

The Cross-Cultural use of the Kirton Adaption- Innovation Inventory: A Further Exploration

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Abstract

English language measures such as the bipolar scale of cognitive style (Kirton, 2005) are not easily understood by people within diverse cultures and languages where English is spoken as a second language. Particularly the scoring of opposites when many items represent each end of the dimensional continuum and where items that represent one of the poles are reverse scored to produce the final score. Understanding can be improved by using a translation of item meaning into the target language. However, a more efficient method is the use of items with bipolar scoring scales to resolve the problem of accurate recognition and scoring of opposites while at the same time eliminating the scoring anchor and any associated social desirability contamination.

Keywords : bipolar scales, translation, negative items

Introduction

Cognitive style (Kirton, 1976) is the preference for the way in which individuals construct their mental models using predominantly either adaptive or innovative thinking which in turn determines the way structure is used (be it permeable or fragmented), (Kelly, 1963) to form individual concepts. While some structure is ever present else we do not function, the more adaptive individuals prefer the more permeable form that has easy consensual agreement while the more innovative individual, less concerned with consensual agreement, prefers a looser more fragmented structure. This preference for the different forms of structural thinking is independent of capacity or level of the individual and is described by Kirton (1976; 2005; 2011) in his theory of cognitive style. The theory describes a style continuum that is bipolar and is determined by individual *preferences* where an individual at one end is concerned with efficiency and rule/group conformity (Adaption). While at the other end, an individual is more concerned with originality (Innovation) and is indifferent to (even unaware of) rules and group conformity. The two poles of the bipolar adaption-innovation creative style continuum with their different preferences offer a link to transactional / transformational styles associated with Leadership (Bass, 1998), Values (Swartz, 1999) and Complexity Theory (Stacey, 2000). These preferences have also been related to the personality domain through the dimensions of intuitive/sensing (Myers, & McCauley, 1985, Tefft, 1990) as well as the open/closed-minded (Costa & McCrea 1992; Von Wittich, 2011) and has shown to be stable over many years (Clapp, 1993).

In a previous study (Clapp et al., 2010) found that in the Thai culture when a bipolar measure (such as the KAI measure of cognitive style) contains a substantial number of both negative and positive items, both polarities of items are scored with the same phasing and so destroying the psychometrics of the measure.

The Kai Inventory when viewed from a western perspective comprises items that are anchored by individual personal preferences to behaviours that are positively related to the Kirton (2011) bipolar concept of cognitive style. Here positive items mean that the statements relate to the presence rather than the absence of a behaviour. The items that are positively related to the Adaptive pole (the scales (E) Efficiency and (R) Rule/Group Conformity) are both reverse scored within the measure to align with the items of the Innovative scale (SO) Sufficiency of Originality. The resulting correlation between the scales representing the two poles Adaption and Innovation is positive ($r= 0.41$, $p < 0.001$ $n=562$). The overall scale consists of 32 items with a Mean=95, and Alpha=0.88 (Kirton, 2005).

In the Thai sample from the previous study (Clapp et al., 2010) using the English version of the KAI all the items representing Efficiency scale (E) and the items representing Rule/Group Conformity (R) are scored in the same phase as the items representing Sufficiency of Originality (SO). Therefore, when the E and R items are reversed scored to align with the SO items a negative rather than a positive correlation results. This is contradictory to the normal findings. The effect on the measure is to dilute the overall Alpha due to the decreasing correlation between the items representing the SO sub-factor and the reversed score items of sub-factors E and R. However, the alpha of the individual sub-factors remains intact. According to many authors, they argued that these findings have been attributed to the basic philosophical differences between the cultures of east and west.

Eastern philosophies tend to tolerate, rather than reject psychological contradiction (Peng et al., 2001). For members of dialectically oriented cultures, the nature of the world is such that semantic opposites such as good and bad exist in the same object or event simultaneously. This duality, the yin/yang is recognisable in all things in dialectical cultures and is rooted in East Asian philosophical and religious traditions, including Confucianism and Buddhism (Peng & Nisbett, 1999). These findings have been extended by Williams and Aaker (2002), who found that people from the Far East are more accepting of conflicting emotions than people from the western countries. Thus, when faced with the apparent contradictions embodied in a mixed-worded scale, people from the West have a predisposition to view positive and reverse-worded items as opposites while people from the East have a predisposition to view these items as related parts of a larger order (Wong et al., 2003).

Research Objectives

The focus of this study concerns two methods of minimising the effects of holistic scoring of items in the Kirton A-I inventory (Kirton, 1976). The contribution of allowing the translation of item meaning, rather than relying on a literal translation of the text without psychometric input. Also, further evaluation of a scale with items arranged as bipolar pairs to provide forced choice of item evaluation.

Conceptual Model

To test the objectives of the study the diagram Figure 1 shows the relationships involved:

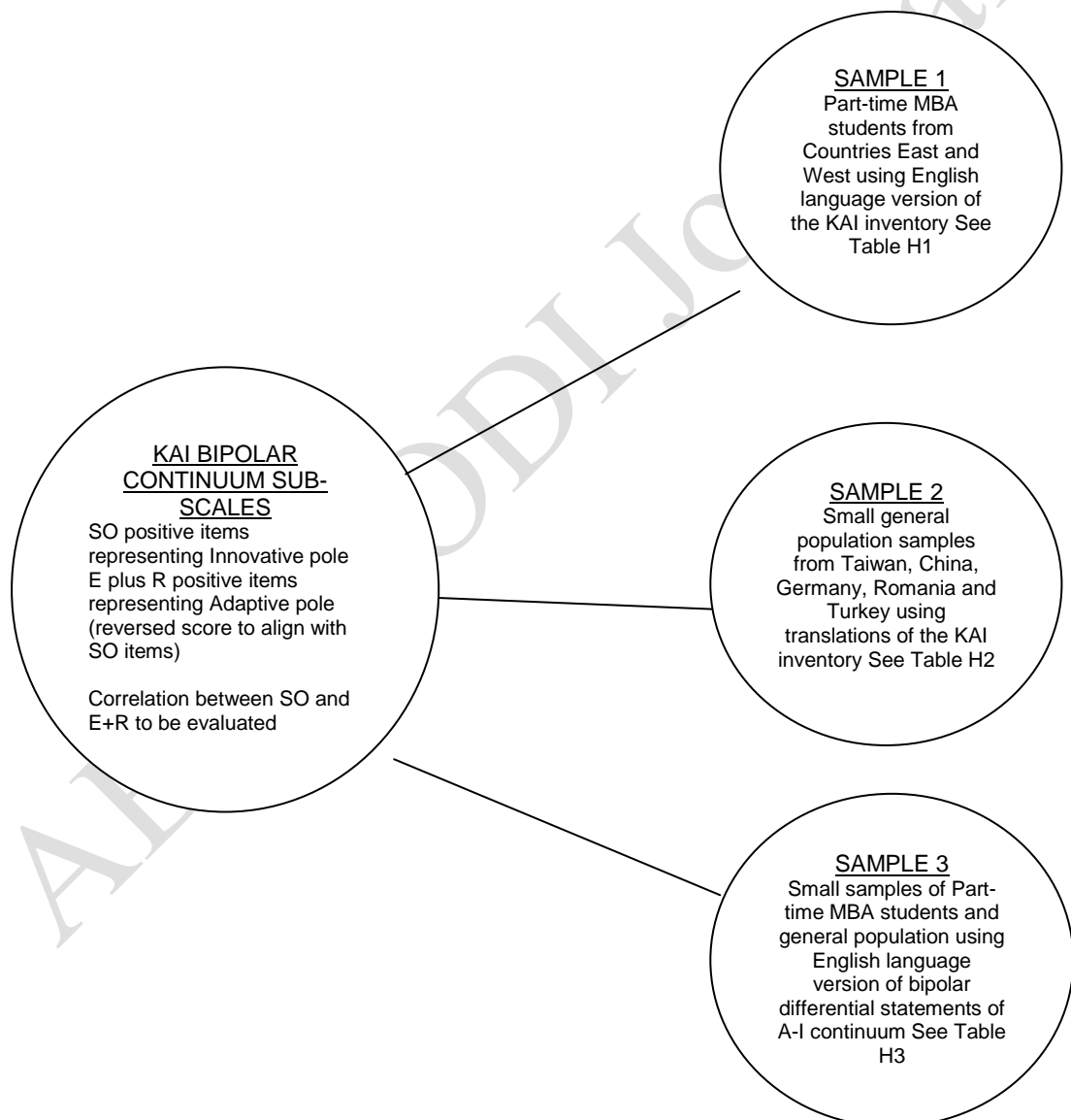


Figure 1: Conceptual Framework

Hypotheses

- 1) Individuals in different countries east and west treat positive and negatively scored items that represent opposite poles in a bipolar psychometric scale in different ways. Thus, different relationships are expected between the KAI sub-factors that represent the Adaptive and Innovative pole of the A-I Continuum.
- 2) When using the KAI in countries where English is not the first language. The effects of allowing a first language translation of item meaning, (rather than relying on a literal translation of the text without psychometric input), will yield sub-factor relationships similar to those found in countries with English as a first language.
- 3) When items that relate to the A-I continuum are arranged as bipolar pairs to provide forced choice of item evaluation, then, no significant difference will be found in samples from east and west using an English language version of the scale.

Measures

Cognitive Style

The KAI (Kirton, 1976) is used as the measure of the domain of cognitive style. The measure evaluates the position of an individual's *preference* along the Adaptive-Innovative continuum of two distinct types of problem solving. One end is concerned with Adaption which relates to algorithmic and paradigm consistent thinking. The other end is concerned with Innovation and relates to paradigm breaking thinking and transformation.

The KAI is a self-report measure consisting of 32 positive statements of behaviour scored as preferences on a five-point Likert scale the 19 adaptive items are reversed scored to align with the other 13 that represent innovation. From a general population sample $n > 1000$ from many different countries (Kirton, 2005) the scores range from 46-146 with a mean of 95.0, a standard deviation of 17.9 and a coefficient alpha of > 0.85 . Three distinct sub-factors are contained within the overall scale and named Sufficiency of Originality (SO) accounting for 13% of the variance with alpha of 0.83, Efficiency (E) accounting for 10% of the variance with alpha of 0.76, Non Rule Group Conformity (R) accounting for 14% of the variance with alpha of 0.83. The correlation between the items representing the two ends of the A-I continuum (the A items are reverse scored) is +0.41 demonstrating bi-polarity.

Bipolar Measure

This measure was designed as a proof of concept rather than a definitive version of an alternative measure. The concepts to be tested was the removal of the problems associated with the social desirability of the scoring key along with the more fundamental

problem of recognition of the opposites in bipolar measures such as the KAI (Kirton, 2005). It was fortunate that both issues could be resolved by the single solution of using bipolar constructs to provide items for construction of the scale (Kelly, 1963, Dichotomy Corollary pp63). Such items are self-contained having no need for an external scoring key and at the same time both similarity and contrast appear within the item thus removing the need to understand what other statement may stand in opposition.

A twelve-item scale was constructed from items that are all positive statements (they describe the presence of something rather than the absence). Six items have a right hand polar statement that has an innovative orientation while the other six items have an adaptive orientation. To determine the overall score, the later six are reversed scored to align with the six items that are innovatively oriented.

Sample

Generally, the individuals involved are a convenience sample drawn from part-time MBA students. There are two exceptions that use a general population sample - the first is where a translated version of the KAI inventory for different countries is evaluated, the second is where a sample from the UK is used to evaluate the bipolar differential version of the A-I continuum.

Results

Hypothesis 1

Individuals in different countries east and west treat positive and negatively scored items that represent opposite poles in a bipolar psychometric scale in separate ways. Thus, different relationships are expected between the KAI sub-factors that represent the Adaptive and Innovative pole of the A-I Continuum.

Table 1

Samples using English Language versions of the 32 item KAI

| Culture | No in Sample | Alpha | Correlation SO with E | Correlation SO with R | Correlation E with R | Correlation SO with (E+R) |
|-----------|--------------|-------|-----------------------|-----------------------|----------------------|---------------------------|
| Chinese | 18 | 0.52 | -0.30 | -0.43 | 0.63 | -0.49 |
| Thai | 202 | 0.54 | -0.38 | -0.3 | 0.61 | -0.37 |
| UAE | 19 | 0.81 | 0.06 | -0.16 | 0.56 | -0.18 |
| Taiwanese | 20 | 0.67 | -0.32 | 0.02 | 0.48 | -0.16 |
| Pakistan | 19 | 0.63 | -0.09 | -0.02 | 0.46 | -0.15 |
| Indian | 80 | 0.79 | -0.08 | 0.32 | 0.39 | 0.11 |
| Myanmar | 48 | 0.63 | -0.03 | 0.16 | 0.13 | 0.14 |
| American | 101 | 0.89 | 0.18 | 0.45 | 0.52 | 0.37 |
| German | 14 | 0.89 | 0.28 | 0.39 | 0.55 | 0.41 |
| Canadian | 23 | 0.88 | 0.05 | 0.66 | 0.43 | 0.49 |

| | | | | | | |
|----------|-----|------|------|------|------|------|
| Nigerian | 16 | 0.88 | 0.51 | 0.51 | 0.62 | 0.52 |
| British | 114 | 0.88 | 0.25 | 0.62 | 0.30 | 0.54 |

The significant difference expected in hypothesis1 indicating that there is a significant difference in the correlation of the items representing the two polar domains for countries east and west was found to be presented and the null hypothesis was rejected (Chi=139.5, p=0). When the KAI measure is used with subjects from differing cultural heritages the polar correlations vary from a range of +0.62 through to +0.11 for countries with a predominantly western influence whereas, countries with a predominantly far eastern influence have polar correlations in the range -0.15 through to -0.49. The differences between east and west is considerable and not just a matter of one or two items being misunderstood. The null hypothesis was fail to reject for the far eastern group (Chi=2.42, p=0.79) and for the western group there was a weak indication of a difference (chi=12.74, p=0.047).

Hypothesis 2

When using the KAI in countries where English is not the first language. The effects of allowing a first language translation of item meaning, (rather than relying on a literal translation of the text without psychometric input), will yield sub-factor relationships similar to those found in countries with English as a first language.

Table 2

Samples Using Translated Versions of the 32 Item KAI Scale

| Culture | No in Sample | Alpha | Correlation SO with E | Correlation SO with R | Correlation with R | Correlation SO with (E+R) |
|-----------|--------------|-------|-----------------------|-----------------------|--------------------|---------------------------|
| Chinese | 53 | 0.84 | -0.17 | 0.50 | 0.33 | +0.29 |
| Taiwanese | 34 | 0.92 | 0.10 | 0.55 | 0.55 | +0.42 |
| German | 502 | 0.89 | 0.13 | 0.39 | 0.31 | +0.35 |
| Romanian | 671 | 0.85 | 0.17 | 0.49 | 0.41 | +0.41 |
| Turkish | 169 | 0.80 | 0.24 | 0.45 | 0.45 | +0.41 |

The results confirm the expected relationships and suggest for the KAI measure that while the English language may be pervasive, in countries where it is spoken as a second language a first language translation of the measure is still necessary. The significant positive correlations between the items representing the two polar domains (the adaptive scales of E+R are reverse scored to align with the innovative scale SO) show that the bipolar nature of the scale and the meaning of the items have been understood by the individuals in the samples.

Hypothesis 3

When items that relate to the A-I continuum are arranged as bipolar pairs to provide forced choice of item evaluation then no significant difference will be found in samples from east or west using an English language version of the scale.

Table 3:
Samples using English Language version of a Bipolar measure of A-I

| Culture | No in Sample | Alpha | Correlation SO with E | Correlation SO with R | Correlation with R | Correlation SO with (E+R) |
|----------|--------------|-------|-----------------------|-----------------------|--------------------|---------------------------|
| English | 29 | 0.84 | 0.59 | 0.63 | 0.57 | +0.71 |
| Thailand | 11 | 0.78 | 0.42 | 0.64 | 0.45 | +0.46 |
| Myanmar | 10 | 0.81 | 0.72 | 0.76 | 0.38 | +0.56 |
| Overall | 50 | 0.82 | 0.56 | 0.65 | 0.53 | +0.64 |

While the samples are small such that the correlations need to be treated with care, however, for the overall sample $p < 0.001$ and all coefficients show a positive relationship as expected in hypothesis 3. Particularly the scales representing the two-polar end of the A-I continuum where the decisions about scoring opposite in the correct phase has been minimised and the scoring anchor for the scale eliminated.

Conclusions

When bipolar measures of psychological concepts, authored in the English language are used across diverse cultures and languages, problems of understanding sufficiently to facilitate the meaning of the items predominate. This situation is exacerbated when bipolar measures are considered where the location of opposites is required to accurately evaluate the overall scale. Where only a small number of items are used to interrupt scoring patterns of the larger number of positive items the issue may be of little consequence. However, when bipolar measures use many positive items addressing each pole, one polar group being reversed scored to provide an overall scale the problem can be sufficient to destroy the psychological integrity of the overall scale. The problem is evident when the overall scale shows a negative relationship between the item groups representing each of the poles when a positive relationship is expected (the items in one group being reversed scored). The results of such an expectation can be seen in Table H1 in the last column.

The cultural heritage of non-English speaking countries historically within the British sphere of influence e.g., Nigeria and Myanmar are similar and different from Thailand while both Thailand and Myanmar are both have a Buddhist religious heritage yet are different. These differences point towards the understanding of the meaning of the items (may be through cultural heritage), if such a distinction can be sharply made. Where the translation into a different language is made by a literal translation of the items, reinforced by reverse translation into the first language to check the accuracy of the process, no allowance is made for cultural differences in meaning of the items. If the translation is to have any statistical veracity its prime contribution is through the correlation with the rest of the items in the scale. To achieve the desired correlation both psychological skills to ensure meaning as well as language skills to ensure understanding are required to secure a successful translation. Where such a process has been used the transfer of sufficient meaning as well as understanding has been achieved, see Table H2 for some comparative studies.

When scoring bipolar psychological scales, where the items are constructed from single statements the distortion associated with lack of location of items of opposite polarity such that they are correctly scored is an added complication and damages the psychometric structure of the measure. Furthermore, potentially the scoring anchor may contain elements of social desirability that adds to the problem. These biases are at their most noticeable when the authorship language is not that of the target population. If, instead of single statement items, semantic differentials are used, the need to understand which items are opposites is minimised, the opposite being implicit in the presentation. Also, the self-contained nature of each item removes the need for a scoring anchor for the overall scale and minimises any associated social desirability effects. In use, it was found that understanding was further improved when both ends of the scale contained positive statements from a similar context, e.g.

I prefer to work
with several
different problems
at the same time

.

I prefer to
concentrate on
one problem at a
time

In the light of these finding it is recommended that where translation psychometric scales from an authored language into a different language the meaning of each item is given priority over the literal translation of the text. Furthermore, when considering the translation of bipolar measures where there are similar numbers of both negatively and positively scored items a semantic differential framework is used. Such use eliminates distortions ,due to both social desirability of the scale anchor as well as the location of opposites for the correct scoring of negative items.

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