RELATIVE PREDICTIVE POWER OF THE
OPTIMISM VERSUS THE PESSIMISM INDEX OF
A CHINESE VERSION OF THE LIFE ORIENTATION TEST

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To examine the dimensionality of the Life Orientation Test (LOT) (a measure of optimism) in Hong Kong Chinese, a Chinese version of the LOT, a physical symptoms checklist, and the Chinese Affect Scale were administered to two separate samples of 230 undergraduates and 173 working adults. Exploratory factor analysis showed that the LOT was split between the optimism and the pessimism indices in both samples, but these two factors were not correlated differentially with either symptom reports or affective measures. On balance, the two indices do differ in one important aspect. The predictive power of the complete LOT was conferred mainly by the optimism rather than the pessimism index. These findings indicate that the two halves of the LOT measure the same construct of optimism, but the positive half or the optimism index does this more adequately. The two-factor solution was probably caused by difference in the direction of item wording rather than multidimensionality. Therefore, the scale should be treated more appropriately as unidimensional for the reason of parsimony.

The Life Orientation Test (LOT) was first developed by Scheier and Carver (1985) to assess the construct of dispositional optimism, which was conceptualized as positive outcome expectancies having important health implications. In the past decade, research on optimism using the LOT has yielded convergent evidence that points to the beneficial health effects of optimism (reviewed by Scheier & Carver, 1992, 1993). Higher scores on the LOT have been shown to be associated with better health outcomes during times of difficulty in different populations such as coronary patients (Desharnais, Godin, Jobin, Valois, & Ross, 1990), breast cancer patients (Carver et al., 1993), gay men at risk for AIDS (Taylor et al., 1992), and college students under academic stress (Aspinwall & Taylor, 1992).

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Scheier, Weintraub, and Carver (1986) attributed the health benefits associated with optimism to adaptive coping. Optimists, in comparison to their less optimistic peers, are more likely to use adaptive problem-focused strategies and less likely to engage in cognitive or behavioral avoidance during stressful encounters. Studies in which path analysis was used have confirmed the significant mediating effect of coping (e.g., Carver et al., 1993; Scheier et al., 1989). More recently, findings from a study in Swedish twins indicate a substantial genetic effect on optimism (Plomin, Scheier, Bergeman, & Pederson, 1992). This further accentuates the importance of this construct in research on personality and health.

Although the construct of optimism has been successfully validated across different populations, the question of whether it can be adequately operationalized by the LOT has stirred up controversies lately. The LOT has been the most widely used instrument in research on optimism. It consists of four positively worded items (e.g., I'm always optimistic about my future), four negatively worded items (e.g., I hardly ever expect things to go my way), and four filler items (e.g., I enjoy my friends a lot). Scheier and Carver (1985, 1987) have suggested that the LOT should best be treated as tapping a bipolar optimism-pessimism dimension in spite of the fact that both a one-factor and a two-factor solution have been found to fit their data by using confirmatory factor analysis. The one-factor stance was favored on the ground that all items loaded heavily on the first factor and correlation between the two factors was high, $r = .64$ (Scheier & Carver, 1985).

Others have begun to question this unidimensional view by showing that the positive and the negative items of the LOT are loaded respectively onto two different factors of optimism versus pessimism (e.g., Lai, 1994; Marshall, Wortman, Kusulas, Hervig, & Vickers, 1992; Mook, Kleijn, & van der Ploeg, 1992). A more convincing piece of evidence demonstrating multidimensionality comes from a study of professional women done by Marshall and Lang (1990). Using confirmatory factor analysis, these two investigators found that their data on the LOT only fitted a two-factor solution. Furthermore, the optimism and the pessimism subscales have been shown in other studies to correlate differentially with reports in physical symptoms (Lai, 1994) as well as other external criteria (e.g., Marshall et al., 1992). These findings tend to suggest that the complete LOT may be treated more reasonably as bidimensional and should not be used as a single scale for assessing optimism.

This multidimensional standpoint is supported by some researchers who have actually defined optimism with only the four positive items of the LOT (e.g., Lai, 1995; Strutton & Lumpkin, 1992). Nevertheless, the evidence accumulated to date, when examined more closely, is not yet able to point convincingly to a multidimensional interpretation for at least two reasons. First, though a two-factor solution has been repeatedly found in studies using confirmatory factor analysis (e.g., Marshall &
Lang, 1990; Scheier & Carver, 1985; Scheier, Carver, & Bridges, 1994),
this may result from differential responding on the basis of difference in
the direction of item wording (e.g., Marshall & Lang, 1990) instead of any
substantive difference between the positive and the negative items. In
other words, a two-factor solution does not necessarily imply a split of
the scale into two substantive dimensions of optimism versus
pessimism. Second, differential relations of the two dimensions with
external criteria have not been consistently demonstrated. Differential
correlations have been reported for some criteria (e.g., reports in
physical symptoms, Lai, 1994) but not others (e.g., psychological stress,
Chang, D'Zurrilla, & Maydeu-Olivares, 1994). In view of these data,
some researchers suggest that the unidimensional stance should be
preferred for the reason of parsimony (e.g., Marshall & Lang, 1990;
Scheier & Carver, 1993).

Although research on optimism using the LOT has been proliferating
during the past decade, most of the studies were carried out with
Western samples. As a consequence, the applicability of the concept of
optimism, as assessed by the LOT, in Asian cultures remains to be
investigated. Three studies using the original English version of the LOT
have been conducted recently among Chinese undergraduates in Hong
Kong (Lai, 1994, 1995, 1996). The resulting data indicate that the LOT is
a valid measure of optimism among Hong Kong Chinese. The two-factor
structure of the test has been replicated and the optimism subscale is
correlated more strongly than the pessimism subscale with symptom
reports (Lai, 1994). Optimism defined by the four positive items has also
been found to moderate the relation between hassles and somatic
complaints (Lai, 1995). In addition, Lai (1996) has also found that
optimistic students used more adaptive strategies to cope with academic
examinations than their less optimistic peers. These findings are similar
to what have been reported previously in the West, and therefore point to
the applicability of the construct of optimism among Hong Kong Chinese.

However encouraging, the data mentioned above must be
interpreted with cautions in view of a major limitation which is concerned
with the use of English tests among respondents who are not native
English speakers. Scheier and Carver (1985) have pointed out that
negatively worded items are semantically more complex than positively
worded ones, and they may form the basis of difference in responding
between the positive and negative items. This semantic effect may be
further accentuated in Hong Kong Chinese taking the original English
version of LOT. The two-factor solution and differential correlations
reported by Lai (1994) may be attributed to this semantic artifact.
Therefore, to evaluate more accurately the dimensionality of the LOT
among Hong Kong Chinese, a Chinese version of the test must be used.

The present study was designed to examine the dimensionality of
LOT in different samples of Hong Kong Chinese using a Chinese version
of the test. As discussed above, the multidimensional view will be
supported if the two subscales of the LOT can be shown to correlate
differentially with the same health-related criterion. This was examined using statistical analyses adopted by Lai (1994). Differential correlation was evaluated by using the Hotelling's $T^2$ test. In addition, the relative contributions of the two subscales to the predictive power of the complete LOT was assessed by semipartial correlation.

**Method**

*Subjects and Procedures*

Data of the present study were obtained from two separate Hong Kong Chinese samples. The first consisted of 58 male ($M$ age = 20.8 yr, $SD = 1.2$) and 172 female ($M$ age = 19.6 yr, $SD = .8$) undergraduates taking a course in introductory psychology at two different universities in Hong Kong. The participants ($N = 230$) were all social work majors in their first year of study. Subjects were asked to complete a Chinese version of the LOT, a physical symptoms checklist (Lai, 1994, 1995), and the Chinese Affect Scale (Hamid & Cheng, 1995) at the end of a lecture to satisfy part of the course requirements. After the test session, they were debriefed about the aim and nature of the present study, and they were assured that the information they provided would be kept strictly confidential.

Participants in the second adult sample were randomly recruited from civil servants working in eight different divisions of the Hong Kong Labour Department. Three offices of each of the eight divisions were randomly selected and each worker in these 24 offices received a test battery comprised of the three scales that were administered to the student sample. The respondents were asked in a cover letter to complete the tests and send them back to the researcher within two months. Out of 232 questionnaires, 173, were returned subsequently, which represented a response rate of 75%. Participation was voluntary and anonymous, and subjects were assured of data confidentiality. The final sample consisted of 100 men and 73 women. The lowest education level attained by 72% of this group was Form 5 (equivalent to grade 11 in US). The rest had either postsecondary or tertiary qualifications. The age of 84% of the subjects was between 20 and 40, with the remaining 16% older than 40. Because the subjects in this sample were selected on a random basis from the Labour Department and workers in different government departments were expected to be similar in major aspects, the present sample was therefore assumed to be representative of government workers in view of the high response rate.

*Measures*

_The Life Orientation Test (LOT)._ The LOT (Scheier & Carver, 1985) is comprised of four positively worded, four negatively worded, and four filler items. The scale has been used as a measure of the extent to which individuals have positive expectancies of life outcomes. Previous studies have shown that the test is psychometrically sound and predicts health outcomes in different populations (Scheier & Carver, 1985, 1987).
For reasons mentioned above, a Chinese version rather than the original English LOT was administered. The original version of LOT was first translated into Chinese by the present author. The test was then back-translated into English by two postgraduate students of psychology, with items being modified until the exact meaning was back-translated. Subjects were required to indicate on a 5-point scale the degree to which they agreed with each of the 12 items (0 = strongly disagree; 4 = strongly agree). The positively phrased items and the negatively phrased items were scored separately, with the positive items representing the optimism subscale and the negative items representing the pessimism subscale. In addition, a complete LOT score was computed by adding the ratings of the positive items and the reversed ratings of the negative items.

Chinese Affect Scale (CAS). This affect checklist was based on affective terms indigenous to the Hong Kong Chinese culture. It consists of 10 positive and 10 negative affect indicators in Chinese (Hamid & Cheng, 1995). The scale has been found to be a reliable as well as valid measure of both state and trait affect among Hong Kong Chinese (Hamid & Cheng, 1995). According to these two researchers, principal component analysis yielded a two-factor solution with the 10 negative items (sad, helpless, frightened, disappointed, bitter, tense, insecure, exhausted, annoyed, depressed) loaded onto the first factor and the 10 positive items (contented, exuberant, excited, agreeable, happy, meaningful, joyful, comfortable, relaxed, peaceful) loaded onto the second. To complete the scale, subjects rated each item on a 5-point scale (0 = very slightly or not at all; 4 = extremely) to indicate how they were feeling in the past month. A positive affect (PA) and a negative affect (NA) score were computed by adding the ratings of the positive and the negative items respectively. The correlation between PA and NA scores was found to be low in prior studies (e.g., \( r = -0.30 \), Hamid & Cheng, 1995; \( r = -0.28 \), Lai, Hamid, & Chow, 1996).

Physical Symptoms Checklist (PSC). This scale has a total of 30 commonly experienced minor symptoms that have been shown to be sensitive to stress among Hong Kong college students (Lai, 1993; Lai, 1995). These include sore throat, congested nose, running nose, sneezing, chills, coughing, headaches, fever, muscle aches, constipation, upset stomach, poor appetite, diarrhea, poor sleep, indigestion, out of breath, toothaches, nausea, pimples on face, back pains, racing feel faint, stiff muscles, severe itching, severe pains or cramps in stomach, cold hands or feet even in hot weather, sweat even in cold weather, itching or painful eyes, sensation of pressure in head, hands tremble or shake. The symptoms on the checklist are not apparently psychological in nature and were extracted from the Cohen-Hoberman Inventory of Physical Symptoms (Cohen & Hoberman, 1983) and the Pennebaker Inventory of Limbic Languidness (Pennebaker, 1982). The scale was translated into Chinese using similar procedures for translating the LOT. Subjects were asked to rate on a 4-point scale how often they had experienced each of the 30 symptoms in the last
month (1 = not at all; 4 = very often). A total symptom score was generated by adding ratings on the 30 items.

Results

Descriptive Statistics

Six separate scale scores were studied in both the student and adult samples. These included scores on the complete LOT, the optimism subscale (OP), the pessimism subscale (PE), PA, NA, and the physical symptoms checklist (PSC). The means and SDs of these scores were listed separately for the two samples in Table 1. The six scales were all internally consistent for these two samples, with Cronbach alphas ranging from .65 to .90. However, means of the pessimism subscale and the three criteria (PA, NA, and PSC) were different between the two samples. College students tended to score higher on pessimism, \( t(397) = 4.33, p < .001 \); NA, \( t(388) = 4.78, p < .005 \); and PSC, \( t(391) = 5.86, p < .001 \). In addition, students reported fewer positive affects than did the government workers, \( t(383) = 5.65, p < .001 \). In other words, the college sample appeared to be more pessimistic, reporting more negative affects and bodily symptoms, but fewer positive emotions, than did the government workers. This may be taken to imply that the former may be more disturbed, which is supported by previous Western findings suggesting that undergraduates are a highly stressed population (Tanck & Robbins, 1979). However, because the health measures used in the present study are subclinical in nature, the clinical implications of the difference observed in the two samples may only be minimal. In contrast, the difference in health status between the two samples may be attributed to the fact that the sample of working adults were recruited

<p>| Table 1 |</p>
<table>
<thead>
<tr>
<th>Mean and Standard Deviations of Scores of the Three LOT Scales and the Three Health-related Criteria for the Undergraduates and Working Adults</th>
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<tr>
<td><strong>Mean</strong></td>
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<tr>
<td><strong>1. Complete LOT</strong></td>
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<td><strong>2. Optimism Index</strong></td>
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<td><strong>3. Pessimism Index</strong></td>
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<tr>
<td><strong>4. Physical Symptoms</strong></td>
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<td></td>
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<td><strong>5. Positive Affect</strong></td>
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<td><strong>6. Negative Affect</strong></td>
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</table>

*Note. Undergraduates (N = 230), Working Adults (N = 173). Data for the adult sample are in bold type.*
from government workers and therefore is not representative of people working in the private sectors. It is not impossible that government workers experience less work-related stress than do their peers in the private sectors, and therefore appeared to be healthier when compared with college students. In other words, these observed differences in scores on health measures should be interpreted cautiously.

With regard to reports in physical symptoms, the two samples reported similar pattern of symptoms although college students tended to experience each symptom more frequently. The five most frequently experienced symptoms among the adult sample were poor sleep ($M = 2.57, SD = 1.02$), muscle aches ($M = 2.23, SD = .97$), sneezing ($M = 2.05, SD = .85$), headaches ($M = 1.93, SD = .87$), and back pains ($M = 1.84, SD = .91$). For the undergraduates, these were poor sleep ($M = 2.98, SD = .96$), muscle aches ($M = 2.37, SD = .92$), headaches ($M = 2.19, SD = .82$), sensation of pressure in head ($M = 2.04, SD = .91$), and racing heart ($M = 2.02, SD = .84$). The most frequently reported symptom common to both samples was poor sleep. Product-moment correlation between the ratings on each of the 30 symptoms averaged across the college students and those averaged across the working adults is very high, $r = .91$.

**Factor Analysis of the Life Orientation Test**

Exploratory factor analyses were performed on the eight LOT items (with the negatively phrased items reversed) separately for the two samples, using principal axis factoring and varimax rotation. Two factors having eigenvalues greater than 1 were generated in the undergraduate sample. The four items pertaining to the optimism subscale were loaded onto the first factor which accounted for 41.2% of total variance (eigenvalue = 3.29). The four items of the pessimism subscale were loaded onto the second factor and explained an additional 15.8% of variance (eigenvalue = 1.27). A similar two-factor solution was generated in the adult sample. The first factor was loaded with the four items of the optimism subscale and explained 41.9% of total variance (eigenvalue = 3.35) whereas the items of the pessimism subscale were loaded on the second factor which accounted for 15.9% of variance (eigenvalue = 1.27). The two-factor solutions of the Chinese LOT items observed in the present two samples were comparable to the one produced previously among a group of Hong Kong undergraduates using the original English LOT (Lai, 1994). The large percentage of variance explained by the first factor in the two samples lends partial support to the unidimensional view.

**Relative Predictive Power of the Optimism and the Pessimism Index**

The intercorrelations among the six scale scores for the two samples are listed in Table 2. The correlations between the complete LOT and the two LOT subscales, and the three criterion scores (PA, NA, and PSC) were all significant in the two samples. In addition, the patterns of correlations between predictors and criteria in the two samples were identical. Higher scores on the complete LOT or the optimism subscale
were associated with lower levels of NA and PSC, but higher PA scores. In contrast, higher pessimism scores were associated with higher scores on NA and PSC, but lower scores on PA.

To assess whether the correlation between the optimism subscale and a particular criterion is significantly different from that between the pessimism subscale and the same criterion, Hotelling's T tests (Rosenthal & Rosnow, 1991, p. 507) were carried out on the data of the two samples separately. For the undergraduates, the Hotelling's Ts associated with PA, NA, and PSC were .37, .51, and .40, respectively. For the working adults, these were 1.49, .52, and .96, respectively. None of these Ts was statistically significant at p = .05. These results imply that the optimism and the pessimism subscales were related to similar extent with the same criterion, which is in favor of the unidimensional rather than the multidimensional view.

Relative predictive power of the optimism versus the pessimism subscale was further examined by using semipartial correlation (Keppel & Zedeck, 1989, p. 430), which looks at the relative contribution of the two subscales to the criterion variance explained by the complete LOT by controlling the effect of either one of the two subscales. As can be seen in Table 3, the correlations between the complete LOT and each of the three criteria remained significant when pessimism scores were controlled. However, while optimism scores were controlled, significant

Table 2

Person Correlations of the Three LOT Scales and the Three Health-related Criteria for the Undergraduates and Working Adults

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<tbody>
<tr>
<td>1. Complete LOT</td>
<td></td>
<td>.86**</td>
<td>.85**</td>
<td>.40**</td>
<td>.42**</td>
<td></td>
</tr>
<tr>
<td>2. Optimism Index</td>
<td>.85**</td>
<td></td>
<td>.47**</td>
<td>.26**</td>
<td>.35**</td>
<td>.38**</td>
</tr>
<tr>
<td>3. Pessimism Index</td>
<td>.84**</td>
<td>.38**</td>
<td></td>
<td>.28**</td>
<td>.33**</td>
<td>.34**</td>
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<tr>
<td>4. Physical Symptoms</td>
<td>.22**</td>
<td>.22**</td>
<td>.14*</td>
<td></td>
<td>.22**</td>
<td>.50**</td>
</tr>
<tr>
<td>5. Positive Affect</td>
<td>.38**</td>
<td>.41**</td>
<td>.29**</td>
<td>.18**</td>
<td></td>
<td>.08</td>
</tr>
<tr>
<td>6. Negative Affect</td>
<td>-.27**</td>
<td>-.24**</td>
<td>.20**</td>
<td>.29**</td>
<td>.08</td>
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*Note. Undergraduates (N = 230), Working adults (N = 173). Data for the adult sample are in bold type. *p < .05; **p < .01.

Table 3

Semi-partial Correlations Between Complete LOT Scores and Three Criterion Measures in Two Samples with Optimism or Pessimism Index Controlled

<table>
<thead>
<tr>
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<th>Students (N = 230)</th>
<th>Adults (N = 173)</th>
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<tr>
<td></td>
<td>OP controlled</td>
<td>PE controlled</td>
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<tr>
<td>PA</td>
<td>.10</td>
<td>.20**</td>
</tr>
<tr>
<td>NA</td>
<td>.07</td>
<td>.18*</td>
</tr>
<tr>
<td>PS</td>
<td>.08</td>
<td>.15*</td>
</tr>
</tbody>
</table>

*Note. OP = Optimism index; PE = Pessimism index; PA = Positive affect; NA = Negative affect; PS = Physical symptoms. *p < .05; **p < .01.
correlations were eliminated. This was observed across the two different samples and suggests that the complete LOT may owe its predictive power to the optimism subscale. In addition, the significant zero-order correlations between pessimism scores and the three criteria may be attributed to multicollinearity with the complete LOT and the optimism subscale.

Discussion

The present results point to the validity of the LOT as a measure of optimism among different Chinese populations. For both the undergraduates and working adults, scores on the complete LOT were found to correlate positively with reports in positive affects and negatively with symptom reports and negative affects. This pattern of relationships has been hypothesized to be central to the construct of dispositional optimism in previous Western studies (e.g., Scheier & Carver, 1985; Marshall et al., 1992).

Although the tests used in the present study were all in Chinese, significant correlation between LOT scores and reports in physical symptoms, which has been reported in studies with Hong Kong Chinese using the original English version of the LOT, was replicated (Lai, 1994, 1995). However, language may have effect on the difference between the correlation of the optimism subscale and symptom reports, and that of the pessimism subscale and the same criterion. Differences in semantic complexity between the optimism and the pessimism subscale of the Chinese LOT might be minimized, and thus differential predictive power of the two LOT subscales was not found in the present study. Differences in predictive power reported in previous studies with Hong Kong Chinese using the original LOT (e.g., Lai, 1994) might have been produced by this semantic artifact.

Results of the present study have important implications for issues related to the dimensionality of the LOT. In spite of the split of the test into the optimism versus the pessimism subscale in the two samples, this is not necessarily substantive. As discussed earlier, a two-factor solution may be attributed to difference in the direction of item wording and the resulting difference in semantic complexity between the positively and the negatively phrased items. More importantly, if the fundamental difference between optimism and pessimism underlies the split, these two separate factors should have been correlated differentially with the same health criterion. However, the present findings did not indicate differential correlations. In other words, the multidimensional interpretation is not favored and, as suggested by other researchers (e.g., Marshall & Lang, 1990, Scheier & Carver, 1993), a unidimensional interpretation should be accepted for the reason of parsimony.

Nevertheless, treating the LOT as unidimensional is not without problems caused by certain limitations. Although differential predictive power of the two subscales has not been shown, this may only be restricted to health measures such as symptom and affect reports.
Because previous studies found that the optimism and the pessimism subscales have different relations with personality dimensions such as neuroticism and extraversion (e.g., Marshall et al., 1992), it remains possible that differential correlations would have been found if other criteria had been used. Therefore, whether a two-factor split is substantive or not can only be determined tentatively by looking at the correlations of the two subscales with a particular set of criteria.

In addition to the point just mentioned, the optimism and the pessimism subscales do differ in a very important aspect. As discussed before, analyses using semipartial correlations showed that the predictive power of the complete LOT is attributed mainly to the optimism subscale. This can be taken to imply that negatively worded items that form the pessimism subscale are poor measures of dispositional optimism, which is what the complete LOT and the optimism subscale are supposed to tap. Inclusion of negatively phrased items in a scale that assesses the presence of a particular construct, like the LOT, is a common measure to minimize the influence of the response bias of acquiescence (e.g., Aiken, 1994; Gatchel & Mears, 1982). However, in the present study, the four negatively worded items do not contribute significantly to the predictive power of the complete LOT and this calls for a need for revision.

Scheier et al. (1994) have revised the LOT recently by deleting one positive and one negative item, and replacing one positive item with a new one. The revision thus contains three positive and three negative items. Nevertheless, confirmatory factor analysis indicates that the two-factor solution is as good as the single-factor one (Scheier et al., 1994). Therefore, the revision does very little in answering the question of whether dispositional optimism is more validly defined by the complete LOT or the optimism subscale. To solve this problem, modifying the negatively phrased items or reducing their number so that a unidimensional LOT can be generated appears to be the most sensible measure to be taken. Any future attempt of revision should take this into account.

References


