MLQ Psychometric Analysis

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**Introduction**

The Meaning in Life Questionnaire (MLQ), (Steger, 2012) is one of the most widely used and validated purpose and meaning scales. It was designed to include two factors one getting at a sense of presence of purpose (MLQ-P) and the other searching for purpose (MLQ-S). Each factor has five items. The purpose of this analysis is threefold. First to see whether this factor structure held up for youth population, because all other validation studies have been conducted on an adult or college age population. Second, in the literature review of this thesis I suggested, based on the literature and meaning and purpose were two integral parts of the same factor that could not easily be separated out from each other. If one has meaning one has purpose and vice versa. Since the MLQ uses the language of both meaning and purpose, this was a perfect case study to see if respondents saw a difference between the two. I, thus, wanted to see whether there was a dichotomy between these two wordings, meaning and purpose, in the items. I hypothesized that if there was a difference it would be small in nature and a second-order model would show that they are really part of the same factor. Third, to test whether MLQ represented is a distinct factor in comparison to factors such as self-concept and whether is correlated with other purpose scales. For this a convergent and discriminant validity test was carried out.

**Exploratory Factor Analysis**

A two factor model was tested using Confirmatory Factor Analysis (CFA), Number of observations used was 970. The fit was good,  for the model was 34 with a  = 32.47, *p* < 0.18; CFI =0.98, TLI = 0. 974, RMSEA = 0.052 [90% CI = 0.042, 0.061].

Loadings (see Table 1) were all above 0.30 and the correlation between the two factors was 0.14 indicating two distinct factors.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | MR2 | MR1 | h2 | u2 | com |
| MLQ 1 | 0.01 | 0.81 | 0.66 | 0.34 | 1.00 |
| MLQ 4 | 0.05 | 0.78 | 0.62 | 0.38 | 1.01 |
| MLQ 5 | 0.05 | 0.77 | 0.61 | 0.39 | 1.01 |
| MLQ 6 | 0.02 | 0.79 | 0.62 | 0.38 | 1.00 |
| MLQ 9 | -0.24 | 0.45 | 0.23 | 0.77 | 1.53 |
| MLQ 2 | 0.81 | -0.08 | 0.64 | 0.36 | 1.02 |
| MLQ 3 | 0.74 | 0.08 | 0.57 | 0.43 | 1.02 |
| MLQ 7 | 0.72 | 0.07 | 0.54 | 0.46 | 1.02 |
| MLQ 8 | 0.72 | 0.09 | 0.55 | 0.45 | 1.03 |
| MLQ 10 | 0.83 | -0.12 | 0.68 | 0.32 | 1.04 |
| SS loadings | 3 | 2.72 |  |  |  |
| MR2 | 1.00 | 0.14 |  |  |  |
| MR1 | 0.14 | 1.00 |  |  |  |

Table 1: Factor Loadings for Confirmatory Factor Analysis of MLQ, Two Factors MLQ-P and MLQ-S

Parallel Analysis using Maximum Likelihood also suggested that there are two factors in the measure. Eigenvalues also analysis suggested that there was two factors factor. The first factor had and eigenvalue of 3.15 wits SD of 1.92 and explained 37% of the variance, the second factor had an eigenvalue of 2 and SD of 1.68 and explained 28% of the variance, the third factor had an eigenvalue of .05 and SD of .7 and explained 7% of the variance. This underscored the two factor model.

An analysis with two factors was conducted using EFA. The fit was identical to the CFA. Loadings (see Table 2) were good and items loaded well on their respective factors (see table 2) and the correlation between the two was low. Thus, I conclude that there are two clear factors here, one presence of purpose and the second searching for purpose and they both work well on a youth population.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | ML1 | ML2 | h2 | u2 | com |
| MLQ 1 | -0.01 | 0.81 | 0.66 | 0.34 | 1.00 |
| MLQ 2 | 0.81 | -0.06 | 0.64 | 0.36 | 1.01 |
| MLQ 3 | 0.74 | 0.09 | 0.57 | 0.43 | 1.03 |
| MLQ 4 | 0.03 | 0.78 | 0.62 | 0.38 | 1.00 |
| MLQ 5 | 0.03 | 0.78 | 0.61 | 0.39 | 1.00 |
| MLQ 6 | 0.00 | 0.79 | 0.62 | 0.38 | 1.00 |
| MLQ 7 | 0.72 | 0.09 | 0.54 | 0.46 | 1.03 |
| MLQ 8 | 0.72 | 0.11 | 0.55 | 0.45 | 1.04 |
| MLQ 9 | -0.25 | 0.44 | 0.23 | 0.77 | 1.58 |
| MLQ 10 | 0.83 | -0.11 | 0.68 | 0.32 | 1.03 |
| SS loadings | 2.98 | 2.74 |  |  |  |
| ML1 | 1.00 | 0.15 |  |  |  |
| ML2 | 0.15 | 1.00 |  |  |  |

Table 2: Factor Loadings for Exploratory Factor Analysis with Oblimin Rotation of APSI

Within these two factors I then attempted to look for evidence of there being two factors, meaning and purpose. This is based on the view of some in the literature that meaning and purpose are tow distinct, albeit related, factors (Damon, 2008, Bronk, 2009.

I first tried to separate out the meaning and purpose questions from the entire MLQ instrument both searching for and presence of purpose using target rotation. However, all the items just loaded on their presence of purpose and searching for purpose factors and did not load on the meaning and purpose questions (see table 3). I then tried a structural equation modelling solution where I set correlations between the factors at zero. The fit ended up being extremely poor,  for the model was 27 with a  = 2609.119, *p* < 0.00; CFI =0.331, TLI = 0.108, RMSEA = 0.314 [90% CI = 0.304, 0.324] and the items did not load on the factors (see table 4 and plot 1).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | MR2 | MR1 | h2 | u2 | com |
| MLQ-P1 Meaning | 0.78 | -0.24 | 0.65 | 0.35 | 1.19 |
| MLQ-S2 Meaning | 0.25 | 0.74 | 0.62 | 0.38 | 1.23 |
| MLQ-P5 Meaning | 0.76 | -0.19 | 0.61 | 0.39 | 1.12 |
| MLQ-S10 Meaning | 0.22 | 0.80 | 0.70 | 0.30 | 1.16 |
| MLQ-S3 Purpose | 0.38 | 0.65 | 0.58 | 0.42 | 1.61 |
| MLQ-P4 Purpose | 0.77 | -0.19 | 0.62 | 0.38 | 1.12 |
| MLQP-6 Purpose | 0.77 | -0.22 | 0.62 | 0.38 | 1.16 |
| MLQ-S8 Purpose | 0.38 | 0.61 | 0.54 | 0.46 | 1.67 |
| MLQ-P9 Purpose | 0.33 | -0.35 | 0.23 | 0.77 | 1.99 |
| SS loadings | 2.89 | 2.28 |  |  |  |
| MR2 | 1.00 | 0.03 |  |  |  |
| MR1 | 0.03 | 1.00 |  |  |  |

Table 3: Factor Loadings for Confirmatory Factor Analysis of MLQ with Target Rotation, Two Factors Meaning and Purpose

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Factor | op | Veriable | Loadings |
| 1 | Purpose | =˜ | MLQ 1 | 0.69 |
| 2 | Purpose | =˜ | MLQ 2 | 0.08 |
| 3 | Purpose | =˜ | MLQ 5 | 0.95 |
| 4 | Purpose | =˜ | MLQ 10 | 0.06 |
| 5 | Meaning | =˜ | MLQ 3 | 0.25 |
| 6 | Meaning | =˜ | MLQ 4 | 0.88 |
| 7 | Meaning | =˜ | MLQ 6 | 0.75 |
| 8 | Meaning | =˜ | MLQ 8 | 0.24 |
| 9 | Meaning | =˜ | MLQ 9 | 0.33 |

Table 4: Factor Loadings for Confirmatory Factor Analysis with SEM (Lavaan) of MLQ, Two Factors: Meaning and Purpose



Plot 1

This underscored that the presence of purpose and searching for purpose factors were dominant and distinct. I then tested whether the purpose and meaning items in MLQ-S were separate factors. Item seven of the MLQ uses the word “significant” instead of meaning or purpose and therefore that was left out. Using a SEM model this resulted in a matrix that was not a positive definite and the second eigenvalue are was less than zero (-0.01) suggesting that the correlation between the two factors was larger than 1 (in this case 1.01). I therefore constrained the coloration between the two latent factors to 1 and ran the model again. This resulted in two eigenvalues of 2.02 and 0.02 and a correlation between the factors of 0.98 and the fit was terrible. The one factor model conversely had excellent fit measurements (see table 5 for a comparison of the one factor fit to the two factor fit). This clearly indicated that a one factor solution was a far better fit of the data than a two factor model and that in the searching for purpose scale meaning and purpose did not represent two distinct factors, on the contrary they were seen by respondents as being identical in content to each other.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Fit Measure | One Factor Model | Meaning/Purpose Model |
| 1 | Chisq | 7.95 | 56.67 |
| 2 | DF | 2.00 | 2.00 |
| 3 | P-Value | 0.02 | 0.00 |
| 4 | CFI | 1.00 | 0.97 |
| 5 | TLI | 0.99 | 0.90 |
| 6 | RMSEA | 0.06 | 0.17 |
| 7 | RMSEA ci upper | 0.02 | 0.13 |
| 8 | RMSEA ci lower | 0.10 | 0.21 |
| 9 | SRMR | 0.01 | 0.13 |

Table 5: Comparison of the one factor fit to the two factor fit

Yet, perhaps in the search for purpose and meaning questions people do not differentiate between the two because they have not yet experienced either. In addition, given that in the five item searching for purpose scale there was three terms, purpose, meaning and significance, it was possible that the addition of significance muddied the waters. Furthermore, searching for meaning and presence of meaning was only marginally correlated (0.14, see table 1) and thus meaning and purpose might be interpreted differently in the presence of purpose scale compared to the searching for purpose scale. It was therefore worth checking whether a meaning and purpose difference existed in the presence of purpose scale.

Thus, I wanted to see whether in the presence of purpose scale I could find a trace of two factors meaning and purpose. I therefore tried to fit three models and see how they compared to each other. The was the one factor model, the second was a two factor model—meaning and purpose—and the third was a second order mode (see tables 6, 7 and 8 and plots 2, 3 and 4).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Factor | op | Veriable | Loadings |
| 1 | Purpose | =˜ | MLQ 1 | 0.81 |
| 2 | Purpose | =˜ | MLQ 5 | 0.78 |
| 3 | Purpose | =˜ | MLQ 4 | 0.79 |
| 4 | Purpose | =˜ | MLQ 6 | 0.79 |
| 5 | Purpose | =˜ | MLQ 9 | 0.40 |
| 6 | MLQ 1 | ˜˜ | MLQ 1 | 0.34 |
| 7 | MLQ 5 | ˜˜ | MLQ 5 | 0.39 |
| 8 | MLQ 4 | ˜˜ | MLQ 4 | 0.38 |
| 16 | MLQ 9 | ˜1 |  | 2.44 |
| 17 | Purpose | ˜1 |  | 0.00 |

Table 6: Factor Loadings for Confirmatory Factor Analysis with Lavaan of MLQ-P, One Purpose Factor



Plot: 2

|  |  |  |  |
| --- | --- | --- | --- |
| Factor | op | Veriable | Loadings |
| Purpose | =˜ | MLQ 1 | 0.83 |
| Purpose | =˜ | MLQ 5 | 0.79 |
| Meaning | =˜ | MLQ 4 | 0.80 |
| Meaning | =˜ | MLQ 6 | 0.80 |
| Meaning | =˜ | MLQ 9 | 0.39 |

Table 7: Factor Loadings for Confirmatory Factor Analysis with Lavaan of MLQ-P, Two Factors of meaning and purpose factors



Plot: 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Factor | op | Veriable | Loadings |
| 1 | Purpose | =˜ | MLQ 1 | 0.83 |
| 2 | Purpose | =˜ | MLQ 5 | 0.79 |
| 3 | Meaning | =˜ | MLQ 4 | 0.80 |
| 4 | Meaning | =˜ | MLQ 6 | 0.80 |
| 5 | Meaning | =˜ | MLQ 9 | 0.39 |
| 6 | Global | =˜ | Meaning | 0.98 |
| 7 | Global | =˜ | Purpose | 0.97 |

Table 8: Factor Loadings for Confirmatory Factor Analysis with Lavaan of MLQ-P Second Order Purpose and Meaning Factors



Plot: 4

Items loaded very well in all three models but slightly better on the two-factor and second order model. The fit for the models were almost identical although the two facto model was marginally better (see table 9). Yet the correlation between the two factors was also very (0.95) high indicating that there is very little difference between these two factors.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Fit Measure | One Factor | Two Factor | Second Order |
| 1 | Chisq | 33.94 | 25.68 | 25.68 |
| 2 | DF | 5.00 | 4.00 | 3.00 |
| 3 | P-value | 0.00 | 0.00 | 0.00 |
| 4 | CFI | 0.99 | 0.99 | 0.99 |
| 5 | TLI | 0.97 | 0.97 | 0.96 |
| 6 | RMSEA | 0.08 | 0.07 | 0.09 |
| 7 | RMSEA ci lower | 0.05 | 0.05 | 0.06 |
| 8 | RMSEA ci upper | 0.10 | 0.10 | 0.12 |
| 9 | SRMR | 0.02 | 0.02 | 0.02 |

Table 9: Measure of Fit

**MLQ with Positive instead of Negative Question**

There remained on issue with the MLQ-P and that is that the negatively worded question (MLQ-P 9) was not loading well on the factors at 0.40 and below. I therefore collected data from an additional 748 teenagers using the MLQ-P but replaced the negatively worded item (MLQ 9) with a positively worded item similar to one found in APSI (I have definite purpose in my life). I wanted to see whether this would result in a better fit for the data and whether it would support a two factor model: meaning and purpose. Goodness of fit measures were all excellent but the one factor fit was marginally better (see table 10), on the two factor model the correlation between the two factors was 0.99 both of these indicate a one factor solution as being the most appropriate solution.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Fit Measure | One Factor Fit | Meaning/Purpose Fit |
| 1 | Chisq | 16.30 | 15.56 |
| 2 | DF | 5.00 | 4.00 |
| 3 | P-Value | 0.01 | 0.00 |
| 4 | CFI | 1.00 | 1.00 |
| 5 | TLI | 1.00 | 0.99 |
| 6 | RMSEA | 0.05 | 0.06 |
| 7 | RMSEA ci upper | 0.03 | 0.03 |
| 8 | RMSEA ci lower | 0.09 | 0.10 |
| 9 | SRMR | 0.00 | 0.00 |

Table 10. Goodness of fit measures

Factor loadings for all items were very high (.89 and above see tables 11 and 12), this indicates that a one factor solution is preferable and that there is no discernable difference between items using the term meaning and those using the term purpose.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Factor | op | Veriable | Loadings |
| 1 | Purpose | =˜ | MLQ 1 1 | 0.94 |
| 2 | Purpose | =˜ | MLQ 5 1 | 0.93 |
| 3 | Purpose | =˜ | MLQ 4 1 | 0.96 |
| 4 | Purpose | =˜ | MLQ 6 1 | 0.95 |
| 5 | Purpose | =˜ | MLQ 11 1 | 0.89 |

Table 11: Factor Loadings for Confirmatory Factor Analysis with Lavaan of MLQ-P, One Purpose Factor

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Factor | op | Veriable | Loadings |
| 1 | Purpose | =˜ | MLQ 1 1 | 0.94 |
| 2 | Purpose | =˜ | MLQ 5 1 | 0.94 |
| 3 | Meaning | =˜ | MLQ 4 1 | 0.96 |
| 4 | Meaning | =˜ | MLQ 6 1 | 0.95 |
| 5 | Meaning | =˜ | MLQ 11 1 | 0.89 |
| 11 | Purpose | ˜˜ | Purpose | 1.00 |
| 12 | Meaning | ˜˜ | Meaning | 1.00 |
| 13 | Purpose | ˜˜ | Meaning | 1.00 |

Table 12: Factor Loadings for Confirmatory Factor Analysis with Lavaan of MLQ-P, One Purpose Factor

**Discriminant and Convergent Validity**

In order to check for validity, I conducted a discriminant and convergent analysis. For discriminant validity I tested MLQ as a two factor model—searching and presence of purpose with APSI second-order two factor model—Feeling Purpose Now and Future Goals—together with ADSQII academic self-concept items testing academic self-concept in four domains: English, Math, Science and general school subjects. Whilst MLQ-P correlated well with the higher order purpose factor of the APSI scale (0.694). As was expected the MLQ-S item did not correlate well with the higher order purpose scale of APSI (0.153). This was similar to how much it correlated with MLQ-P (0.163). This verified that the MLQ-P purpose scale is convergent with other scales that have been show to also measure the construct of purpose.

Besides for English and Math all the other self-concept measures correlated with each other between .40 and .70 but none of the self-concept items correlated with the MLQ-P items beyond 0.26. This showed that the MLQ-P and MLQ-S were distinct from the self-concept scale and was tapping a completely different construct (see table 13).

|  |  |  |  |
| --- | --- | --- | --- |
| Factor | op | Veriable | Loadings |
| MLQP | =˜ | MLQ 1 | 0.79 |
| MLQP | =˜ | MLQ 4 | 0.8 |
| MLQP | =˜ | MLQ 5 | 0.77 |
| MLQP | =˜ | MLQ 6 | 0.81 |
| MLQP | =˜ | MLQ 9 | 0.38 |
| MLQS | =˜ | MLQ 2 | 0.8 |
| MLQS | =˜ | MLQ 3 | 0.75 |
| MLQS | =˜ | MLQ 7 | 0.74 |
| MLQS | =˜ | MLQ 8 | 0.74 |
| MLQS | =˜ | MLQ 10 | 0.8 |
| Feeling Purpose Now | =˜ | APSI 1 | 0.87 |
| Feeling Purpose Now | =˜ | APSI 2 | 0.8 |
| Feeling Purpose Now | =˜ | APSI 5 | 0.69 |
| Future Goals | =˜ | APSI 4 | 0.84 |
| Future Goals | =˜ | APSI 7 | 0.79 |
| Future Goals | =˜ | APSI 8 | 0.82 |
| Purpose | =˜ | Feeling Purpose Now | 0.99 |
| Purpose | =˜ | Future Goals | 0.92 |
| English | =˜ | ASDQII 1 | 0.88 |
| English | =˜ | ASDQII 2 | 0.86 |
| English | =˜ | ASDQII 3 | 0.87 |
| English | =˜ | ASDQII 4 | 0.83 |
| English | =˜ | ASDQII 5 | 0.85 |
| Math | =˜ | ASDQII 6 | 0.9 |
| Math | =˜ | ASDQII 7 | 0.91 |
| Math | =˜ | ASDQII 8 | 0.92 |
| Math | =˜ | ASDQII 9 | 0.9 |
| Math | =˜ | ASDQII 10 | 0.91 |
| Science | =˜ | ASDQII 11 | 0.91 |
| Science | =˜ | ASDQII 12 | 0.9 |
| Science | =˜ | ASDQII 13 | 0.9 |
| Science | =˜ | ASDQII 14 | 0.9 |
| Science | =˜ | ASDQII 15 | 0.89 |
| Subjects | =˜ | ASDQII 16 | 0.83 |
| Subjects | =˜ | ASDQII 17 | 0.86 |
| Subjects | =˜ | ASDQII 18 | 0.85 |
| Subjects | =˜ | ASDQII 19 | 0.83 |
| Subjects | =˜ | ASDQII 20 | 0.84 |
| MLQP | ˜˜ | MLQP | 1 |
| MLQS | ˜˜ | MLQS | 1 |
| Feeling Purpose Now | ˜˜ | Feeling Purpose Now | 0.02 |
| Future Goals | ˜˜ | Future Goals | 0.16 |
| Purpose | ˜˜ | Purpose | 1 |
| English | ˜˜ | English | 1 |
| Math | ˜˜ | Math | 1 |
| Science | ˜˜ | Science | 1 |
| Subjects | ˜˜ | Subjects | 1 |
| MLQP | ˜˜ | MLQS | 0.16 |
| MLQP | ˜˜ | Purpose | 0.69 |
| MLQP | ˜˜ | English | 0.29 |
| MLQP | ˜˜ | Math | 0.17 |
| MLQP | ˜˜ | Science | 0.16 |
| MLQP | ˜˜ | Subjects | 0.26 |
| MLQS | ˜˜ | Purpose | 0.15 |
| MLQS | ˜˜ | English | 0.11 |
| MLQS | ˜˜ | Math | 0 |
| MLQS | ˜˜ | Science | 0.08 |
| MLQS | ˜˜ | Subjects | 0.05 |
| Purpose | ˜˜ | English | 0.17 |
| Purpose | ˜˜ | Math | 0.15 |
| Purpose | ˜˜ | Science | 0.12 |
| Purpose | ˜˜ | Subjects | 0.16 |
| English | ˜˜ | Math | 0.24 |
| English | ˜˜ | Science | 0.4 |
| English | ˜˜ | Subjects | 0.68 |
| Math | ˜˜ | Science | 0.52 |
| Math | ˜˜ | Subjects | 0.69 |
| Science | ˜˜ | Subjects | 0.7 |

Table 13: Factor Loadings for Discriminant and Convergent Validity

of MLQ-Present and MLQ Searching with APSI and Academic Self Concept using Lavaan

**Conclusion**

The point of this study was threefold. First I wanted to discover whether the meaning in Life Questionnaire (MLQ) would work with a teenage population. The results indicated that both searching for purpose and presence of purpose were two distinct and uncorrelated factors and were present for this population. Second I wanted to see whether there is a meaningful difference of factors between meaning and purpose as some have suggested (Bronk, 2009). There was little support in this data for meaning and purpose being two distinct factors. It seems that respondents see these two terms as interchangeable. This might indicate, as some in the literature have suggested, and I have maintained in the literature review section of this thesis, that meaning is a salient part of purpose and cannot be separated out it. This study supports the idea that a unified concept of purpose is made up of both a meaning aspect and a purpose aspect that most people see as both interchangeable and inseparable from each other. Finally the MLQ-P correlated with other purpose scales and did not correlate with self-concept scales indicating that it properly tapped the factor of purpose in life.

**Life Engagement Test Psychometric Analysis**

The Life Engagement Test (LET) was designed to measure purpose in life (Scheier, et al, 2006). The authors of the LET defined purpose as the extent to which an individual partakes in activities and works towards goals that they find personally valuable. LET contains six items three positive (2,4,6) then three negative (1,3,5).

1.There is not enough purpose in my life.

2. To me, the things I do are all worthwhile.

3. Most of what I do seems trivial and unimportant to me.

4. I value my activities a lot.

5. I don’t care very much about the things I do.

6. I have lots of reasons for living.

Psychometric properties of the LET was conducted by the authors on samples of older adults such as community-dwelling men and women who participated in a study on infectious disease, female osteoarthritis patients and their spouses as well as a group of women transitioning through the menopause. No study has been conducted to test the validity of the survey instrument on youth.

In their studies the authors conducted exploratory factor analyses across the different samples and found that a one-factor solution accounted for between 43% and 62% of the variance among the items. They also found high factor loadings, between 57 and .86 and averaging .71, for all six items across all their samples. Although they conducted a test retest model, administered the LET twice, approximately 4 months apart, their sample size was relatively small with N = 178 in one group, N = 62 in the second, N = 55 in the third and N = 61 in the fourth.

In my analysis we have a sample of N=957 youth and I was unable to find support for a one factor model in an exploratory factor analysis. Parallel analysis suggested that there was two factors. Whilst the authors retained factors with eigenvalues >1 using Kaiser’s criterion, (Kaiser, 1960), In my Principle Component Analysis (PCA) I found two eigenvalues >.7 (the first was 2 and the second was 0.82) which based on Jolliffe’s criterion (Jolliffe, 1986) which recommends retaining factors above .70 would suggest two factors. In addition a scree plot supported the contention that there were two factors. Furthermore, the first factor only explained 0.42 percent of the variance whilst the second explained and additional 0.28 percent of the variance among the items. This further indicated that a two factor solution would be an optimal fit to the data.

Nonetheless, given the authors contention of their being one factor and finding only one component with an eigenvalue >1 in my EFA I tried to fit a one factor solution to the data. The results can be seen in table 1. Items 2 and 4 did not load on one factor at all and item six loaded poorly on the factor. I therefore tried a two factor solution and whilst the items loaded better and seemed to divide along the negatively and positively worded items, item 6 was cross loading on both factors (see table 1). The fit was also extremely poor and did not support a one factor solution at all (see table 2). I therefore tried to fit a two factor solution which seemed to be a good fit for the data. Most of the items loaded well on each factor except for item 6 (I have lots of reasons for living) which was cross loading. A Target Rotation yielded virtually identical results for this model. I therefore tried a model that removed item 6, whilst that yielded a somewhat better fit (see table 2) item 4 no longer loaded as well on the second factor and the correlation between the factor went down and item 2 was loading on the second factor at 1. In addition, the Chi Squared was not significant and the CFI and TLI were both 1 and the RMSEA was 0.01. A Target Rotation produced virtually identical results. All this indicated a potential over fitting of the data. I also noted that a one factor model without item 6 yielded results almost identical to a one factor model that included item 6. In addition, on the two factor model, correlations between the factors were low .14 for the model with item 6 and .07 for the model without item 6.

Based on this analysis I rejected the authors suggestion that LET represented one factor in favor of the evidence that that suggested there were two factors and that whilst item 6 was somewhat problematic removing it in the EFA yielded little benefit in terms of fit and factor structure. The two factors that emerged from the EFE were clearly based on positively and negatively worded items and the question therefore was whether this was just a method effect which if accounted for would still yield a one factor solution for the data.

Table 1. Factor Loadings for Exploratory Factor Analysis of LET

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | One Factor EFA | Two Factors EFA | | Two Factor EFA No Item 6 | |
| Variable | **Factor 1** | **Factor 1** | **Factor 2** | **Factor 1** | **Factor 2** |
| LET 1 | **0.66** | **0.63** | 0.15 | **0.64** | 0.15 |
| LET 2 | 0.12 | -0.03 | **0.74** | 0 | **1** |
| LET 3 | **0.85** | **0.87** | -0.04 | **0.87** | -0.02 |
| LET 4 | 0.08 | -0.07 | **0.74** | -0.01 | **0.54** |
| LET 5 | **0.77** | **0.79** | -0.06 | **0.78** | -0.06 |
| LET 6 | **0.42** | **0.33** | **0.50** |  |  |
| SS loadings | 1.96 | 1.9 | 1.4 | 1.77 | 1.32 |
|  | Correlations | 1 | 0.14 | 1 | 0.07 |
|  |  | 0.14 | 1 | 0.07 | 1 |

Table 2. Fit Measures for Exploratory Factor Analysis of LET

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Models | Chisq | DF | P-Value | CFI | TLI | RMSEA | lower | upper | SRMR |
| One Factor Model | 595.42 | 9 | 0 | 0.66 | 0.43 | 0.26 | 0.24 | 0.28 | 0.19 |
| Two Factor Model | 15.66 | 4 | 0 | 0.99 | 0.97 | 0.06 | 0.03 | 0.09 | 0.02 |
| Two Factor w/o 6 | 1.15 | 1 | 0.28 | 1 | 1 | 0.01 |  | 0.09 | 0.01 |

**Confirmatory Factor Analysis**

Given the evidence of the authors of the LET test that there was ponly one factor and my results from the EFA I was left wondering whether the two factors were a simple method effect of the negatively and positively worded items. In order to try and answer this I used Marsh et al’s (2009) methodology of dealing with negative and positive items and ev;luated a multiple model approach in the CFA.

Model 1 was a one factor model. Model 2 was a two factor model where the two factors were correlated with each other. Model 3 was a two factor approach but dropped item 6. Model 4 was a second order model with one global factor and a positive and negative latent factor. Model 5 was a bi-factor model where positive and negative latent factors were set as uncorrelated with each other or with the main factor. Model 6 is similar to model 3 but only identified the negative items as latent factor uncorrelated with the main factor. Model 7 was also a bi-factor similar to model 3 but only identified the positive items as latent factor uncorrelated with the main factor. As Marsh et al. point out these models will allow us to asses whether there is a method effect associated with the negatively and positively worded items going on.

 Model 1 Model 2



Model 3 Model 4

Model 5 Model 6



Model 7



**Results**

In this section I examine the seven models. Model 1 which tested the one factor approach did not load well and was a poor fit for the data and the loading were also problematic as can be seen in tables 2 and 3. Based on the EFA on previous research on method effects the one factor approach was clearly the worst fitting model (CFI = .66, TLI = .42, RMSEA = .24-.25).

The two factor model (Model 2) was substantially better than Model 1, loadings were decent to excellent (see table 3). The fit, however, was poor with a (CFI = .89, TLI = 80, RMSEA = .13 - .17) indicating that a two factor model was a poor fit for the data. Correlations between the factors was .18.

Model 3 was two factor model without item 6. When running that model some estimated variances were negative and the observed variable error term matrix was not positive definite which resulted in item 2 loading on the positive factor at 1.17—the was clearly an over fitted model as was seen in the EFA. I therefore ran the model setting item 2 to be <=1. This resulted in results identical to those found in the EFA. The negative items remaining unchanged from Model 2. However, item 2 now loaded on the positive factor at 1 and item 5 at .54. The fit improved dramatically a (CFI = .97, TLI = 93, RMSEA = .07 - .12). The correlation between the factors without item 6 was now at .07 indicating that without item 6 there is even less in common between these positive and negative factors.

Overall, dropping item 6 was problematic on a number of levels. First, it caused problems with the model to the degree that it over fitted initially. Second, it left us with a two item factor positive factor, not ideal at the best of times. Furthermore the difference in the loadings of the two items on the positive factor made for a less convincing coherent factor. Third, doing this did not leave us with excellent fit measures. Thus, I concluded that we would gain little from dropping item 6 in the rest of the models.

Model 4 suggested that there might be a higher order global LET purpose factor that incorporated the positive and negative purpose items that might be a better fit for the data. I therefore set the positive and negative items to their own individual latent factors and set both of them to a LET Global factor. Loading on the individual factors were good to excellent. However, the positive factor only loaded marginally well onto the LET Global factor (.32) and the negative factor loaded acceptably well on the LET Global (.54) but not extremely well (see table 3). Despite this, the fit measures indicated that a second order model a still poor fit to the data a (CFI = .89, TLI = 73, RMSEA = .14 - .18) and was in fact a slightly worse fit than Model 2 which accounted for the items as tow independent factors (see table 4).

Model 5 was a bi-factor model which accounted for a global factor and two independent uncorrelated positive and negative factors that could explain some of the method effects. The results, however, did not indicate that this was a good fit for the data. Items 2 and 4 did not load on the Global LET factor with a loading >.3, the rest of the items, however, were loading well on their respective positive and negative factors. There was a significant improvement in the fit over Models 1, 2 and 4 (CFI = .97, TLI = 87, RMSEA = .9 - .15).

Model 6 was a bi-factor that only took into account the negative items as a separate uncorrelated latent factor. The results, also did not indicate that this model was a good fit for the data. Like Model 5 items 2 and 4 did not load on the Global LET factor with a loading >.3, yet the items were all loading well on the negative factor, this model represented a worse fit than Models 2, 4 and 5 although was better than Models 1 and 2 (CFI = .91, TLI = 79, RMSEA = .13 - .18).

The final Model was number 7 which took into account the positive items as a separate uncorrelated latent factor. Like Model 5 and 6 items 2 and 4 did not load on the Global LET factor with a loading >.3, yet the items were all loading well on the positive factor, this model represented a the best fit of all (CFI = .97, TLI = 93, RMSEA = .06 - .11). Thus this model represented a good fit for the data. This can be interpreted to mean that there is a methods effect represented by the positively worded questions in the LET test. The limitation to this interpretation, however, is that at least tow of those positively worded items were not loading onto the Global LET factor again indicating that they are separate factors.

**Discussion**

Whilst it is plausible to argue that a one factor solution fits the data when a positively worded method effect is taken into consideration, thus supporting the authors contention of the LET being a scale the represents on factor of purpose, a more plausible interpretation is that there are two separate factors here that in the end do not work well and therefore result in a poor fit for the data. This interpretation is supported by the fact that two of the positively worded items (2 and 4) do not load on the Global LET factor at all (.07 and .03 respectively) when the positive method effect is taken into consideration. This seems to show that these items are loading entirely on the positive latent factor and not on the Global LET factor at all, clear proof of a two factor model. Despite this, as was demonstrated above, a two factor model ends up having good loadings but poor fit indices.

**Conclusion**

Thus, I have concluded that the two factors present in the LET test are not a result of a method effect but a result of poorly worded items that do not properly tap the construct of purpose as understood by youth.

Table 3. Factor Loadings for CFA of LET

|  |  |  |  |
| --- | --- | --- | --- |
| Model | Items | Factor Names | Loadings |
| Model 1 | LET 1 | LET | 0.66 |
|  | LET 2 | LET | 0.12 |
|  | LET 3 | LET | 0.85 |
|  | LET 4 | LET | 0.08 |
|  | LET 5 | LET | 0.77 |
|  | LET 6 | LET | 0.42 |
| Model 2 | LET 1 | Negative | 0.65 |
|  | LET 3 | Negative | 0.87 |
|  | LET 5 | Negative | 0.77 |
|  | LET 2 | Positive | 0.72 |
|  | LET 4 | Positive | 0.73 |
|  | LET 6 | Positive | 0.56 |
| Model 3 | LET 1 | Negative | 0.64 |
|  | LET 3 | Negative | 0.87 |
|  | LET 5 | Negative | 0.77 |
|  | LET 2 | Positive | 1 |
|  | LET 4 | Positive | 0.54 |
| Model 4 | LET 1 | Negative | 0.64 |
|  | LET 3 | Negative | 0.87 |
|  | LET 5 | Negative | 0.77 |
|  | LET 2 | Positive | 0.72 |
|  | LET 4 | Positive | 0.73 |
|  | LET 6 | Positive | 0.56 |
|  | Positive | LET Global | 0.32 |
|  | Negative | LET Global | 0.55 |
| Model 5 | LET 1 | Negative | 0.43 |
|  | LET 3 | Negative | 0.7 |
|  | LET 5 | Negative | 0.58 |
|  | LET 2 | Positive | 0.66 |
|  | LET 4 | Positive | 0.8 |
|  | LET 6 | Positive | 0.43 |
|  | LET 1 | LET Global | 0.48 |
|  | LET 2 | LET Global | 0.16 |
|  | LET 3 | LET Global | 0.54 |
|  | LET 4 | LET Global | 0.08 |
|  | LET 5 | LET Global | 0.5 |
|  | LET 6 | LET Global | 0.63 |
| Model 6 | LET 1 | Negative | 0.61 |
|  | LET 3 | Negative | 0.86 |
|  | LET 5 | Negative | 0.77 |
|  | LET 1 | LET Global | 0.28 |
|  | LET 2 | LET Global | 0.74 |
|  | LET 3 | LET Global | 0.13 |
|  | LET 4 | LET Global | 0.71 |
|  | LET 5 | LET Global | 0.09 |
|  | LET 6 | LET Global | 0.55 |
| Model 7 | LET 2 | Positive | 0.71 |
|  | LET 4 | Positive | 0.76 |
|  | LET 6 | Positive | 0.5 |
|  | LET 1 | LET Global | 0.65 |
|  | LET 2 | LET Global | 0.07 |
|  | LET 3 | LET Global | 0.86 |
|  | LET 4 | LET Global | 0.03 |
|  | LET 5 | LET Global | 0.78 |
|  | LET 6 | LET Global | 0.4 |

Table 4. Fit Measures for CFA of LET

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Models | Chisq | DF | P-Value | CFI | TLI | RMSEA | lower | upper | SRMR |
| Model 1 | 598.24 | 9 | 0 | 0.66 | 0.43 | 0.26 | 0.24 | 0.28 | 0.14 |
| Model 2 | 188.42 | 8 | 0 | 0.89 | 0.80 | 0.15 | 0.13 | 0.17 | 0.09 |
| Model 3 | 50.117 | 5 | 0 | 0.97 | 0.93 | 0.10 | 0.07 | 0.12 | 0.04 |
| Model 4 | 188.42 | 7 | 0 | 0.89 | 0.77 | 0.16 | 0.14 | 0.19 | 0.09 |
| Model 5 | 47.67 | 3 | 0 | 0.97 | 0.87 | 0.12 | 0.1 | 0.16 | 0.03 |
| Model 6 | 151.02 | 6 | 0 | 0.92 | 0.79 | 0.16 | 0.14 | 0.18 | 0.08 |
| Model 7 | 51.43 | 6 | 0 | 0.97 | 0.93 | 0.09 | 0.07 | 0.11 | 0.04 |