

# Development of an academic self-discipline questionnaire for university students<sup>1</sup>

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## Abstract

This study aimed to develop a new Academic Self-discipline (ASD) questionnaire and test its reliability. The questionnaire was conducted on 40 undergraduate students at the University of Leicester. Data was collected using the Experimental Participation Requirement (EPR) system and analyzed by Statistical Package for Social Sciences (SPSS). 58 were analyzed by factor analysis and internal reliability, which also helped obtain the final version of ASD. The test was validated using the face validity method. The results suggested that the ASD survey has 18 highly reliable items, with an  $\alpha$  value of 0.9. The analysis also revealed that the questionnaire applied here has two main components: a study in a plan and attention.

## 1 Introduction

How can students manage the conflict between impulsive behaviors, enabling short-term pleasure, and goal-directed behaviors, providing them with long-term gains? Answering this question is crucial for students' academic success and personal development. Previous studies found self-discipline is a crucial element for the development of academic performance because self-disciplined students prefer goal-directed responses that require great effort and patience to momentarily more gratifying goals (Duckworth & Gross, 2014; Duckworth & Seligman, 2006; Duckworth et al., 2019; Trautwein et al., 2009). Self-discipline is the ability of individuals to pursue a higher goal with a conscious effort by suppressing other desires that may interfere with the goal (Duckworth & Seligman, 2006; Zhao & Kio, 2015). Therefore, Self-discipline is the significant variable that distinguishes top students from others (Duckworth & Seligman, 2005). For example,

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a study by Duckworth and Seligman (2005) listed the characteristics of self-disciplined students as follows: reading instructions before reading questions, listening to teachers rather than imagining in the class (related to attention), prioritizing doing homework over watching tv, continuing to study for long-term goals despite boredom, and frustration.

Highly self-disciplined people have different characteristics than people with low self-discipline. For example, individuals with higher academic self-discipline focus on thoughts and behaviors to develop their personality rather than engaging in momentary behaviors that provide short-term pleasure (Lievens, Ones, Dec, & Dilchert, 2009). In addition, highly self-disciplined students seemed to manage the conflict between long-term gains, which require effort and persistence (Hagger & Hamilton, 2019), and short-term pleasure. However, at the same time, they are careful not to make careless mistakes (Gong, Rai, Beck, & Heffernan, 2009). Some features of students with high and low self-discipline abilities are described below.

**Table 1** The characteristics of students with high and low self-discipline across the studies

High Self-discipline	Low Self-discipline
<ul style="list-style-type: none"> <li>● Prefer more valuable but delayed reinforcer</li> <li>● Ability to defer immediate reward</li> <li>● Generate delay-enhancing thoughts</li> <li>● Delay of gratification (Mischell, Shoda &amp; Peake, 1988)</li> </ul>	<ul style="list-style-type: none"> <li>● Prefer immediate but less valued choices</li> <li>● Impaired delay of gratification (Mischell, Shoda &amp; Peake, 1988)</li> </ul>
<ul style="list-style-type: none"> <li>● Task-oriented ideation (Mischel, 1974)</li> </ul>	<ul style="list-style-type: none"> <li>● Consummatory ideation (Mischel, 1974)</li> </ul>
<ul style="list-style-type: none"> <li>● Abstract ideation about future reward</li> <li>● Resistance to temptations</li> <li>● Resisting immediate pleasures (Mischel, 1974; Funder, Block &amp; Block, 1983).</li> </ul>	<ul style="list-style-type: none"> <li>● Insufficient impulse control (Baumeister et al., 1998)</li> </ul>
<ul style="list-style-type: none"> <li>● Ego-resiliency</li> <li>● Ego-control (Mischel, 1974)</li> <li>● Ego overcontrolled (Funder, Block &amp; Block, 1983)</li> </ul>	<ul style="list-style-type: none"> <li>● Ego- under controlled (Funder, Block &amp; Block, 1983)</li> </ul>
<ul style="list-style-type: none"> <li>● Reasonable</li> <li>● Attentive</li> <li>● Cooperative</li> <li>● Emotional adjustment (Funder, Block &amp; Block, 1983).</li> <li>● Modulate emotional/ motivational impulses (Duckworth, Carlson, 2013; Baumeister et al., 1998)</li> </ul>	<ul style="list-style-type: none"> <li>● Aggressive</li> <li>● Irritable</li> <li>● Restless</li> <li>● Failure in self-control (Funder, Block &amp; Block, 1983).</li> </ul>
<ul style="list-style-type: none"> <li>● Good interpersonal skills/ success</li> <li>● Less pathology</li> <li>● Stress tolerance</li> <li>● Deal with frustration</li> <li>● Better Psychological adjustment (Tangney, Baumeister &amp; Boone, 2018)</li> </ul>	<ul style="list-style-type: none"> <li>● Stressed (Tangney, Baumeister &amp; Boone, 2018)</li> </ul>
<ul style="list-style-type: none"> <li>● Suppress distracting response</li> <li>● Continue task-oriented approaches (Zhao &amp; Kuo, 2015)</li> </ul>	<ul style="list-style-type: none"> <li>● Delay discounting</li> <li>● Impulsivity</li> <li>● Self-control dilemma (Duckworth et al., 2019)</li> </ul>

Earlier studies up to the 2000s used the term of delay of gratification synonymously with self-discipline. Delay of gratification was defined as the regulation of attention, thoughts, emotions, and behaviors for the sake of future consequences (Mischel, 1974), parallel with self-discipline. These studies (Funder, Block, & Block, 1983; Mischel, 1974; Shoda, Mischel, & Peake, 1990)

advocated that delayed gratification was essential for developing personal quality. Shoda, Mischel, and Peake (1990) measured preschool children's differences in the delay of gratification to predict their self-regulatory, social, cognitive, attentional competence, and coping strategies after a decade as adolescents. The results revealed that a self-imposed delay of gratification at an early age predicted the qualities of individuals as adolescents.

Similarly, other studies found that failure or inadequate practice of delay of gratification results in antisocial and criminal behaviors, violence and physical aggression (Mowrer & Ullman, 1945), and school dropout (Robbins, 1972). Moreover, Funder, Block, and Block (1983) categorized individuals into two forms: ego under-controlled and ego overcontrolled. The first form was the ego, under control, which tends to translate desires and immediate impulses into behaviors. As a result, they are likely to have short-lived relationships and interests. The second form was ego overcontrolled, tending to inhibit impulses and delay gratification, which is crucial for personality development.

Contrary to the earlier studies, Taylor, Kuo, and Sullivan (2002) offered delay of gratification as one form of self-discipline. They stated that there are three different forms of self-discipline. The first form was concentration, defined as sustaining attentional focus despite distractions, boredom, frustration, or fatigue. Concentration enables individuals to stay on task enough to make progress and effectively complete tasks earlier. On the other hand, individuals with concentration deficits might spend countless hours in front of books and assignments but make less progress due to failure to pay deliberate direct attention. The second form was impulse inhibition, characterized as overcoming initial impulses and considering potential benefits and drawbacks of action before acting. Impulse inhibition enables individuals to make more cautious responses, behave responsibly and prevent risky behaviors such as substance use, aggression, and violence. The third form was delaying gratification, described as overcoming impatience and postponing short-term rewards for long-term gains. Delay of gratification helps individuals persist in working for long-term goals.

Studies after the 2000s preferred to use the terms self-control (Tangney, Boone, & Baumeister, 2018; Wills et al., 2006), Behavioural and Emotional Self-Control (Wills et al., 2006), self-regulation (Duckworth & Carlson, 2013), and willpower (Job et al., 2010) synonymously with self-discipline. Even though these terms varied across studies, the purpose was similar. The primary purpose was to investigate the relationship between self-discipline and academic success. The results showed that self-discipline was positively correlated with course grades and standardized achievement test scores. (Duckworth & Carlson, 2013; Zhao & Kuo, 2015) and intellectual potential (Duckworth & Seligman, 2005). On the other hand, failure to exercise self-discipline was linked to 'antisocial behaviors, risky sexual behaviors, substance misuse, suicidality, and community crime' (Malouf et al., 2014) and school dropout rate (Duckworth & Seligman, 2005).

Furthermore, several studies compared self-discipline and intelligence quotient (IQ) to predict students' school success. Both intellectual (i.e., IQ) and non-intellectual strengths help students succeed in school and get higher grades on exams. However, Duckworth and Seligman (2005) found that self-discipline, a type of intellectual ability, was two times more effective on academic success than IQ (intelligence quotient), suggesting that self-discipline played a more prominent role in students' course grades than their intellectual strengths. Another study by Hogan and Weiss (1974) divided pupils into two groups, sharing similar IQ levels but differing in self-discipline. The success of students with higher self-discipline is remarkably higher than the pupils who do not

have self-discipline. The reason behind that is their longer focus time and ability to learn more quickly due to their concentration ability (Taylor et al., 2002; Duckworth & Seligman, 2005).

In summary, self-discipline is a strong predictor of students' academic success and the primary variable that distinguishes top students from others (Duckworth & Seligman, 2005). These studies above investigated the link between self-discipline (i.e., delay of gratification) and academic achievement for children and teenagers (ages 4 and 19). However, there were not enough psychometric scales for undergraduate and postgraduate populations to measure their self-discipline ability. For example, one self-discipline questionnaire developed by Şimşir and Dilmaç (2020) examined the self-discipline ability of Turkish university students. More valid and reliable measures are desperately needed to study such populations in different countries. Furthermore, such a measure is necessary because it is also important to assess students' self-discipline to know the link between self-discipline and academic achievement or other variables such as student time management. Therefore, the present study aims to develop a new measure of academic self-discipline by testing its reliability, exploratory factor analysis, and face validity.

## **2 Method**

### **2.1 Design**

Fifty-eight closed-ended questions were initially created for this study, and there were no leading questions or embarrassing items to make participants feel comfortable and get objective answers. Maltby et al. (2010) stated that if surveys had these two types of questions, participants would give wrong answers instead of what they think and not feel embarrassed. In addition, we used a 5-points scale for this questionnaire (1 - never, 2 - rare, 3 - sometimes, 4 - often, 5 - always). Maltby et al. (2010) claimed that the 5-choices answer type is better for surveys. Face validity is developing a measurement of what it appears to measure (Maltby et al., 2010). We examined the face validity to examine whether this questionnaire appropriately measures what it claims to measure. The questionnaire represents a good measure of Self-discipline because all the items were written to measure the target variable of Self-discipline.

### **2.2 Participants and procedure**

Forty undergraduate psychology students from the University of Leicester participated in this study. After completing the survey, all volunteers were rewarded with one Electronic Patients Record (EPR) credit. EPR, Experimental Participation Requirement, was an online system to find participants for several experiments or to participate in experiments within the University of Leicester. Participants' gender and ethnicity were not considered for his study because of the purpose of this study, which was to develop a research questionnaire. All participants signed the participant consent form before filling out the questionnaire. Ethical approval was granted by the University of Leicester Psychology Research Ethics Committee (PREC).

### **2.3 Data collection**

After developing the survey with fifty-eight items, the survey was uploaded to the Electronic Patients Record (EPR) system. Then, the participants logged on to the EPR system with their students' accounts to participate in this study. The whole time to answer all the questions was about ten minutes. The data was collected in 2016.

### **2.4 Data analysis**

The data from participants' answers were analyzed using internal reliability analysis to investigate the internal consistency of the items. According to Maltby, Day, and Macaskill (2010), if the result of a test is suggested to be reliable, then all the items should be positively correlated with one another. Therefore, the first analysis was the internal reliability analysis which was conducted to investigate the internal consistency of the items. Then, some items were excluded from the initial items pool to improve and increase internal consistency. There were two main columns in this table: column 4 (which represent Corrected Item-Total Correlation) and column 6 (Cronbach's Alpha if the Item is Deleted). Because these two columns are vital for researchers to reduce the number of items on a scale from the initial items pool. If an item's correlation value in column 4 is lower than .3, this item should be removed to reduce the number of items and improve the Cronbach alpha value (Maltby et al., 2010). In light of this rule, we have eliminated items one by one from which the correlation value was the worst in column 4 and the highest in column 5. This item elimination process continued until no item's correlation remained below 0.3.

As a next step, we used the data reduction statistical method called exploratory factor analysis. This analysis aimed to explore 'what items loaded onto which correlated items' (Maltby et al., 2010). The analysis revealed two important tables: Total Variance Explained (see Table 5) and Scree plot (Figure 1). Total Variance Explained showed the number of factors and their Eigenvalue, which was an important criterion because we separated the satisfactory factors from the others due to the criteria. The principle for separation was that the Eigenvalue should be above 1.00; otherwise, it is expected to be ignored (Maltby et al., 2010). We also checked the Scree plot, the visual inspection technique, and a version of the Total Variance Explained table to check the robustness of the latent factor structure. All the analyses were conducted using IBM SPSS Statistics for Windows, Version 23.0.

### 3 Findings

The internal reliability analysis was conducted to investigate the internal consistency of the items. As can be seen in Table 2, there was a very high  $\alpha$  coefficient value, 0.93, for fifty-eight items in Academic Self-discipline (ASD) scale.

**Table 2** Internal consistency for 58 items from reliability statistics

Cronbach's Alpha	N of Items
.933	58

Although the first run of Cronbach's alpha value was very good for this test, the Item Total statistic (see Table 3) results indicated that the  $\alpha$  value could be improved and increased above 0.93 if some items were excluded from the initial items pool. As an example, we have firstly excluded the item coded as 39 (whose component matrix value is 0.08), in which the  $\alpha$  value has been increased to .936. After the lowest value had been deleted, we rerun the internal consistency to identify the next worst item in the Item-Total Statistics Table. This item elimination process continued until no item's correlation remained below 0.3. At the end of this procedure, we eliminated 13 items coded as 1, 3, 4, 5, 7, 16, 21, 24, 29, 39, 50, 53, and 54 from the items pool. After this procedure was completed, we employed Cronbach's alpha again to check the internal consistency value for 45 items and obtained the result of this analysis, as shown in Table 4. The table shows that the  $\alpha$  value has increased slightly and reached 0.95.

**Table 3** Item-total statistics results

Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ASD1	189.846	660.186	-.014	.933
ASD2	190.846	640.291	.467	.932
ASD3	189.974	655.920	.216	.933
ASD4	191.256	652.511	.140	.934
ASD5	190.179	652.888	.281	.933
ASD6	190.692	640.377	.581	.932
ASD7	192.179	644.888	.261	.933
ASD8	190.897	637.042	.445	.932
ASD9	190.744	648.722	.323	.933
ASD10	191.179	634.256	.473	.932
ASD11	191.538	635.518	.482	.932
ASD12	191.564	632.516	.533	.931
ASD13	192.231	625.340	.629	.931
ASD14	191.231	640.235	.337	.933
ASD15	191.179	635.993	.495	.932
ASD16	191.513	648.993	.186	.934
ASD17	191.872	623.220	.622	.931
ASD18	191.051	641.050	.399	.932
ASD19	191.641	626.552	.652	.931
ASD20	192.000	626.263	.658	.930
ASD21	191.795	649.483	.221	.933
ASD22	192.256	621.564	.640	.930
ASD23	192.128	634.799	.565	.931
ASD24	191.795	657.957	.021	.935
ASD25	191.590	623.248	.614	.931
ASD26	191.462	626.834	.539	.931
ASD27	191.231	642.498	.471	.932
ASD28	191.795	642.062	.364	.932
ASD29	192.462	674.518	-.308	.937
ASD30	191.923	621.757	.680	.930
ASD31	191.308	627.061	.704	.930
ASD32	191.615	622.401	.620	.931
ASD33	191.051	640.471	.444	.932
ASD34	192.205	625.904	.543	.931
ASD35	191.436	629.094	.588	.931
ASD36	191.846	636.555	.482	.932
ASD37	191.564	623.779	.713	.930
ASD38	192.333	623.807	.626	.931
ASD59	191.949	648.682	.277	.933
ASD40	191.564	628.094	.562	.931
ASD41	191.359	652.552	.079	.935
ASD42	190.872	633.483	.559	.931
ASD43	191.231	636.498	.427	.932
ASD44	190.744	630.196	.644	.931
ASD45	191.615	628.506	.493	.932
ASD46	190.641	639.762	.422	.932
ASD47	191.538	640.939	.323	.933
ASD48	191.615	636.664	.520	.932
ASD49	192.051	639.208	.342	.933
ASD50	191.513	652.309	.110	.934
ASD51	191.667	636.123	.491	.932
ASD52	191.154	638.081	.467	.932
ASD53	192.179	653.151	.168	.933
ASD54	191.103	648.831	.223	.933

ASD55	191.590	634.617	.562	.931
ASD56	191.410	643.248	.325	.933
ASD57	191.718	631.576	.604	.931
ASD58	191.846	641.186	.396	.932

**Table 4** Internal consistency for 45 items from reliability statistics.

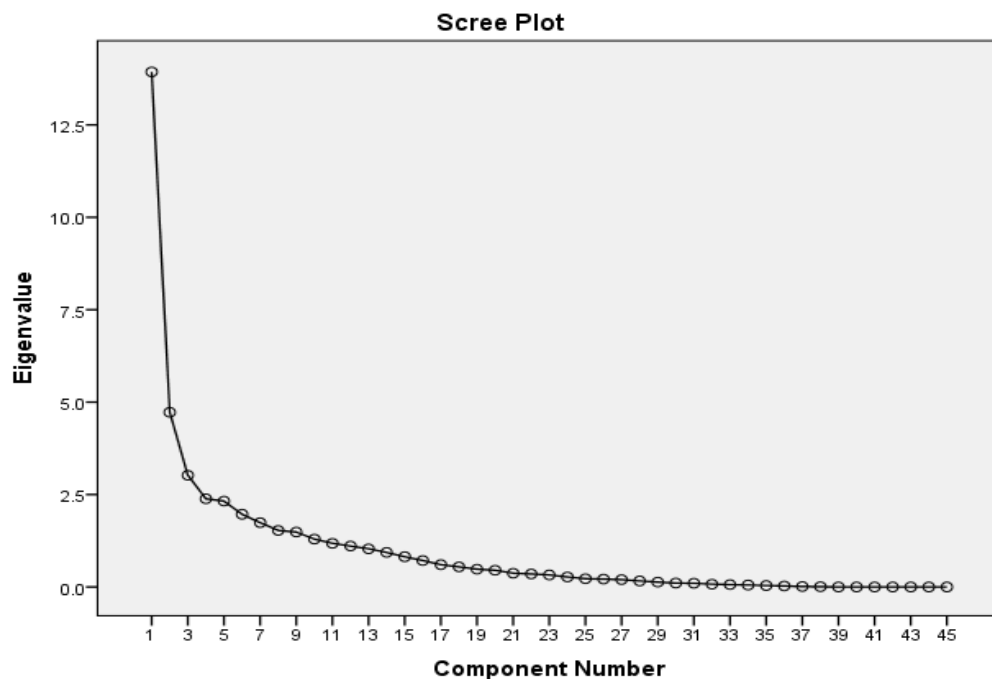
Cronbach's Alpha	N of Items
.946	45

The exploratory factor analysis revealed two important outputs: The total Variance Explained Table (see Table 5) and Scree Plot (see Figure 1). The total Variance Explained Table showed that 13 factors seemed satisfactory, and they accounted for 83 % of all variances. Figure 1 displayed that the first component's Eigenvalue was about 14.00, while the last one was almost zero. The figure also showed that the first three factors displayed more distinctive features than the rest of the components. For example, the fourth component's Eigenvalue was smaller than the first three. Therefore, this figure suggested breaking the remaining items into three different factors. Because of that, we decided to focus on three factors solution, and the exploratory factor analysis technique was rerun by increasing the Eigenvalue from 1 to 2.5. The three factors accounted for 48 % of the total variance (see Table 5).

**Table 5** Extraction method: Principal component analysis result

Comp.	Total Variance Explained					
	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.934	30.964	30.964	13.934	30.964	30.964
2	4.725	10.501	41.465	4.725	10.501	41.465
3	3.022	6.715	48.180	3.022	6.715	48.180
4	2.385	5.300	53.480	2.385	5.300	53.480
5	2.323	5.161	58.641	2.323	5.161	58.641
6	1.967	4.371	63.012	1.967	4.371	63.012
7	1.741	3.868	66.880	1.741	3.868	66.880
8	1.530	3.399	70.280	1.530	3.399	70.280
9	1.485	3.300	73.580	1.485	3.300	73.580
10	1.294	2.877	76.457	1.294	2.877	76.457
11	1.181	2.625	79.081	1.181	2.625	79.081
12	1.106	2.458	81.540	1.106	2.458	81.540
13	1.032	2.294	83.834	1.032	2.294	83.834
14	.934	2.076	85.910			
15	.818	1.818	87.728			
16	.715	1.589	89.317			
17	.603	1.340	90.657			
18	.543	1.208	91.865			
19	.480	1.067	92.933			
20	.452	1.004	93.936			
21	.372	.827	94.763			
22	.352	.782	95.545			
23	.325	.722	96.267			
24	.271	.603	96.870			
25	.223	.496	97.365			
26	.213	.474	97.840			
27	.199	.442	98.282			
28	.162	.361	98.642			
29	.130	.290	98.932			
30	.105	.234	99.166			

31	.100	.223	99.389
32	.076	.168	99.557
33	.063	.140	99.697
34	.052	.115	99.812
35	.038	.084	99.896
36	.027	.060	99.956
37	.012	.027	99.983
38	.008	.017	100.000
39	5.786E-16	1.286E-15	100.000
40	1.659E-16	3.687E-16	100.000
41	6.394E-17	1.421E-16	100.000
42	-1.547E-16	-3.437E-16	100.000
43	-3.883E-16	-8.628E-16	100.000
44	-4.541E-16	-1.009E-15	100.000
45	-1.030E-15	-2.288E-15	100.000



**Figure 1** Scree plot for 45 items. This Figure illustrates the distribution of the components from highest to lowest. The x-axes defined the component numbers, and the y-axes described Eigenvalue.

However, in the Component matrix table (see Table 6), some items still remained below the correlation value of .3, which was not considered a good factor loading (Maltby et al., 2010). Therefore, we have removed the items below .3 one by one. In this way, we have removed 25 items from the pattern matrix table (items 2, 6, 8, 9, 10, 11, 13, 14, 20, 22, 27, 28, 32, 34, 37, 41, 42, 43, 44, 45, 47, 52, 55, 57, 58). The point here was to increase items' loadings value to be above .3. After this step, we got 20 remaining items with three factors.

**Table 6** Extraction method: Principal component analysis

Academic Self-Discipline Items	Components		
	1	2	3
2	.504	-.536	-.363
6	.579	-.086	.136
8	.496	-.516	-.366
9	.339	-.394	.116



10	.530	-.306	-.352
11	.500	-.571	-.018
12	.519	-.444	.296
13	.619	-.036	.495
14	.385	.026	.349
15	.542	.229	-.190
17	.610	-.358	.336
18	.437	.540	-.026
19	.676	-.209	.132
20	.705	-.250	-.123
22	.658	.343	.216
23	.553	-.308	.315
25	.690	.249	-.426
26	.609	.062	-.177
27	.504	.097	-.483
28	.372	.002	.173
30	.687	.062	.323
31	.744	-.098	-.043
32	.637	.114	.331
33	.528	-.038	-.611
34	.558	.492	.195
35	.656	-.080	-.232
36	.486	-.403	.288
37	.744	-.397	-.142
38	.644	-.219	.356
39	.323	.164	-.073
40	.585	.049	.002
42	.609	.443	-.203
43	.484	.705	-.110
44	.691	.403	-.136
45	.528	.462	.199
46	.470	-.055	-.257
47	.369	.024	.109
48	.562	-.062	-.189
49	.408	-.319	.109
51	.517	.135	.105
52	.501	.011	-.244
55	.591	-.093	-.037
56	.361	.628	.143
57	.645	.466	-.037
58	.379	.182	.307

Extraction method: Principal Component Analysis. a. 3 components extracted.

Then, we checked the internal consistency with Cronbach's alpha for each of the three remaining factors. The  $\alpha$  value for Factor 1 was .864, Factor 2 was .808, and Factor 3 was .361 (see Table 7). This means that factors 1 and 2 were statistically reliable ( $\alpha > .7$ ); however, the internal consistency of factor 3 remained below .7. Hence, we removed the two items, which were item 51 and item 56, loaded on the third factor. And then, we ran the Cronbach, and Table 8 came out. Finally, two factors of the solution were taken into account for this study (Table 9).

**Table 7** Reliability statistics for factors

Factors	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Factor 1	.864	.868	9
Factor 2	.859	.858	9
Factor 3	.361	.361	2

**Table 8** Internal consistency for 18 items reliability statistics

Cronbach's Alpha	N of Items
.901	18

Table 8 shows the questionnaire reliability for the final 18 items, which resulted from several sequential statistical analysis steps mentioned above. The reliability of the ASD psychometric scale was proved satisfactory ( $\alpha=.901$ ;  $\alpha>.7$ ).

**Table 9** indicates correlation scores for each item for the final 18 items

Items	Component	
	Study in a plan	Attention
38. I wake up the same time everyday	.797	
23. I repeat my modules after class I make a preparation before class.	.787	
36. I do not allow my choices to be dictated by impulses of my feelings.	.781	
17. I have my own study timetable.	.776	
19. I use my study time wisely.	.751	
12. I study randomly.	.656	
30. I imagine something else while I am in class.	.580	
40. If I have planned to study, I can refuse to hang around with my best friend	.527	
49. I do not use my Facebook account while studying even though I desire it much.	.502	
25. I am cognitively ready before starting to study.		.850
33. I organise my study place where there are not any distractors.		.804
35. I remove everything that disturbs me.		.793
15. I know what to study before start studying.		.694
26. I do not use Facebook while studying.		.666
31. I keep myself away from distracting elements to study effectively.		.585
18. I know how to study.		.565
46. If I got higher mark, I give up studying		.491
48. I sustain attentional focus despite distractions, boredom, or fatigue.		.456

Extraction method: Principal Component Analysis.  
 Rotation method: Oblimin with Kaiser Normalization.<sup>a</sup>  
 a. Rotation converged in 6 iterations.

#### 4 Discussion and Conclusion

In this study, we aimed to develop new academic self-discipline (ASD) and tested its psychometric properties on undergraduate students. A new psychometric scale with 18 items was constructed to measure general academic self-discipline. By extension, all 18 items in the ASD scale demonstrate high reliability 90 alpha coefficient value. We also have carried out internal reliability to investigate consistency and exploratory factor analysis techniques to identify the underlying factors. The results suggested that study in a plan and attention were the two main components of the academic self-discipline scale for university students. The study plan covers items regarding study and lifestyle habits, sticking to the study plan, wise time management, and voluntary delay of short-term pleasure during the study time, such as checking social media and hanging out with friends. Attention includes items regarding paying full and conscious attention to study and removing any physical distractors (organizing study place) and digital distractors (i.e., Facebook). These two forms of self-discipline were important for university students' academic success.

The present study found that students with self-discipline have their study plan, can overcome unhelpful tendencies, and delay prepotent gratification to accomplish long-term goals. Similar findings were reported in earlier studies. For example, Duckworth and Seligman (2005) stated that the main reason for school failure prefers short-term pleasure over long-term gain. Additionally, Funder, Block & Block (1983) noted that delay of gratification is a significant component of being an individual with a personal quality to regulate their emotions, thoughts, and behaviors for the sake of more prominent targets.

Furthermore, social media (i.e., Facebook) related items were associated with both the study in a plan and concentration components of the academic self-discipline questionnaire. Thus, resisting the temptation of using social media is a critical ability to continue studying and fully concentrate on what is being studied. Therefore, students who do not use social media platforms while studying give conscious attention to their work, enabling them to study enough to make progress and complete task earlier (Taylor et al., 2002).

Overall, the questionnaire was developed to identify students' academic self-discipline ability specifically for undergraduate students, contrary to many studies focused on measuring self-discipline among primary and elementary school and high school students (Mischell, Shoda & Peake, 1988; Wills et al., 2006; Trautwein et al., 2009; Duckworth & Seligman, 2005; 2006; Zhao & Kio, 2015). Therefore, this scale can predict undergraduate students' final GPA, help them gain admission to high-profile jobs, and select competitive master's and Ph.D. programs. Additionally, educators can detect students with self-discipline deficits by using this questionnaire so that they can be trained to raise the ability of emotional and behavioral control of self-discipline (Zhao & Kuo, 2015) because self-discipline can be trained (Duckworth & Carlson, 2013; Duckworth & Seligman, 2005).

#### **4.1 Limitations and Future Directions**

There are several limitations of the current study. The first was that our study included fifty-eight items; however, only forty students participated. Although it was suggested to be at least five items to each question (Maltby et al., 2010), the number of participants in this survey was less than the items. Regardless of the limited number of participants, the reliability of the ASD test was high ( $\alpha = .9$ ). The second limitation was that the study was just conducted in a small UK sample. To explore a better psychometric property of the scale, it is also important to replicate the study in different cultures. Furthermore, it can be worth looking at the test-retest reliability to confirm obtained results besides internal reliability. Regardless of all the limitations, which were above, this test was found statistically reliable and valid.

### **5 Statement of Researchers**

#### **5.1 Researchers contribution rate statement:**

The author confirms sole responsibility for the following: study design, data collection, analysis and interpretation of results, and manuscript preparation.

#### **5.2 Conflict statement:**

We have no conflicts of interest to disclose.

#### **5.3 Support and thanks:**

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