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VALIDATION OF A TAILORED L2 MOTIVATIONAL SELF SYSTEM QUESTIONNAIRE THROUGH CONFIRMATORY FACTOR ANALYSIS

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Abstract

This study investigated the structure of a self-report motivation questionnaire which was designed on the basis of the most recent theory of second language (L2) motivation research devised by Zoltan Dörnyei; namely, L2 motivational self system (L2MSS). The data was collected through administering the questionnaire to a sample of 318 undergraduate students. The scores underwent confirmatory factor analysis (CFA). The results of the analyses demonstrated that the hypothesized model is a good fit for the data and the questionnaire is both valid and reliable as a measure of motivational attributes.

Keywords: motivation, confirmatory factor analysis, validity, reliability

1. Introduction

Measuring and quantifying psychological and unobservable constructs have always been a challenge for researchers. This problem becomes even harder in disciplines such as psychology and education. In L2 education and pedagogy, individual differences such as anxiety, attitude and motivation are among the toughest and most controversial concepts to measure. In fact, because of their highly abstract and inaccessible nature, they are variously conceptualized by different rhetoricians and theoretical standpoints. Therefore, with a change in the theoretical conceptualization and emergence of novel hypothetical models comes a shift in operational definitions and measurement methods.

L2 motivation has been a hotly disputed issue in the past 50 years. Since its introduction by Gardner and Lambert (1959), L2 motivation research has undergone many ups and downs and has witnessed several major theoretical periods. Beginning with the early social-psychological period (Gardner, 1985), the waves of change took the research agenda to the cognitive-situated period (Crookes & Schmidt, 1991), the process-oriented period (Dörnyei & Otto, 1998; Williams & Burden, 1997), and finally socio-dynamic period (Dörnyei, 2005; Ushioda, 2009). The last period gave rise to the latest model of L2 motivation, namely, L2 motivational self system (L2MSS). This model was promoted by Dörnyei (2005, 2009) and then, empirically supported by several research studies (e.g., Csizér & Kormos, 2009; Kormos & Kiddle, 2013; Taguchi, Magid & Papi, 2009).

During those periods, different self-report questionnaires have been utilized for quantifying motivational attributes of L2 learners. Gardner's (1985) the Attitude/Motivation Test battery (AMTB) has been the most widely used instrument during the past decades. It was constructed in accordance with early principles of social-psychological perspectives to L2 motivation. The questionnaire consisted of more than 130 items and possessed acceptable psychometric characteristics (Gardner & MacIntyre, 1993). However, in the wake of the new era of socio-dynamic views to L2 motivation the old ways seemed obsolete and outdated. Based on the new L2MSS conceptualization, L2 motivation is manifested as motivated

behavior (intended effort) which is understood as an individual learner's willingness or intention to put effort, energy and time into the language learning activities. The main components of the model are ideal L2 self (the L2-specific facet of one's ideal self), ought-to L2 self (the attributes that one believes one ought to possess to meet others' expectations and to avoid possible negative outcomes), and L2 learning experience or attitude to language learning (situated, executive motives related to the immediate learning environment and experience) (Dörnyei & Ushioda, 2011). The L2MSS characterizes a special understanding of L2 motivation by linking the construct to individuals' vision of their imagined selves in a future state (Dörnyei & Ryan, 2015). In fact, learners' imagination power and their perceptional sensory preferences (visual or auditory) are viewed as robust means to enable the learners to imagine their L2-related ideal or ought-to future selves. It means that the more elaborate and vivid the learners' personal visions are, the more motivated they become to exert effort and attain the ideal situation (or avoid the negative ones) (Dörnyei & Ushioda, 2011).

In light of this novel theory, some new motivation questionnaires were designed and constructed to measure motivational disposition as defined by the L2MSS. Dörnyei, Csizér and Nemeth (2006) used the first version of an L2MSS-based questionnaire. It involved not only the major elements of the theory, but also several other interconnected variables which affect L2 motivation (e.g. attitude to L2 community, contact with L2 speakers, L2 self-confidence, etc.). Later, several other researchers drew on this original version, added some other variables and often manipulated the number of items in each multi-item scale to serve their own specific purposes. Al-Shehri (2009), Chan (2014), Dörnyei and Chan (2013), Magid (2014), Ryan (2009), Taguchi et al. (2009), and You and Dörnyei (2016) all applied the same core components and modified the questionnaire in terms of response scales (five-point or six-point) and the number of items. That is why there are various types of L2MSS-based questionnaires that normally include the major elements (intended effort, ideal L2 self, ought-to L2 self, and attitude to language learning). In addition, upon the intended aims of the studies they include a variety of other variables which are directly or indirectly related to the motivational characteristics of L2 learners.

1.1. The current study

The present study is part of a larger research project that sought to investigate the L2 motivational attributes, imagery capacity, and sensory learning styles of Iranian EFL learners. In order to prepare a proper measurement instrument, the various existing l2MSS-based questionnaires were used and a more comprehensive questionnaire was compiled which deals with both the motivational components and the imagery-sensory elements. The resulting questionnaire needed to be validated and tested for its reliability. Therefore, the present study attempted to provide the necessary validity evidence and reliability indexes through meticulous examination of the questionnaire.

2. Method

2.1. Participants

The L2MSS-based questionnaire was administered to 318 Persian-speaking EFL learners (127 male and 181 female) enrolled at four private language institutes in Tehran, Iran. Their ages ranged from 17 to 41 (Mean= 24.3, SD= 4.1). The students were purposefully selected from intermediate, upper-intermediate, and advanced levels. The intentional choice of age and proficiency level was because of Dörnyei and Kubanyiova's (2014) suggestion to focus on mature learners who are likely to possess realistic future-oriented visions and their knowledge and experience allow them to build personally relevant goals. Also, they are

probably more sensitive to and aware of their social roles and duties that engender ought-to self.

2.2. Instrument

The compiled questionnaire (see the Appendix) was prepared to measure seven distinct variables. Four of the multi-item scales (those pertained to the elements of the motivational model) were adopted from Taguchi et al. (2009) and three of them (imagery and sensory style components) were taken from Chan (2014). No change was made to any of the individual items. The final product consisted of a total of 51 items categorized into seven scales. A detailed overview of them follows:

1. Intended effort (motivated behavior): 10 items, example: I would like to spend lots of time studying English.

2. Ideal L2 Self: 10 items, example: I can imagine a situation where I am speaking English with foreigners.

3. Ought-to l2 Self: 10 items, example: I consider learning English important because the people I respect think that I should do it.

4. Attitude to language learning: 6 items, example: I like the atmosphere of my English classes.

5. Visual sensory style: 5 items, example: I remember things better if I write them down.

6. Auditory sensory style: 5 items, example: I prefer to learn by listening to the teacher than by reading a text.

7. Imagery capacity: 5 items, example: I avoid running into problems by imagining how they might happen in the future.

2.3. Procedure

First, the questionnaire was subjected to a think aloud activity with five intermediate language learners who were also non-English students at university. Fortunately, they could easily read and understand all the items and did not face any major problem in grasping the ideas in them. This could be attributed to the fact the items had already underwent similar processes in earlier studies (as named above). Then, the administration took place in paper-and-pencil form. It took around 25-30 minutes for every individual to accomplish the task. Finally, the obtained data was used for estimating the validity and reliability of the questionnaire by using AMOS and SPSS.

2.4. Data analysis

Using AMOS 23, the collected data was subjected to confirmatory factor analysis (CFA) in order to determine the construct validity of the instrument. CFA was preferred over exploratory factor analysis (EFA) because EFA is appropriate when researchers have few, if any, hypothesis about the internal structure of the questionnaire and the grouping of the items. The researchers try to explore the nature of the relationships in order to discover the potential categories and multi-item scales. On the other hand, CFA is useful when researchers have a clear hypothesis or theory (or several competing ones) about the latent factors that underlie the observed responses and constitute the multi-item scales. CFA allows researchers to evaluate the degree to which their pre-established measurement theory is consistent with actual data produced by the respondents. Therefore, CFA facilitates hypothesis-testing, theory comparison, and theory development (Bishop & Hertenstein, 2004).

According to Furr and Bacharach (2014), the resulting CFA output is scrutinized and interpreted within three major steps; obtaining fit indices, obtaining parameter estimates, and potentially, doing model modification. First of all, fit indices are examined. They might include the Goodness of Fit Index (GFI), the Incremental fit Index (IFI), the Normed Fit Index (NFI), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square of Approximation (RMSEA). If the indices show that the hypothesized measurement model demonstrates overall adequacy, i.e. is consistent with the observed data, researchers move to the next step. However, if the model is not a good fit, researchers needs to consider model modification. When obtaining poor fit indices, they should examine modification indices to identify useful revisions to their measurement model. The final step pertains to obtaining parameter estimates. Typical parameter estimates include items' factor loadings, inter-factor associations, and error variances. They present the factorial structure of the scales. The most significant parameter is factor loading which reflects the degree to which each item is linked to a latent factor.

It must be noted that the questionnaire scales do not constitute a comprehensive, hierarchical model. Actually, each of the seven multi-item scales is independent from the other ones and the seven measured factors do not lead to a more inclusive and all-encompassing latent trait, hence, no single overarching theory can be imposed to them. In addition, intended effort is itself being measured through a separate scale and is not considered an unobserved latent trait emerging from lower-order factors. Hence, the CFA involves constructing seven distinct models, each containing a factor directly connected to a number of individual Likert scale items.

3. Results and Discussion

The scales were subjected to a maximum-likelihood CFA. Several fit indexes were examined to assess the fit of each scale. None of the models demonstrated statistically significant chi-square values, suggesting that all of the factors fit their respective data. The other indexes of fit were examined next. The goodness of fit index (GFI), the adjusted goodness of fit index (AGFI), the incremental fit index (IFI), the normed fit index (NFI), the Tucker-Lewis index (TLI), and the comparative fit index (CFI) were calculated. They indicate the fit gained by each factor model relative to the most restrictive model. These indexes are scaled from 0 to 1 (with 0 meaning no fit and 1 meaning perfect fit). Any value higher than .90 is acceptable, though .93 and .95 are also set by some sources (Hu & Bentler, 1999).

Finally, the root mean square error of approximation (RMSEA) was computed. This index is a population discrepancy function that compensates for the effects of model complexity. The closer the RMSEA coefficient is to 0, the better the fit of the model. Usually, an RMSEA of less than .08 is considered to be a good indicator. However, some scholars prefer a value of less than .05 (Browne and Cudek, 1993). Table 1 offers a summary of the indexes for all the multi-item scales. As the results indicate, all of them achieved reasonable fit and gained construct validity evidence.

Table 1. *Fit indexes for the seven multi-item scales*

Fit index	Intended effort	Ideal L2 self	Ought-to L2 self	Attitude to language learning	Auditory sensory style	Visual sensory style	Imagery capacity	Critical value
CMIN	47.30	45.67	46.63	9.85	5.73	.95	2.43	
CMIN/DF	1.43	1.38	1.41	1.4	1.91	.32	.6	< 3
P value	.051	.07	.058	.19	.12	.81	.65	> .05

GFI	.91	.92	.91	.97	.97	.99	.99	> .9
AGFI	.86	.88	.86	.92	.89	.98	.96	> .9
IFI	.98	.98	.98	.98	.99	1	1	> .9
NFI	.95	.96	.95	.94	.98	.99	.99	> .9
TLI	.97	.98	.97	.96	.97	1	1	> .9
CFI	.98	.98	.98	.98	.99	1	1	> .9
RMSEA	.06	.06	.06	.62	.09	.0	.0	< .08

Note. CMIN = minimum discrepancy; CMIN/DF = minimum discrepancy divided by degrees of freedom; GFI = goodness of fit index; AGFI = adjusted goodness of fit index; IFI = incremental fit index; NFI = normed fit index; TLI = Tucker-Lewis Index; CFI = comparative fit index; RMSEA = root mean square error of approximation.

The items' loading confirmed that the seven factors of the questionnaire were well defined by their related items. All item loadings exceeded the .60 critical value and differed reliably from zero at 0.001 level (two-tailed). Table 2 summarizes the parameter estimates (factor loading estimates) of all the 51 items of the questionnaire.

Table 2. *Parameter estimates for the seven multi-item scales*

Intended effort		Ideal L2 self		Ought-to L2 self		Attitude to language learning		Auditory sensory style		Visual sensory style		Imagery capacity	
item	FLE	item	FLE	item	FLE	item	FLE	item	FLE	item	FLE	item	FLE
1	.81	11	.91	21	.76	31	.90	37	.88	42	.81	47	.85
2	.82	12	.87	22	.86	32	.92	38	.76	43	.87	48	.80
3	.92	13	.89	23	.86	33	.89	39	.77	44	.77	49	.76
4	.69	14	.83	24	.85	34	.87	40	.81	45	.67	50	.79
5	.85	15	.82	25	.85	35	.91	41	.77	46	.73	51	.79
6	.75	16	.89	26	.72	36	.86						
7	.85	17	.83	27	.71								
8	.83	18	.86	28	.83								
9	.85	19	.87	29	.82								
10	.82	20	.84	30	.84								

Note. FLE = Factor loading estimate

3.1. Estimating the reliability

The collected data was also subjected to Cronbach α for estimating the internal consistency of the scales. The findings revealed that the questionnaire is highly reliable. The results are summarized in Table 3.

Table 3. *Reliability estimates of the scales*

Multi-item Scale	Cronbach α
Intended effort	.95
Ideal L2 self	.96
Ought-to L2 self	.95
Attitude to language learning	.94
Cultural interest	.94
Attitude to L2 community	.91
Auditory sensory style	.89
Visual sensory style	.88
Imagery capacity	.88
L2 self-confidence	.96

The results of the CFA indicated that the questionnaire enjoys well-established construct validity and reliability. the obtained evidence suggests that the groups of individual items

represent the factors well and that the measurement instrument can be confidently used to quantify the given constructs.

4. Conclusion and Implication

The aim of this study was to evaluate the construct validity of a compiled questionnaire measuring the motivational attributes of L2 learners as defined by the L2MSS. The outcomes of the statistical analyses showed that the questionnaire possessed satisfactory construct validity. In addition, the questionnaire had remarkable reliability and internal consistency in the specific administration setting wherein the instrument was examined and tested.

The implications of this study pertain to potential applications of the questionnaire to research projects. Measurement is a crucial part in every research study. Therefore, the reliability and validity of the instrument largely determines the accuracy and applicability of the results. The validated motivation questionnaire presented in the current study could supply the future studies with a valid and robust device to collect data and use them to draw conclusions with more confidence and assurance.

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Appendix

Appendix
Motivation and Vision Questionnaire

We would like to ask you to help us by participating in this survey, to better understand the thoughts and beliefs of learners of English in Iran. This questionnaire is not a test so there are no "right" or "wrong" answers and you do not even have to write your name on it. We are interested in your opinion. The results of this survey will be used only for research purposes so please give your answers sincerely to ensure the success of this project. Thank you very much for your help!

Part I

We would like you to tell us how much you agree or disagree with the following statements by simply circling a number from 1 to 5. Please do not leave out any items.

strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
1	**2**	**3**	**4**	**5**

Example: if you strongly agree with the following statement, circle 5.

I like classical music.	**1**	**2**	**3**	**4**	**5**

Intended effort					
1. If an English course was offered in the future, I'd like to take it.	1	2	3	4	5
2. I am working hard at learning English.	1	2	3	4	5
3. I am prepared to expend a lot of effort in learning English.	1	2	3	4	5
4. I think that I am doing my best to learn English.	1	2	3	4	5
5. I would like to spend lots of time studying English.	1	2	3	4	5
6. I would like to concentrate on studying English more than any other topic.	1	2	3	4	5
7. If my teacher would give the class an optional assignment, I would certainly volunteer to do it.	1	2	3	4	5
8. I would like to study English even if I were not required to do so.	1	2	3	4	5
9. If I could have access to English-speaking TV stations, I would try to watch them often.	1	2	3	4	5
10. I frequently think over what we have learnt in my English class.	1	2	3	4	5
Ideal L2 self					
11. I can imagine myself living abroad and using English effectively for communicating with the locals.	1	2	3	4	5
12. I can imagine myself speaking English with international friends or colleagues.	1	2	3	4	5
13. I imagine myself as someone who is able to speak English.	1	2	3	4	5
14. I can imagine myself speaking English as if I were a native speaker of English.	1	2	3	4	5
15. Whenever I think of my future career, I imagine myself using English.	1	2	3	4	5
16. I can imagine myself studying in a university where all my courses are taught in English.	1	2	3	4	5
17. The things I want to do in the future require me to speak English.	1	2	3	4	5
18. I can imagine a situation where I am doing business with foreigners by speaking English.	1	2	3	4	5
19. I can imagine myself in the future giving an English speech successfully to the public in the future.	1	2	3	4	5
20. I can imagine myself participating in a debate in English.	1	2	3	4	5
Ought-to L2 self					

21. I study English because close friends of mine think it is important.	1	2	3	4	5
22. I have to study English, because, if I do not study it, I think my family will be disappointed with me.	1	2	3	4	5
23. Learning English is necessary because people surrounding me expect me to do so.	1	2	3	4	5
24. I consider learning English important because the people I respect think that I should do it.	1	2	3	4	5
25. Studying English is important to me in order to gain the approval of my peers/teachers/family/boss.	1	2	3	4	5
26. It will have a negative impact on my life if I don't learn English.	1	2	3	4	5
27. Studying English is important to me because an educated person is supposed to be able to speak English.	1	2	3	4	5
28. Studying English is important to me because other people will respect me more if I have knowledge of English.	1	2	3	4	5
29. If I fail to learn English, I'll be letting other people down.	1	2	3	4	5
30. People around me believe that I must study these languages to be an educated person.	1	2	3	4	5
Attitude to Learning English					
31. I like the atmosphere of my English classes.	1	2	3	4	5
32. I find learning English really interesting.	1	2	3	4	5
33. I always look forward to English classes.	1	2	3	4	5
34. I really enjoy learning English.	1	2	3	4	5
35. I really like the actual process of learning English.	1	2	3	4	5
36. I think time passes faster while studying English.	1	2	3	4	5
Auditory sensory style					
37. When the teacher tells me the instructions, I understand better.	1	2	3	4	5
38. I remember things better if I discuss them with someone.	1	2	3	4	5
39. I prefer to learn by listening to the teacher rather than by reading a text.	1	2	3	4	5
40. I learn better in class when the teacher gives a lecture.	1	2	3	4	5
41. I remember things I have heard in class better than things I have read.	1	2	3	4	5
Visual sensory style					
42. I understand better by reading instructions than by listening to instructions.	1	2	3	4	5
43. I remember something better if I write it down.	1	2	3	4	5
44. I learn better by reading what the teacher writes on the chalkboard.	1	2	3	4	5
45. I make drawings in my notes to remember important material.	1	2	3	4	5
46. I use colour-coding (e.g. highlighter pen) to help me as I learn or work.	1	2	3	4	5
Imagery capacity					
47. If I wish, I can imagine some things so vividly that they hold my attention as a good movie or story does.	1	2	3	4	5
48. When I am thinking, I often have visual images rather than thoughts in my mind.	1	2	3	4	5
49. I avoid running into problems by imagining how they might happen in future.	1	2	3	4	5
50. When reading fiction, I usually have a vivid mental picture of the scene that has been described.	1	2	3	4	5
51. My daydreams are sometimes so vivid I feel as though I actually experience the scene.	1	2	3	4	5