in materialism, value and goal were both mentioned. The first quote conceptualizes goal as something to be achieved by the materialistic value one had, and the second conceptualizes goal and value comprised materialism. But as we drew together both concepts, the need for aspiration-value relation explanations was still needed and reflected at the practical level (the use of measurement).

3.4. Limitations and future directions

There are four important limitations to be noted. First, on the use of instruments, this study did not have documented translation, adaptation, and psychometric characteristic properties of the instrument as references. Second, in the procedure, the convenient sampling method to recruit participants resulted in the proportion of gender and age were not balanced, this study did not accommodate the evidence for the absence of social desirability in the responses, and the participants might have undergone fatigue and lost in focus when giving respond to a large number of items. Third, on the data analysis, the cutoff for salient loadings for the item according to Norman and Streiner [54] produced many complex items, hence was not used and this might skip information that could explain the result in more detail. Fourth, the number of responses to each measurement was different (5-point and 10-point), considering there is a discussion regarding the same number of responses requirement for factor analysis. Last, all the produced models did not meet the standard level of TLI (>.95 indicated a good fit). However, this was not a large concern since we did not propose a model for fit across all indices. These issues can be addressed in subsequent studies, which included the

documentation of the adaptation of the measurement, psychometric properties of the measurement, recruited more balanced sample's characteristic proportion, the development method for research to minimize participant's fatigue in responded a large number of items, and consideration of more suited approach to answer the research question.

4. CONCLUSION

The current investigation tried to provide evidence on the materialism construct between two widely used materialism constructs (MVS and AI) that had notable intersections and might underlie inconsistency of findings. The EFA revealed factors, generally showed that the proportion of dissimilarity between materialism as value that was measured by MVS, and materialism as aspiration that was measured by AI was larger than their similarity. The small part of each measurement also showed an intersection in the model, but considering the concept of each had, materialism as value and materialism as aspiration were proposed as different measurement constructs. The result hopefully could provide new insight into the use of materialism measurement in the study and for researchers to elaborate the evidence of materialism construct.

APPENDIX

Table 2. Oblimin-rotated pattern matrix for 9-factor model (75 items)

Item	F1	F2	F3	F4	F5	F6	F7	F8	F9	h^2
AI 1 (affiliation)	.19	-.06	-.01	.02	**.53**	.10	-.12	**.31**	-.09	.57
AI 2 (affiliation)	.08	.03	-.04	.06	**.52**	-.03	.22	-.04	.02	.40
AI 3 (affiliation)	.03	.05	.04	.00	**.66**	.06	.12	-.06	-.03	.55
AI 4 (affiliation)	-.11	.02	-.02	-.02	**.55**	.07	-.05	.28	.17	.56
AI 5 (affiliation)	.02	.05	.06	-.04	**.61**	.06	.11	.07	.06	.60
AI 6 (affiliation)	.12	.17	.03	.06	**.59**	.02	-.03	-.16	.03	.47
AI 7 (community feeling)	-.01	.00	.01	-.15	.10	.21	.08	**.31**	-.13	.31
AI 8 (community feeling)	.01	.05	-.02	-.01	.10	.06	.07	**.63**	-.01	.56
AI 9 (community feeling)	.22	.02	-.08	.05	-.02	-.02	.23	**.47**	.04	.40
AI 10 (community feeling)	.01	.08	.06	-.03	-.02	.10	.16	**.59**	-.04	.56
AI 11 (conformity)	.23	.22	.03	-.05	.10	.03	-.07	**.37**	-.05	.41
AI 12 (conformity)	**.43**	.05	.09	-.03	.04	-.05	-.18	.23	.18	.40
AI 13 (conformity)	**.44**	.12	.10	.03	-.06	-.04	-.20	.23	.10	.38
AI 14 (conformity)	**.31**	.17	-.06	.01	.19	.05	.21	.22	-.03	.48
AI 15 (financial success)	.18	.07	**.53**	.06	.08	.00	-.06	.05	.15	.59
AI 16 (financial success)	.09	.09	**.70**	.03	-.09	-.08	.06	.03	.12	.65
AI 17 (financial success)	.03	.01	**.69**	.11	.07	.02	.05	-.01	.09	.70
AI 18 (financial success)	.07	.01	**.68**	.01	.10	.03	.04	-.01	-.09	.57
AI 19 (hedonisme)	-.17	-.01	.11	.02	**.36**	.22	-.13	-.02	**.39**	.41
AI 20 (hedonisme)	.14	-.06	.08	.03	.01	.19	.15	.00	**.58**	.63
AI 21 (hedonisme)	.25	-.05	**.32**	-.02	.10	-.02	.07	.01	**.39**	.62
AI 22 (hedonisme)	.23	-.09	.14	.06	.09	-.04	.19	-.01	**.40**	.51
AI 23 (hedonisme)	-.01	-.07	.14	.06	.04	-.10	.12	-.11	**.43**	.32
AI 24 (image)	**.57**	.00	.04	.09	.04	.05	.06	-.05	.29	.65
AI 25 (image)	**.47**	.06	.11	.13	-.03	.01	.17	.03	.23	.58
AI 26 (image)	**.43**	.02	.06	.23	.17	.04	-.08	-.15	.06	.43
AI 27 (image)	**.44**	.15	-.02	.17	.00	.02	.05	.01	.25	.47
AI 28 (image)	**.60**	-.03	.03	.06	.04	.06	-.01	.13	-.03	.45
AI 29 (physical health)	.29	.03	.15	.00	.10	.02	.16	.04	.19	.39
AI 30 (physical health)	.00	.02	.00	-.01	.03	**.84**	-.02	-.01	-.01	.72
AI 31 (physical health)	-.01	.01	.00	-.02	.03	**.68**	.14	.07	.04	.62
AI 32 (physical health)	.03	.04	-.07	.01	-.04	**.87**	-.05	-.05	.03	.69
AI 33 (physical health)	.02	.13	-.04	.01	.21	.27	.14	.30	.02	.53
AI 34 (popularity)	**.75**	.02	.06	.06	.06	-.03	.09	-.07	.08	.75
AI 35 (popularity)	**.64**	.06	.11	-.05	.10	.05	-.05	.10	-.06	.56
AI 36 (popularity)	**.33**	.05	.12	.06	**.46**	-.06	-.06	.06	-.02	.53
AI 37 (popularity)	**.60**	-.02	.25	-.08	.14	-.01	.11	.04	-.11	.63
AI 38 (safety)	-.10	.13	.17	.07	.09	.23	.18	.13	-.04	.32
AI 39 (safety)	-.02	-.03	**.32**	.02	.03	.29	.28	.06	-.19	.42
AI 40 (safety)	-.03	.13	.13	.06	.18	.16	**.37**	.23	-.06	.59
AI 41 (safety)	.07	.02	.06	.03	.15	.04	**.43**	.12	.16	.47
AI 42 (safety)	.01	.24	.18	.01	.15	.10	**.32**	.06	-.10	.45
AI 43 (self-acceptance)	.05	.12	.06	-.02	.04	.12	.30	.25	-.06	.36
AI 44 (self-acceptance)	.05	-.07	.11	.04	-.02	.12	**.54**	.05	.09	.45
AI 45 (self-acceptance)	.03	-.11	.08	-.02	-.01	.02	**.54**	.04	.15	.42
AI 46 (self-acceptance)	.00	.11	.10	-.05	.17	.12	**.46**	.20	-.06	.60

Table 2. Oblimin-rotated pattern matrix for 9-factor model (75 items) (*continued*)

Item	F1	F2	F3	F4	F5	F6	F7	F8	F9	h2
AI 47 (self-acceptance)	-.12	.05	.14	-.04	.21	.21	.14	.17	.16	.40
AI 48 (self-acceptance)	-.18	.22	.11	.02	.09	.28	.11	.26	.08	.48
AI 49 (self-acceptance)	-.13	.12	.05	-.13	.07	.28	.11	.13	.12	.31
AI 50 (self-acceptance)	-.16	.03	.15	-.05	.10	**.33**	.17	.14	-.06	.35
AI 51 (self-acceptance)	.10	-.04	-.08	.03	.09	.02	**.50**	.09	.20	.43
AI 52 (spirituality)	-.03	.18	.01	-.15	-.06	-.07	-.07	**.35**	.28	.25
AI 53 (spirituality)	-.01	**.84**	.06	.01	.00	.07	-.01	.01	-.03	.78
AI 54 (spirituality)	.01	**.90**	-.03	-.02	-.01	.08	-.02	-.08	.00	.82
AI 55 (spirituality)	-.01	**.94**	.00	.01	.02	-.06	.03	.03	.00	.87
AI 56 (spirituality)	.00	**.93**	.00	.00	-.02	-.03	-.04	.01	.01	.85
AI 57 (spirituality)	-.08	**.38**	.06	-.04	.13	.11	-.01	**.36**	-.01	.54
MVS 1 (centrality)	-.16	-.03	-.10	**.52**	.13	-.22	.12	.04	.02	.29
MVS 2 (centrality)	-.09	-.05	.14	**.43**	.03	.00	.04	-.03	-.05	.25
MVS 3 (centrality)	.02	.10	.09	.15	.07	.00	-.19	.12	-.05	.09
MVS 4 (centrality)	-.11	-.07	.06	**.47**	-.03	-.06	.07	-.01	.08	.27
MVS 5 (centrality)	.08	.06	.00	**.51**	.11	-.03	.11	-.08	-.01	.35
MVS 6 (centrality)	.03	-.11	.20	**.44**	.00	.00	.05	.01	.10	.40
MVS 7 (centrality)	-.15	-.14	.28	**.41**	.01	.01	-.12	.02	-.04	.33
MVS 8 (success)	.21	.01	.12	**.43**	-.07	.07	-.06	.04	-.08	.32
MVS 9 (success)	.05	-.11	**.38**	**.35**	-.09	.10	-.08	-.02	.06	.44
MVS 10 (success)	.00	-.03	.18	**.38**	-.04	.05	-.16	-.11	-.01	.27
MVS 11 (success)	.25	-.06	.16	**.33**	-.13	.10	-.13	.03	.04	.32
MVS 12 (success)	**.31**	.02	-.06	**.45**	-.03	.08	.06	-.09	.00	.35
MVS 13 (success)	.02	.08	-.12	**.48**	-.02	.00	-.12	.04	.05	.21
MVS 14 (happiness)	.06	.03	-.14	.20	.02	-.04	-.13	.13	-.11	.08
MVS 15 (happiness)	.07	-.05	.24	.29	-.01	-.02	-.10	.12	.08	.26
MVS 16 (happiness)	-.08	-.02	**.34**	.11	.03	.12	-.10	-.09	.02	.16
MVS 17 (happiness)	.02	.01	**.40**	**.38**	.00	-.06	.03	-.09	-.02	.45
MVS 18 (happiness)	.04	-.02	.06	**.47**	-.03	.03	-.01	.10	-.06	.25

Note: 'Principal axis factoring' extraction method was used in combination with an 'oblimin' rotation. h^2=communality. Salient pattern coefficients ≥.3 in boldface.

ACKNOWLEDGEMENTS

The authors would like to express gratitude to Aftina Nurul Husna for the contributions to the Indonesian-version instrument. Special thanks to Helly Prajitno Soetjipto and Sri Kusrohmaniah, the lecturers, and students of Universitas Gadjah Mada. Lastly, this work is dedicated to the memory of Helly Prajitno Soetjipto, whose presence is deeply missed.

REFERENCES

[1] M. Bunge, *Matter and mind: a philosophical inquiry*, vol. 287. in Boston Studies in the Philosophy of Science, vol. 287. Dordrecht: Springer Netherlands, 2010, doi: 10.1007/978-90-481-9225-0.

[2] K. Zhou, L. Lu, L. Hu, and Y. Wang, "Associations between two conceptualizations of materialism and subjective wellbeing in China: A meta-analysis of studies from 1998 to 2022," *Frontiers in Psychology*, vol. 13, p. 982172, 2022, doi: 10.3389/fpsyg.2022.982172.

[3] A. Isham, C. Verfuerth, A. Armstrong, P. Elf, B. Gatersleben, and T. Jackson, "The problematic role of materialistic values in the pursuit of sustainable well-being," *International Journal of Environmental Research and Public Health*, vol. 19, no. 6, p. 3673, Jan. 2022, doi: 10.3390/ijerph19063673.

[4] P. Tarka, R. J. Harnish, and J. Babaev, "From materialism to hedonistic shopping values and compulsive buying: a mediation model examining gender differences," *Journal of Consumer Behaviour*, vol. 21, no. 4, pp. 786–805, 2022, doi: 10.1002/cb.2037.

[5] L. J. Shrum *et al.*, "Materialism: the good, the bad, and the ugly," *Journal of Marketing Management*, vol. 30, no. 17–18, pp. 1858–1881, Dec. 2014, doi: 10.1080/0267257X.2014.959985.

[6] P. Vargas and S. Yoon, "On the psychology of materialism: wanting things, having things, and being happy," *Advertising & Society Review*, vol. 7, no. 1, pp. 1–15, Jan. 2006, doi: 10.1353/asr.2006.0022.

[7] N. Wong *et al.*, "Rethinking materialism: a process view and some transformative consumer research implications," *Journal of Research for Consumers*, vol. 19, pp. 1–4, Jan. 2011.

[8] R. W. Belk, "Materialism: trait aspects of living in the material world," *Journal of Consumer Research*, vol. 12, no. 3, pp. 265–80, Dec. 1985, doi: 10.1086/208515.

[9] S. Manchiraju and Z. Krizan, "What is materialism? Testing two dominant perspectives on materialism in the marketing literature," *Management & Marketing*, vol. 10, no. 2, pp. 89–102, Sep. 2015, doi: 10.1515/mmcks-2015-0008.

[10] R. W. Belk, "Worldly possessions: issues and criticisms," in *Advances in Consumer Research*, 1982, pp. 514–520.

[11] R. W. Belk, "Three scales to measure constructs related to materialism: reliability, validity, and relationships to measures of happiness," in *Advances in Consumer Research*, 1984, pp. 155–158.

[12] K. V. Karpinskiy and N. V. K. Volkova, "The questionnaire of dispositional materialism (QDM): conceptual bases and psychometric development," *Psikhologicheskii Zhurnal*, vol. 40, no. 1, pp. 104–117, 2019, doi: 10.31857/S020595920002256-7.

[13] J. A. Roberts and A. Clement, "Materialism and satisfaction with over-all quality of life and eight life domains," *Social Indicators Research*, vol. 82, no. 1, pp. 79–92, May 2007, doi: 10.1007/s11205-006-9015-0.

[14] M. L. Richins and S. Dawson, "A consumer values orientation for materialism and its measurement: scale development and validation," *Journal of Consumer Research*, vol. 19, no. 3, pp. 303–316, Dec. 1992, doi: 10.1086/209304.
[15] R. Hidayat and A. N. Husna, "Adaptation of the content of the combined materialism scale (personality, values, aspirations) (in Indonesian: Adaptasi isi skala materialisme gabungan (kepribadian, nilai, aspirasi) [Unpublished])," Fakultas Psikologi, Universitas Gadjah Mada, 2019.
[16] M. L. Richins, "The material values scale: measurement properties and development of a short form," *Journal of Consumer Research*, vol. 31, no. 1, pp. 209–219, 2004, doi: 10.1086/383436.
[17] A. Trzcińska, K. Kubicka, and W. Podsiadłowski, "The construction and preliminary validation of a new Pictorial materialism test for 4–6-year-old children," *PLOS ONE*, vol. 18, no. 8, p. e0290512, Aug. 2023, doi: 10.1371/journal.pone.0290512.
[18] S. J. Opree, M. Buijzen, E. A. van Reijmersdal, and P. M. Valkenburg, "Development and validation of the material values scale for children (MVS-c)," *Personality and Individual Differences*, vol. 51, no. 8, pp. 963–968, Dec. 2011, doi: 10.1016/j.paid.2011.07.029.
[19] H. van der Meulen, R. Kühne, and S. J. Opree, "Validating the material values scale for children (MVS-c) for use in early childhood," *Child Indicators Research*, vol. 11, no. 4, pp. 1201–1216, Aug. 2018, doi: 10.1007/s12187-017-9456-9.
[20] E. Gurel-Atay, M. J. Sirgy, D. Webb, A. Ekici, D.-J. Lee, and L. R. Kahle, "What motivates people to be materialistic? Developing a measure of materialism motives," *Journal of Consumer Behaviour*, vol. 20, no. 3, pp. 590–606, 2021, doi: 10.1002/cb.1887.
[21] M. E. Goldberg, G. J. Gorn, L. A. Peracchio, and G. Bamossy, "Understanding materialism among youth," *Journal of Consumer Psychology*, vol. 13, no. 3, pp. 278–288, Jan. 2003, doi: 10.1207/S15327663JCP1303_09.
[22] A. M. Zawadzka *et al.*, "Can the youth materialism scale be used across different countries and cultures?" *International Journal of Market Research*, vol. 63, no. 3, pp. 317–334, 2021, doi: 10.1177/1470785320956794.
[23] T. Kasser and R. M. Ryan, "A dark side of the American dream: correlates of financial success as a central life aspiration," *Journal of Personality and Social Psychology*, vol. 65, no. 2, pp. 410–422, 1993, doi: 10.1037/0022-3514.65.2.410.
[24] T. Kasser, "Materialistic values and goals," *Annual Review of Psychology*, vol. 67, no. 1, pp. 489–514, 2016, doi: 10.1146/annurev-psych-122414-033344.
[25] F. Grouzet *et al.*, "The structure of goal contents across 15 cultures," *Journal of Personality and Social Psychology*, vol. 89, no. 5, pp. 800–816, Dec. 2005, doi: 10.1037/0022-3514.89.5.800.
[26] J. A. Muñiz-Velázquez, D. Gomez-Baya, and M. Lopez-Casquete, "Implicit and explicit assessment of materialism: Associations with happiness and depression," *Personality and Individual Differences*, vol. 116, pp. 123–132, Oct. 2017, doi: 10.1016/j.paid.2017.04.033.
[27] T. Kasser, "Materialistic value orientation," in *Handbook of Spirituality and Business*, L. Bouckaert and L. Zsolnai, Eds., London: Palgrave Macmillan UK, 2011, pp. 204–211, doi: 10.1057/9780230321458_25.
[28] H. Dittmar and A. Isham, "Materialistic value orientation and wellbeing," *Current Opinion in Psychology*, vol. 46, p. 101337, Aug. 2022, doi: 10.1016/j.copsyc.2022.101337.
[29] R. Hidayat, "Goal constructs in consumer behaviour," *Buletin Psikologi*, vol. 17, no. 2, pp. 66–89, 2009.
[30] R. Lekavičienė, D. Antinienė, S. Nikou, A. Rūtelionė, B. Šeinauskienė, and E. Vaičiukynaitė, "Reducing consumer materialism and compulsive buying through emotional intelligence training amongst Lithuanian students," *Frontiers in Psychology*, vol. 13, p. 932395, 2022.
[31] V. Reyes *et al.*, "Dispositional gratitude as an underlying psychological process between materialism and the satisfaction and frustration of basic psychological needs: a longitudinal mediational analysis," *Journal of Happiness Studies*, vol. 23, no. 2, pp. 561–586, Feb. 2022, doi: 10.1007/s10902-021-00414-0.
[32] J. S. Ahn, M. Busque-Carrier, S. Cho, and G. Rivard, "Value change across adolescent years: how do adolescents' intrinsic and extrinsic values develop?" *Journal of Research in Personality*, vol. 99, p. 104263, 2022, doi: 10.1016/j.jrp.2022.104263.
[33] L. Ku, A. B. I. Bernardo, and C. M. Zaroff, "Are higher-order life values antecedents of students' learning engagement and adaptive learning outcomes? The case of materialistic vs. intrinsic life values," *Current Psychology*, vol. 41, no. 6, pp. 3461–3471, 2022, doi: 10.1007/s12144-020-00851-9.
[34] R. Rai, C. Chauhan, and M.-I. Cheng, "Materialistic values, brand knowledge and the mass media: hours spent on the internet predicts materialistic values and brand knowledge," *Current Psychology*, vol. 39, no. 6, pp. 2140–2148, Dec. 2020, doi: 10.1007/s12144-018-9900-0.
[35] J. Tessier, M. Joussemet, V. Kurdi, and G. A. Mageau, "Adolescents 'walking the talk': how value importance and enactment relate to well-being and risk-taking," *Motivation and Emotion*, vol. 45, no. 3, pp. 249–264, 2021, doi: 10.1007/s11031-021-09870-w.
[36] E. L. Bradshaw, J. H. Conigrave, B. A. Steward, K. A. Ferber, P. D. Parker, and R. M. Ryan, "A meta-analysis of the dark side of the american dream: evidence for the universal wellness costs of prioritizing extrinsic over intrinsic goals," *Journal of Personality and Social Psychology*, vol. 124, no. 4, pp. 873–899, 2022, doi: 10.1037/pspp0000431.
[37] M. E. Górnik-Durose and A. Pyszkowska, "Personality matters–explaining the link between materialism and well-being in young adults," *Personality and Individual Differences*, vol. 163, p. 110075, Sep. 2020, doi: 10.1016/j.paid.2020.110075.
[38] L. R. Aritonang, "Testing Richins and Dawson' material values scale for Indonesians," in *The International Conference on Entrepreneurship, Business, and Social Science*, 2015, pp. 1–15.
[39] The Jamovi Project, "Jamovi-open statistical software for the desktop and cloud." [Online]. Available: https://www.jamovi.org/ (Accessed: Jun. 09, 2023).
[40] Posit team, "RStudio: integrated development environment for R." Posit Software, PBC, Boston, MA, 2023. [Online]. Available: http://www.posit.co/ (Accessed: Jun. 09, 2023).
[41] R Core Team, "R: a language and environment for statistical computing." R Foundation for Statistical Computing, Vienna, Austria, 2023. [Online]. Available: https://www.R-project.org/ (Accessed: Jun. 09, 2023).
[42] K. Backhaus, B. Erichson, S. Gensler, R. Weiber, and T. Weiber, "Factor analysis," in *Multivariate analysis: an application-oriented introduction*, K. Backhaus, B. Erichson, S. Gensler, R. Weiber, and T. Weiber, Eds., Wiesbaden: Springer Fachmedien, 2021, pp. 381–450, doi: 10.1007/978-3-658-32589-3_7.
[43] J. L. Horn, "A rationale and test for the number of factors in factor analysis," *Psychometrika*, vol. 30, no. 2, pp. 179–185, Jun. 1965, doi: 10.1007/BF02289447.
[44] Y.-L. Chen and L.-J. Weng, "On Horn's approximation to the sampling distribution of eigenvalues from random correlation matrices in parallel analysis," *Current Psychology*, vol. 43, no. 4, pp. 3738–3748, Apr. 2023, doi: 10.1007/s12144-023-04635-9.
[45] J. M. F. ten Berge and H. A. L. Kiers, "A numerical approach to the approximate and the exact minimum rank of a covariance matrix," *Psychometrika*, vol. 56, no. 2, pp. 309–315, Jun. 1991, doi: 10.1007/BF02294464.
[46] A. Stegeman and T. T. T. Lam, "Three-mode factor analysis by means of Candecomp/Parafac," *Psychometrika*, vol. 79, no. 3, pp. 426–443, Jul. 2014, doi: 10.1007/s11336-013-9359-8.

[47] C. Peterson, "Exploratory factor analysis and theory generation in psychology," *Review of Philosophy and Psychology*, vol. 8, no. 3, pp. 519–540, Sep. 2017, doi: 10.1007/s13164-016-0325-0.
[48] S. Lim and S. Jahng, "Determining the number of factors using parallel analysis and its recent variants," *Psychological Methods*, vol. 24, no. 4, pp. 452–467, Aug. 2019, doi: 10.1037/met0000230.
[49] M. E. Timmerman and U. Lorenzo-Seva, "Dimensionality assessment of ordered polytomous items with parallel analysis," *Psychological Methods*, vol. 16, no. 2, pp. 209–220, Jun. 2011, doi: 10.1037/a0023353.
[50] A. Shapiro and J. M. F. ten Berge, "Statistical inference of minimum rank factor analysis," *Psychometrika*, vol. 67, no. 1, pp. 79–94, Mar. 2002, doi: 10.1007/BF02294710.
[51] M. W. Watkins, "Exploratory factor analysis: a guide to best practice," *Journal of Black Psychology*, vol. 44, no. 3, pp. 219–246, Apr. 2018, doi: 10.1177/0095798418771807.
[52] S. Grieder and M. D. Steiner, "Algorithmic jingle jungle: a comparison of implementations of principal axis factoring and promax rotation in R and SPSS," *Behavior Research Methods*, vol. 54, no. 1, pp. 54–74, Feb. 2022, doi: 10.3758/s13428-021-01581-x.
[53] L. R. Fabrigar, D. T. Wegener, R. C. MacCallum, and E. J. Strahan, "Evaluating the use of exploratory factor analysis in psychological research," *Psychological Methods*, vol. 4, no. 3, pp. 272–299, 1999, doi: 10.1037/1082-989X.4.3.272.
[54] G. R. Norman and D. L. Streiner, *Biostatistics: the bare essentials*. Mosby, 1994.
[55] Y. Xia and Y. Yang, "RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods," *Behavior Research Methods*, vol. 51, no. 1, pp. 409–428, Feb. 2019, doi: 10.3758/s13428-018-1055-2.

BIOGRAPHIES OF AUTHORS

Kuni Saffana is a master of psychology (applied psychometrics) graduate from Universitas Gadjah Mada. Currently a lecturer at Universitas Muhammadiyah Purworejo, Indonesia. She has experience as a data analyst in a market research company, working on writing her project for publication and Ph.D. preparation. She is passionate about psychometrics, data analysis, research methodology, and sustainability. She can be contacted at email: k.saffana@umpwr.ac.id.

Valendra Granitha Shandika Puri is an Assistant Professor of Psychology, at Universitas Islam Negeri Syarif Hidayatullah Jakarta, Indonesia. She graduated from Universitas Gadjah Mada and had experience in the marketing research field. Her research interest is psychometrics (assessment and method). She can be contacted at email: valendra.granitha@uinjkt.ac.id.

Rahmat Hidayat is an Associate Professor of Psychology, at Universitas Gadjah Mada, Indonesia. Currently serving as the Dean of the Faculty of Psychology, Universitas Gadjah Mada, Yogyakarta 55281, Indonesia. His research focuses on judgment and decision-making, consumer behavior, and the instrument validation of psychological assessment. He can be contacted at email: r.hidayat@ugm.ac.id.