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Validity and reliability of optimism questionnaire among adolescents based on theory of planned behavior

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Abstract

This study aimed to normalize and examine the validity and reliability of the optimism questionnaire based on the theory of planned behavior among the first-grade high school male adolescents. The study was conducted on 170 male students in the first grade of high school. The data were gathered using a researcher–made questionnaire containing 49 questions. In order to determine the validity of the questionnaire structure, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were performed using the SPSS-19 and SAS (version 19) software. High internal consistency values were obtained for all the subscales. The results of factor analysis showed that 14 significant factors had eigenvalues greater than 1.0 and 71.22% of the variance were explained by these factors. In CFA method, four factors were considered for the 45 questions of the questionnaire based on the theory of planned behavior, which explained 39.98% of the variance. The results indicated that the optimism questionnaire was a valid and reliable instrument to be used among the students in the first grade of high school.

Keywords: Adolescent, Optimize, Questionnaire, Reliability, Validity

Introduction

Adolescence is considered as one of the most critical periods of life. Adolescents are faced with many problems in this period, including identity crisis, social and sexual changes, emotional disorders (depression), violence, delinquency, addiction, suicide, and family and job problems [1].

Optimism protects adolescents against health risks and is effective against depression signs, as well [2]. The main feature of human beings is the ability to think, which is defined as the process of applying the power of judgment and transfer of concepts [3].

At the most initial level, optimism is believed to have an inverse relationship with disappointment and risk factors related to depression. Optimist individuals are those who expect good events to occur, while pessimist ones are those who expect to face bad happenings [4]. Optimism is defined as the tendency to take the most hopeful attitude as well as the cognitive and emotional preparation about the superiority of good things to bad ones [5].

Promotion of optimism together with other mental and emotional dimensions plays an

important role in promotion of adolescents' health. In fact, in case we intervene in the adolescents' risk factors, supportive factors, and social issues, their health might be improved [2]. Various studies on adolescents, students, adults, and elderly have shown significant relationships between satisfaction with life and optimism [6].

Optimism is based on the belief that good results will emerge. Therefore, optimism is one of the variables that can predict compromising behavior. Another important factor that can predict compromising behavior is the feeling of control over the events which are going to happen in the future [7]. Based on the theory of planned behavior, control of conscious behavior refers to how much an individual feels s/he is acting based on a determined behavior [8].

When students understand that their thoughts control their acts, it influences their beliefs, motivations, and educational performance more effectively [9]. Attitude towards behavior, as one of the constructs of the theory of planned behavior, refers to the overall feeling of love or hate about any determined behavior. When a person has a good idea about a behavior, s/he is more likely to conduct that specific behavior and vice versa [8].

On the other hand, parents provide the ground for their children to learn violence, develop interest in music or desire to drink alcohol, and acquire talent, optimism, or pessimism. Also, children learn a part of optimism from adults, such as parents, teachers, and the instructors who are respectful for them and spend more time with them [10]. Subjective norm, as another constructs of the theory of planned behavior, refers to individual's beliefs about whether or not s/he should conduct Eigen behaviors based on the view of the most important people in one's life [8].

In general, different methods are used to measure optimism. One of these methods is that people expect their future happenings based on their interpretations of the past events. In case previous failures are considered as stable factors, expectation of failure will be increased, because it is possible that these factors become permanent [4].

Based on Ajzen, no standard questionnaires are there for performing studies on the theory of planned behavior worldwide. Hence, it is necessary to carry out studies in order to design a new questionnaire appropriate for eigen-behavior in a specific population. Moreover, the theory of planned behavior must be codified in an experimental work to ensure its psychometric properties [11].

Considering what was mentioned above about optimism and the fact that no domestic and foreign studies have been conducted on this issue using the theory of planned behavior, the present study aims to do validity and reliability of the optimism questionnaire based on the theory of planned behavior in the Iranian male adolescents.

Method

The study was performed on 170 male students in the first grade of high schools of Shiraz, Iran, who volunteered to participate in the study. The data were gathered using a researcher–made questionnaire containing 49 questions. These questions were answered through a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). However, scores of 1 and 5 were assigned to strongly agree and strongly disagree options, respectively, in the following questions: 3, 4, 7, 9, 11, 14, 15, 19, 21, 32, 34, 35, 38, 43, 44.

Considering the main constructs of the theory of planned behavior, this questionnaire included 26 questions for attitude toward behavior, 4 questions for subjective norms, 9 questions for perceived behavioral control, and 10 questions for behavioral intention. The content and construct validity of the questionnaire were confirmed by experts. Besides, the validity of the four subscales was assessed using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Additionally, the internal consistency of the questionnaire was evaluated using Cronbach's alpha coefficient. All the data analyses were performed using the SPSS

statistical software (v.19), except for CFA which was carried out through SAS 9.2.

Results

The present study was conducted on 170 first grade high school students. The participants' mean age was 15.08+0.68 ranging from 14 to17 years. Besides, 30% of the students' parents had diploma, while 28.2% had under diploma degrees. Moreover, 46.5% of the students were the first child of their parents and 47.1% had 1 to 5 close friends. The mean, standard deviation, and internal consistency of the scores of different subscales and the total score of the optimism questionnaire have been presented in Table 1.

Table 1 *Means, standard deviations, and internal consistency estimates of different subscales of optimism questionnaire*

Subscales of questionnaire	Mean ± SD	Cronbach's alpha
Attitude	19.01 ± 14.09	0.84
Subjective norm	14.11 ± 3.59	0.67
Perceived behavioral control	23.68 ± 4.75	0.61
Behavioral intention	26.36 ± 5.8	0.73

The findings revealed that Cronbach's alpha coefficient of the subscales ranged from 0.61 to 0.84. Therefore, the questionnaire and its constructs had acceptable internal consistency.

In factor analysis in this study, Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity were utilized in order to determine the adequacy of the data and existence of the initial requirements for factor analysis. Moreover, EFA and CFA were used to assess the subscales' validity and the results have been presented in Tables 2 to 4. The results showed that KMO index and p-value were acceptable and, consequently, factor analysis could be performed (Table 2).

Table 2 *Kaiser meyer olkin (KMO) measure of data adequacy and bartlett's test of sphericity*

KMO	χ^2	DF	p- value
0.6	2100.407	990	0.001

The results of EFA and orthogonal rotation using varimax technique have been presented in Table 3. The results indicated a 14-factor structure which accounted for 71.22% of the total variance (Table 3).

In CFA based on the theory of planned behavior, 4 factors were considered for the 45 questions of the questionnaire which determined 39.98% of the variance of the data.

Considering the definition of model constructs and the researcher's opinion, questions 1-26 were located in the first factor, questions 27-30 were placed in the second one, questions 31-37 were located in the third factor, and questions 32-45 were considered in the fourth factor (Table 4). The four factors extracted in the CFA appeared to coincide with the constructs of the original model.

According to Table 5, all the items were associated with a factor (the bold values). However, some of them were not associated with the expected factors. The findings showed that questions numbered 1, 2, 6, 8, 12, 16, 18, 20, 24, 35, and 39 were correlated to the first factor, questions numbered 3, 4, 7, 9, 11, 14, 15, 19, 21, 31, 36, and 41 were correlated to the second factor, questions numbered 29, 30, 37, 38, 40, 42, 43, 44, and 45 were correlated to the third factor, and questions numbered 5, 10, 13, 17, 22, 23, 25, 26, 27, 28, 32, 33, and 34 were correlated to the forth factor. Considering the theoretical basis of this instrument, the questions which were related to the same factor were assigned a similar title. Consequently, the four following factors were identified: attitude (26 questions) in the first factor, subjective norms (4

questions) in the second factor, perceived behavioral control (7 questions) in the third factor, and behavioral intention (8 questions) in the fourth factor. Loadings ranged from 0.383 to 0.750.

The results of Pearson correlation coefficient revealed significant, positive relationships among attitude, subjective norms, perceived behavioral control, and behavioral intention as well as among subjective norms, perceived behavioral control, and behavioral intention (Table 6).

Table 3 *Factor loadings of the 45 items of the optimism questionnaire*

Questions	The amount of the initial Eigen value			The total squared factor loading of each factor before rotation			The total squared factor loading of each factor after rotation		
	Total	Percentage of variance	Cumulative percentage	Total	Percentage of variance	Cumulative percentage	Total	Percentage of variance	Cumulative percentage
1	9.751	21.670	21.670	9.751	21.670	21.670	4.330	9.623	9.623
2	3.562	7.915	29.584	3.562	7.915	29.584	3.737	8.305	17.928
3	2.597	5.772	35.356	2.597	5.772	35.356	3.701	8.225	26.153
4	2.083	4.628	39.984	2.083	4.628	39.984	2.219	4.932	31.086
5	2.000	4.444	44.428	2.000	4.444	44.428	2.134	4.743	35.829
6	1.751	3.892	48.320	1.751	3.892	48.320	2.121	4.712	40.541
7	1.598	3.552	51.872	1.598	3.552	51.872	1.960	4.356	44.897
8	1.540	3.423	55.295	1.540	3.423	55.295	1.880	4.178	49.075
9	1.333	2.963	58.258	1.333	2.963	58.258	1.827	4.059	53.135
10	1.254	2.787	61.045	1.254	2.787	61.045	1.802	4.004	57.138
11	1.250	2.777	63.821	1.250	2.777	63.821	1.709	3.797	60.935
12	1.202	2.672	66.494	1.202	2.672	66.494	1.676	3.725	64.660
13	1.083	2.406	68.900	1.083	2.406	68.900	1.529	3.398	68.058
14	1.046	2.323	71.223	1.046	2.323	71.223	1.424	3.165	71.223
15	0.901	2.002	73.223						
16	0.840	1.868	73.226						
17	0.801	1.779	75.093						
18	0.767	1.703	76.872						
19	0.727	1.616	78.576						
20	0.691	1.535	80.192						
21	0.647	1.437	81.727						
22	0.626	1.391	83.164						
23	0.575	1.278	84.555						
24	0.531	1.180	85.833						
25	0.517	1.150	87.013						
26	0.500	1.110	88.163						
27	0.483	1.074	89.273						
28	0.434	0.966	90.312						
29	0.391	0.869	92.181						
30	0.383	0.852	93.033						
31	0.359	0.799	93.831						
32	0.332	0.738	94.570						
33	0.302	0.670	95.240						
34	0.289	0.642	95.882						
35	0.267	0.594	96.476						
36	0.242	0.539	97.015						
37	0.224	0.497	97.512						
38	0.200	0.445	97.975						
39	0.192	0.426	98.383						
40	0.173	0.383	98.766						
41	0.151	0.336	99.103						
42	0.137	0.303	99.406						
43	0.109	0.242	99.648						
44	0.097	0.215	99.862						
45	0.062	0.138	100.000						

Table 4 *Rotated factor loadings of the eigen values and proportion of variance explained in the optimism questionnaire based on 4 factor model*

Variable	First factor	Second factor	Third factor	Forth factor
1	0.695	0.225	0.210	0.092
2	0.618	0.073	0.119	-0.029
3	0.210	0.486	0.010	-0.274
4	0.119	0.753	0.064	0.067
5	0.380	-0.059	-0.022	0.388
6	0.456	0.085	-0.121	0.235
7	0.048	0.629	0.317	0.120
8	0.547	0.249	0.305	0.177
9	0.464	0.629	-0.030	0.137
10	0.299	0.103	0.302	0.512
11	-0.013	0.645	-0.136	-0.095
12	0.635	0.158	-0.020	0.404
13	0.133	0.030	0.215	0.479
14	0.000	0.490	-0.110	0.112
15	0.170	0.530	-0.082	0.101
16	0.545	-0.066	0.080	0.201
17	0.030	0.056	-0.070	0.430
18	0.585	0.155	0.227	0.113
19	-0.002	0.589	0.100	0.310
20	0.449	0.380	0.094	0.393
21	-0.007	0.534	0.177	0.239
22	0.285	0.287	0.064	0.568
23	0.144	-0.092	0.048	0.410
24	0.422	-0.128	0.303	0.145
25	0.320	0.204	0.224	0.387
26	0.040	0.121	-0.182	0.579
27	-0.030	0.080	0.257	0.542
28	0.152	0.019	0.143	0.613
29	0.301	-0.151	0.419	0.145
30	0.350	0.024	0.437	0.394
31	0.018	0.525	0.305	-0.023
32	0.260	-0.100	0.136	0.409
33	-0.051	0.217	0.157	0.383
34	0.180	0.361	0.281	0.450
35	0.412	-0.032	0.325	0.197
36	-0.252	0.394	0.293	0.136
37	0.131	0.098	0.396	0.297
38	0.351	0.131	0.632	0.001
39	0.593	0.197	0.369	0.002
40	0.477	0.081	0.501	0.016
41	0.161	0.561	0.200	-0.147
42	-0.002	0.132	0.435	0.143
43	0.139	0.009	0.750	0.044
44	0.224	0.006	0.694	-0.068
45	0.033	0.186	0.603	0.175
The amount of eigenly	9.751	3.562	2.597	2.083
Percentage of variance	21.670	7.915	5.772	4.628
Cumulative percentage	21.670	29.584	35.356	39.984

Table 6 *Pearson correlation among the subscales of optimism questionnaire*

	Attitude	Subjective norm	Perceived behavioral control	Behavioral intention
Attitude	1			
Subjective norm	0.381*	1		
Perceived behavioral control	0.477*	0.303*	1	
Behavioral intention	0.433*	0.35*	0.376*	1

*p<0.05

Discussion

The study data confirmed the reliability of the optimism questionnaire. Up to now, several studies have been conducted on optimism and various questionnaires are also available in this field [2-4,6,9,12,13]. However, due to the lack of questionnaires based on the theory of planed behavior, this study developed a questionnaire with 45 items which included the factors affecting optimism based on the aforementioned theory. Efficiency of the theory of planed behavior has been approved in different studies [11,14-17]. Due to the lack of research in this area, the results have been compared with most similar studies.

At the beginning of the study, the questionnaire included 49 items. After data collection, however, the following items were deleted: 1) it is up to me to be able to enjoy my life in bad situations. 2) I cannot be optimist without a psychologist's/other's help. 3) I know that I need optimism, but have not made my decision yet, and 4) I have studied in this area through different books, CDs, and classes over the past six months. After all, 45 items remained in the questionnaire.

Reliability is defined as consistency and stability of an instrument, which reveals the accuracy of the measures [18]. The present study results showed a Cronbach's alpha coefficient of 0.84 for attitude, 0.67 for subjective norms, 0.61 for perceived behavioral control, and 0.73 for behavioral intention. Also, the Cronbach's alpha coefficient of the total constructs was 0.91. This measure was reported as 0.74 in Kajbaf's study [7] and 0.84 in Hadinezhad's research [13].

In the present study, Pearson correlation coefficient revealed significant direct relationships among the model constructs (r>0.303). Yet, the highest correlation was observed between attitude and perceived behavioral control (r=0.477).

In order to determine the construct validity of the components of the questionnaire, DFA and CFA were employed. The results of KMO sampling and Bartlett's test of sphericity (0.6 and 2100.407, respectively; p<0.001) indicated the adequacy of the data and existence of the initial requirements for factor analysis. In the study conducted by Hadinezhad , KMO and Bartlett's test index were 0.871 and 5550.80, respectively, which were significant at p>0.001 [13].

In this study, the construct validity of the questionnaire components was measured using EFA through normal varimax method. The results revealed 14 significant items with values greater than 1.0. The Eigen values and variance of the significant factors were as follows: 9.75, 3.56, 2.6, 2.08, 2.00, 1.75, 1.60, 1.54, 1.33, 1.25, 1.25, 1.20, 1.08, and 1.05 (32.05% in total). In addition, the amount of determined variance for the 14 factors was 21.67%, 7.91%, 5.77%, 4.63%, 4.44%, 3.89%, 3.55%, 3.42%, 2.96%, 2.79%, 2.78%, 2.67%, 2.40%, and 2.32% (71.223% in total). In the study performed by Kajbaf, analysis of optimism revealed two important significant factors with >1 values. The eigen amount was 2.95 for the first factor and 1.23 for the second one, representing 36.8% and 15.14% of the variance, respectively [7]. Moreover, the findings of the study by Hadinejad showed seven factors with >1 values, which determined 0.48% of the variance [13].

In the study by Karaminia, the results of EFA showed that the 12-item hope scale for adults was composed of one item representing 47% of the variance [19]. Furthermore, Rajabi

investigated the consistency of attitude towards cigarette smoking by four factors which determined 57.53% of the variance [20]. In another study, EFA revealed five factors for the 40-item hope scale which determined 56% of the variance [21].

In the present study, the results of CFA based on the structure and theoretical background of the theory of planed behavior revealed four factors for all the items. Based on the factors' structure matrix, questions numbered 1, 2, 6, 8, 12, 16, 18, 20, 24, 35, and 39 were correlated to the first factor, questions numbered 3, 4, 7, 9, 11, 14, 15, 19, 21, 31, 36, and 41 were correlated to the second factor, questions numbered 29, 30, 37, 38, 40, 42, 43, 44, and 45 were correlated to the third factor, and questions numbered 5, 10, 13, 17, 22, 23, 25, 26, 27, 28, 32, 33, and 34 were correlated to the forth factor. The results were not completely in concordance with the considered theoretical model. It could be happened because of the significant correlations among different factors of the questionnaire. The Eigen values were 9.75 for the first factor, 3.65 for the second factor, 2.60 for the third factor, and 2.08 for the fourth factor, representing 21.67%, 7.91%, 5.77%, and 4.63% of the variance, respectively. The results of Kajbaf's study presented 2 factors for the questions which represented 52.2% of the variance [7]. In the study conducted by Pakpour, the constructs of theory of planned behavior determined 51% of the variance of brushing teeth behavior. These constructs also determined 29% of the variance of using dental floss in the study by Rise et al. [22] and 66% of change in physicians' decisions for sharing knowledge in Alipour's research [23].

It is worth mentioning that the highest amount of change was related to attitude, which is in agreement with the findings of the studies by Alipour [23], Ali Mehri [24], [25], and Karimi [11].

Limitations of the present study were that it is performed on one sex and used a convenient sample size, therefore; we cannot generalize the results to all of adolescents.

Conclusion

Since the designed questionnaire had acceptable validity and reliability, it can be used in other studies, eigenly on adolescents.

Suggestions:

Considering the limitations of this study, the followings are recommended in future studies:

1- Studies should be performed on the two sexes and a larger sample size.

2- The participants' age groups, educational degrees, cultural and social background, and economic status should be taken into account.

3- Studies should also be carried out based on other models of health education in order to find the most effective model for conducting studies on this subject.

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Contribution

Study design: ARJ, LGH, MHK

Data collection and analysis: SK, ARJ

Manuscript preparation: ARJ, LGH, SK, MHK

Conflict of Interest

"The authors declare that they have no competing interests."

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