ORIGINAL PAPER

Factorial Validation of “How I Think” Questionnaire Among Male Inmates in Malaysia

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Abstract

Introduction: Cognitive distortion seems to be a potential force in shaping criminals and antisocial behaviour within an individual. Unfortunately there is no valid Malay psychometric instrument available to measure cognitive distortion in Malaysian settings, especially in prisons. There is an urgent need to have a valid and reliable Malay psychometric instrument to assess the cognitive distortion among Malaysians. Therefore, the present study aimed to validate “How I Think” Questionnaire into the Malay language (henceforth, HIT-M). Methods: A cross-sectional study was conducted among inmates (n = 150) incarcerated within two prisons in Peninsular Malaysia. The validation study commenced with Forward-Backward translations and was followed by content and face validities. Later, construct validity was performed via Exploratory Factor Analysis using Principal Component Analysis. Varimax rotation was applied in order to optimize the factor loadings on the extracted component. Finally, reliability testing was performed to determine the internal consistency of the items which was done using Cronbach Alpha coefficient method (α). Findings: Initial factor loadings resulted in 11 factors with a total variance of 74.1%. Next, factor analysis was repeated by extracting the items into a four factor structure parallel to the theoretical construct. Items with factor loadings above 0.40 were retained as acceptable factor loadings. After considering factor loadings, item correlation and content of items, the final version of HIT-M consisted of 24 items. The internal consistency of HIT-M was 0.90 which was considered good. Conclusion: HIT-M is a valid and reliable psychometric instrument to measure and assess cognitive distortion among Malaysians.

Keywords: Antisocial Behaviour, Cognitive Distortion, Criminal Behaviour, Reliability, Validation
Introduction

Crime and violence are visualised as destructive elements of a nation. The written and verbal portrayal of crime and violence has prompted criminal justice agencies to come up with various proactive measures to combat crime. Underlying proactive measures, research and knowledge regarding psychological aspects of criminals are vital and crucial for key personnels to address the possible psychological factors for crime engagement. This is in order to facilitate early intervention among at risk groups.

In determining the possible factors for crime engagement, the importance of cognitive aspects has been recently examined within the field of criminology and social psychology. Several theories have been formulated as attempts to explain the commencement, development, and persistence of antisocial and violent behaviour. In line with this, social-cognitive theories have illustrated cognitive distortion (CD) as a result of antisocial behaviour or deficiency in interpreting social events. Generally, CD is contextualised as inaccurate or biased ways of conferring meaning upon experiences. In other words, CD can be viewed as inaccurate or rationalizing attitudes, thoughts, or beliefs concerning own or other’s behaviour. While CD is often linked to criminals and delinquents, CD is also characterized as a normal psychological process that all individuals engage in, despite age, gender, race, sexual orientation, and sociodemographic grouping.

CD is often perceived as a risk factor for antisocial and violent behaviour. Antisocial behaviour which is defined as harmful behaviour to others, by breaking important social and moral norms; includes aggressive acts of serious assaults (e.g., murder, sexual assaults, and violent assaults) and less serious criminal behaviour like shoplifting, burglary and robbery. A growing body of diverse literatures have acknowledged the importance of CD as a causal factor for a wide range of externalizing behaviour problems such as delinquency, aggression and antisocial behaviour.

Across the criminological literature, there are various nomenclatures pertaining to CD. Various terms were provided for CD, for instance: CD represented with “rationalizations”, “minimizations”, “justifications”, “antisocial attitudes”, “criminal thinking style”, “social cognition” and “self-serving cognitive distortions”. However, for the purpose of the present validation study, self-serving cognitive distortions (SSCD) was used to describe and represent the CD exhibited by offenders in Malaysia. This is parallel to the terminology used in the How I Think Questionnaire (HIT).

Outcomes of the SSCD have been classified as primary and secondary cognitive distortions. In line with this, primary type cognitive distortions are said to form a consolidated egocentric bias as a result of self-centered attitudes, thoughts, and beliefs. Meanwhile, secondary type cognitive distortions are perceived as pre or post-transgression rationalizations that neutralize conscience, reduce stress, empathy, and guilty feelings.

According to Barigga et al., there are three secondary distortions: blaming others, minimizing/mislabeling, and assuming the worst. It was proposed that these secondary cognitive distortions support and reinforce primary distortions. Secondary cognitions...
protect self-image when a person displays or exhibits antisocial behaviour or deviant characteristics\textsuperscript{20,22}.

Several psychometric instruments have been designed to measure the cognitive content of test takers. Examples include Criminal Attitudes to Violence Scale\textsuperscript{23}, Measure of Criminal Attitudes and Associates\textsuperscript{24}, Criminal Sentiments Scale–Modified\textsuperscript{25}, Psychological Inventory of Criminal Thinking Styles\textsuperscript{18} and the HIT questionnaire\textsuperscript{20}. All these psychometric instruments aimed to measure both the process and content of thinking that is assumed to promote and maintain criminality within the self.

Although the importance of CD in criminal and antisocial behaviour is widely acknowledged, and there are number of psychometric instruments available to assess the level of CD; a valid Malay version of an appropriate psychometric instrument is still lacking. Therefore, the present study aimed to validate the HIT which is used to measure SSCD. It is anticipated that many stakeholders will benefit from having a valid Malay version of HIT (henceforth, HIT-M) for use within Malaysian settings.

**Methods**

**Study design and participants**

The present validation study was an observational cross-sectional study which was conducted in mid 2012 using a guided self-administered questionnaire. The reference population for this validation study was those Malaysian inmates who have been charged for violent crimes. The source population of the present study took into account the inmates from two Malaysian prisons based on the selection criteria.

A series of inclusion and exclusion criteria were fixed by the researchers prior to the recruitment of participants. The inclusion criteria were males aged 18 years and above who had been charged for violent crime offences and voluntarily consented to this validation study. Those who were mentally unfit and unable to read and understand the Malay language were excluded from this study.

The calculation of the sample size for factor analysis was performed in accordance to Gorsuch’s\textsuperscript{26} formula in which the total number of items in HIT was multiplied by 5. Although the required sample size was 195 inmates, only 150 inmates participated in this validation study as the potential participants in this study are considered as a ‘hard to reach’ population.

For the purpose of this validation study, the recruitment of participants was based on the non-probability sampling method which was purposive sampling. Due to access restraints, the level of risk and dangerousness of this vulnerable group, the selection of participants were made by the prison authorities. The type of sampling was also to assure the safety of the researchers and prevent any possible opportunities to escape and perpetrate violence by the inmates.

**Psychometric instrument**

The HIT by Barriga et al.\textsuperscript{20} was developed and designed specifically to measure the level of SSCD as they relate to a wide range of externalizing behaviours. HIT has a theoretical ground that has been empirically tested with promising outcomes\textsuperscript{1,10}. The HIT
consists of 39 items in four scales representing SSCD. In addition, HIT also contains eight anomalous response items and seven positive filler items to encourage the maximum use of this psychometric instrument. However, anomalous response and positive filler items were not included in the present validation study as the researchers were only concerned with types of SSCD.

Translation process

It should be born in mind that psychometric instruments which were developed in English or other foreign languages are not suitable to be used directly for non-English populations due to cultural and language differences. With this in mind, it was important to translate HIT into the Malay language since it is the formal and local language of Malaysian citizens. Therefore, two types of translations: forward and backward translations; were carried out at the beginning of this study.

It has been suggested that the process of using both forward and backward translations improve the reliability and validity of the translated questionnaire. As such, three bilinguists were assigned to carry out the forward translation from English to Malay language. Following this, the backward translation process from the Malay version to the English version were performed by three other bilinguists who had no prior knowledge of the original English version. The Malay version of HIT was termed as HIT-M.

Validation process

In order to obtain a valid HIT-M, three validation processes were carried out: Content, Face, and Construct validity. The content validity was performed by three experts from the field of criminology and psychology since the content validation of questionnaires need to be established by experts and professionals. For the purpose of face validity, HIT-M was distributed to the general public (n = 20) to consider cultural and community contexts of terms that were used in the HIT-M. Later, HIT-M was subjected to construct validity which was analysed using Exploratory Factor Analysis (EFA).

Data collection

For the purpose of construct validity, HIT-M was distributed to 150 male inmates from two Malaysian prisons. The ethical approval to conduct this validation was obtained from Universiti Sains Malaysia and Malaysian Department of Prisons. The objectives of the study was clearly explained to the participants and issues of confidentiality and anonymity were also clarified and assured. Proper instructions were given and signed consent was obtained prior to participants’ involvement.

The average time for questionnaire completion was about 20 minutes. The questionnaire was administered in a group format and were collected on the same day. The voluntary involvement of the participants were appreciated and verbally thanked.

Statistical analysis

The data was entered and analysed using the Statistical Package of Social Sciences (SPSS) version 20.0 software to report the descriptive statistics of sociodemographic information. This software was also used to analyse the construct validity of HIT-M. The construct validity was analysed using EFA.
by extracting factors using Principal Component Analysis (PCA). Prior to EFA, several preliminary analyses were performed to ensure the adequacy of sample size to enable factor analysis of HIT-M. As such, Kaiser-Meyer-Olkin (KMO) and Bartlett’s test of sphericity were performed. The sample size was considered adequate if KMO values is more than 0.60 and Bartlett’s test of sphericity is significant if p-value is less than 0.05.

As mentioned earlier, the PCA method was applied in the extraction of components in which components with eigenvalues of over 1 were retained. Varimax rotation was applied in order to optimize the factor loadings on the extracted component. Items with loading factor of more than 0.4 were assumed as an acceptable loading factor. Finally, reliability testing was performed to determine the internal consistency of the items in HIT-M which was done using Cronbach Alpha coefficient method (α).

Results

Sociodemographic information

The sociodemographic information were collected and presented in the form of descriptive statistics. The respondents’s age ranged between 19 and 53 years old with a mean age of 29.18 years (SD = 8.52). Table 1 below shows the summary of sociodemographic information of the respondents who were involved in the construct validation phase.

<table>
<thead>
<tr>
<th>Sociodemographic information</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>112</td>
<td>74.7</td>
</tr>
<tr>
<td>Married</td>
<td>29</td>
<td>19.3</td>
</tr>
<tr>
<td>Divorcee</td>
<td>4</td>
<td>2.7</td>
</tr>
<tr>
<td>Widower</td>
<td>5</td>
<td>3.3</td>
</tr>
</tbody>
</table>

**Highest education level**
- Never been to school: 6 (4.0%)
- Primary: 6 (4.0%)
- Lower secondary (Form 1-Form 3): 48 (32.0%)
- Upper secondary (Form 4-Form 5): 75 (50.0%)
- Pre-university: 7 (4.7%)
- Diploma: 8 (5.3%)

**Occupational status**
- Unemployed: 20 (13.3%)
- Self employed: 62 (41.3%)
- Semiskilled: 54 (36.0%)
- Clerical-skilled: 10 (6.7%)
- Professionals: 4 (2.7%)

**Substance abuse usage history**
- No alcohol and drug consumption: 24 (16%)
Alcohol consumption only 7 4.7
Drug consumption only 77 51.3
Both alcohol and drug consumption 38 25.3
Intoxicating substance consumption 4 2.7

**Translation process**

Overall, the outcomes of the translation processes were considered good. For each item, the standard of translation averaged 80 percent agreement between the translators. Only a few amendments were made due to ambiguously worded items or colloquial terms.

**Content and face validity**

All the experts who reviewed the content of HIT-M agreed that the items in HIT-M were relevant and covered the elements of SSCD. Overall, it was concluded that HIT-M exhibited a good and promising content validity. Furthermore, HIT-M also showed good face validity as the respondents were able to understand the items well. The language that was used seemed to be appropriate and culturally sensitive.

**Exploratory Factor analysis**

As mentioned previously, the construct validity of HIT-M involved 150 adult male inmates. The construct validity was assessed using EFA. The factors were extracted using PCA. Prior to factor extraction using PCA, preliminary analysis was conducted to test the suitability of data for factor analysis.

The preliminary analysis of HIT-M was found to be satisfactory. The inspection of the Anti-image correlation matrix was above 0.5 for all items. The KMO value was 0.66, suggesting adequate sampling to enable factor analysis. Meanwhile, the Bartlett’s Test of Sphericity was found to be highly significant with p-value of less than 0.001, supporting the factorability of the correlation matrix.

Varimax rotation was performed in order to aid the interpretation of factor loadings. Initial factor analysis was computed by including all the items of HIT-M. This resulted in 11 loading factors that explained 74.1% of the total variance. The scree plot suggested 11 sub components with eigenvalues above 1.

Since the theoretical construct of SSCD suggested four domains, the factor analysis was repeated by reducing 11 factors to 4 factors which accounted for 49.7% of the total variance. The scree plot suggested four sub components with eigenvalues above 1. After considering the factor loadings, item correlation and the content of items; several items were removed.

The new KMO value after removal of several items was 0.77. Bartlett’s Test of Sphericity was highly significant (p-value<0.001). The result in Table 2 was chosen as the final factor analysis which consisted of six items in each domain, giving a total number of 24 items. All these 24 items loaded at greater than 0.40.
Table 2. Final factor loadings of HIT-M

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Factor 1</td>
</tr>
<tr>
<td>1</td>
<td>Self-centered 9</td>
<td>.74</td>
</tr>
<tr>
<td>2</td>
<td>Self-centered 4</td>
<td>.74</td>
</tr>
<tr>
<td>3</td>
<td>Self-centered 5</td>
<td>.73</td>
</tr>
<tr>
<td>4</td>
<td>Self-centered 3</td>
<td>.72</td>
</tr>
<tr>
<td>5</td>
<td>Minimizing 21</td>
<td>.60</td>
</tr>
<tr>
<td>6</td>
<td>Self-centered 6</td>
<td>.57</td>
</tr>
<tr>
<td>7</td>
<td>Assuming the worst 36</td>
<td>.81</td>
</tr>
<tr>
<td>8</td>
<td>Assuming the worst 37</td>
<td>.78</td>
</tr>
<tr>
<td>9</td>
<td>Blaming others 12</td>
<td>.68</td>
</tr>
<tr>
<td>10</td>
<td>Blaming others 14</td>
<td>.68</td>
</tr>
<tr>
<td>11</td>
<td>Blaming others 18</td>
<td>.60</td>
</tr>
<tr>
<td>12</td>
<td>Blaming others 15</td>
<td>.57</td>
</tr>
<tr>
<td>13</td>
<td>Minimizing/ mislabeling 22</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Minimizing/ mislabeling 28</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Minimizing/ mislabeling 24</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Assuming the worst 32</td>
<td>.53</td>
</tr>
<tr>
<td>17</td>
<td>Minimizing/ mislabeling 27</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Minimizing/ mislabeling 23</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Minimizing/ mislabeling 20</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Assuming the worst 33</td>
<td>.67</td>
</tr>
<tr>
<td>21</td>
<td>Blaming others 16</td>
<td>.59</td>
</tr>
<tr>
<td>22</td>
<td>Assuming the worst 34</td>
<td>.57</td>
</tr>
<tr>
<td>23</td>
<td>Blaming others 11</td>
<td>.50</td>
</tr>
<tr>
<td>24</td>
<td>Assuming the worst 35</td>
<td>.43</td>
</tr>
</tbody>
</table>


Based on the final factor loading table above, Factor 1 comprises of six items with factor loadings .57 to .74. The items are Self-centered 9, Self-centered 4, Self-centered 5, Self-centered 3, Minimizing/mislabeling 21, and Self-centered 6. Factor 2 comprises of six items with factor loadings ranging from .57 to .81. The items are Assuming the worst 36, Assuming the worst 37, Blaming others 12, Blaming others 14, Blaming others 18, and Blaming others 15.

The next is Factor 3 which also consisted of six items. Factor 3 constitutes of Minimizing/ mislabeling 22, Minimizing/ mislabeling 28, Minimizing/ mislabeling 24, Assuming the worst 32, Minimizing/ mislabeling 27, and Minimizing/ mislabeling 23 with factor loadings ranging from .50 to .62. Finally, the Factor 5 consisted of 6 items (Minimizing/ mislabeling 20, Assuming the worst 33, Blaming others 16, Assuming the worst 34, Blaming others 11, and Assuming the worst 35) with factor loadings ranging from .43 to .75. All the factor loadings for 24 items were satisfactory and promising.
Reliability testing

The reliability of HIT-M was calculated using the Cronbach alpha method. In addition, Cronbach alpha were computed for all the domains in HIT-M to ascertain the internal consistency values. The overall internal consistency seemed to be highly promising which is 0.90. The reliability for four domains in HIT-M ranged from 0.76 to 0.87 indicating good Cronbach alpha values. Table 3 depicts the internal consistency of the overall scale and also for each domain in HIT-M.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Number of items</th>
<th>Cronbach alpha (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>24</td>
<td>0.90</td>
</tr>
<tr>
<td>Self-centered</td>
<td>6</td>
<td>0.87</td>
</tr>
<tr>
<td>Blaming others</td>
<td>6</td>
<td>0.83</td>
</tr>
<tr>
<td>Minimizing/ mislabeling</td>
<td>6</td>
<td>0.80</td>
</tr>
<tr>
<td>Assuming the worst</td>
<td>6</td>
<td>0.76</td>
</tr>
</tbody>
</table>

Discussion

Over the past decades, the importance of CD as a marker for criminal behaviour has been highlighted in which CD is often linked to externalizing behaviour problems such as aggressive behaviours and law breaking acts\(^2\). Since CD permits individuals to rationalize the antisocial attitude, maladaptive beliefs, and irrational thoughts, it often leads to a range of problems and behaviours\(^{11}\). According to Barriga, Gibbs and colleagues\(^{20}\), individuals with high levels of CD are more likely to express aggression and other types of antisocial behaviour.

In addition, SSCD is said to be elevated within the offender population such as adolescents who have committed sexual offenses\(^{31}\). Notably, research by Murphy\(^{15}\) has shown that child molesters exhibit a wide range of CD such as denial, minimization, justification, and rationalization of their offending behaviour. Previous researches\(^{32-35}\) have also indicated that CD is strongly associated with child sexual abuse.

The available evidence indicates that CD has been observed among the younger age group who are dispositioned towards delinquency. For example, research had noted higher CD among juvenile delinquents than non-delinquents\(^2\). Previous studies\(^1-2\) provided more support for this assertion. Furthermore, the excessive use of CD tend to result in psychopathology\(^2\).

Theoretically, it was suggested that CD is able to block moral judgment development which makes the person think of being not responsible for any type of behavioural problems that are exhibited by him or herself. This rationalization is the foundation for the direct relationship between CD and criminal behaviour\(^{36}\). CD, representing some symptoms of SSCD; is often labeled as antisocial attitudes and is a criminogenic marker which insulate the individual from blame or a negative self-concept\(^2\).

In Malaysia, there are no Malay language validated psychometric instrument to access the level of CD among test takers. Early screening and intervention is highly recommended in order to ameliorate high levels of CD among test takers as it can lead
to antisocial behaviour and other criminogenic behaviour. As suggested by Sestir and Bartolow\textsuperscript{37}, understanding the level of cognition is important in order to obtain a fuller understanding of the nature of human aggression and violence.

In the first part of this study, two types of translations were carried out by a group of bilingualists. The outcome of translations seem to be promising and good. Amendments were made to ambiguously worded and colloquial items which might confuse participants. Meanwhile, the outcome of content and face validity also evidenced good outcomes as the feedbacks from experts and the general public were good. However, a few items were restuctured in terms of sentencing and vocabulary.

Preliminary analysis commenced prior to construct validity. The preliminary analysis seems to be satisfactory and fulfilled all the requirements for sampling adequacy. The KMO values was considered good since they exceed the recommended value of 0.60\textsuperscript{30}. The Bartlett’s Test of Sphericity was highly significant suggesting that data is appropriate to proceed with factor analysis.

The EFA using PCA showed that the factor loadings of the items in HIT-M did not correspond to the original domains of HIT. While the original HIT demonstrated four domains, the initial factor loadings in this present study revealed eleven factors. In order to reflect the theoretical construct of SSCD, the items were extrapolated into four factors.

The four factors were self-centered, blaming others, minimizing/ mislabeling, and assuming the worst. The factors were identified based on the number of items that were highly loaded into each factor. With this in mind, Factor 1 was identified as self-centered, Factor 2 as blaming others, Factor 3 as minimizing/ mislabeling and Factor 4 as assuming the worst.

However, some items were found to be highly loaded into different factors compared to the original scale. For example, item 21 (minimizing/ mislabeling) was categorized in self-centered instead of the original minimizing/ mislabeling. Meanwhile, items 36 and 37 (assuming the worst) showed high factor loadings in the factor blaming others.

In addition, item 32 (assuming the worst) showed higher factor loading in the factor minimizing/ mislabeling instead of the original factor assuming the worst. Other items such as item 20 (minimizing/ mislabeling), item 11 and item 16 (blaming others) evidenced higher factor loading in the factor assuming the worst. The cultural context could be one of the reasons that may explain why certain items highly loaded into different factors compared to the original factors.

The content of each items that loaded in different factors compared to the original factors were checked properly prior to their inclusion in a new factor. Prior to the omission and inclusion of any items, the items were carefully analysed in terms of content and factor loadings. From this process, the final domains in HIT-M consisted of six items each. The higher factor loadings of each item in every domain indicated good relationship to the particular domain of HIT-M.

Internal consistency which examines the average inter-item relationship of the items of any scale is very important as it measures
the degree to which the items are related to each other. According to Peat et al. [39], a cut-off alpha value above 0.70 is considered good in the field of social science. The reliability of HIT-M was measured with internal consistency reliability using Cronbach’s alpha. It is worth to note that all the reliability values for each domain exceeded the cut-off alpha value as recommended by Peat et al. [39].

As such, it can be concluded that HIT-M is a reliable psychometric instrument. In this validation study, researchers were aware of the importance of test-retest reliability. However, the researchers could not perform the test-retest reliability as permission was not granted by prison authorities due to the level of accessibility and dangerousness of the inmates. Some of the inmates had also been released from prison.

The good psychometric properties featured by HIT-M indicate that HIT-M is a viable psychometric instrument to measure and access CD among Malaysians. As a result, various types of cognitive intervention programs can be offered to those who exhibit high levels of CD. In fact, previous researches have acknowledged the role of cognitive-behavioural programmes as efforts to reduce antisocial behaviour among people at-risk. One of the example of cognitive-behavioural programme is Cognitive-Behaviour Therapy (CBT) which was considered among the promising rehabilitative treatments for the offenders. Currently, in Malaysian prisons, CBT is part of an intensive rehabilitation programme for sexual offenders. Therefore HIT-M can serves as a screening tool to assess the level of CD in order to offer the proper cognitive-behavioural treatment to those at-risk individuals.

Conclusion

The result of this study contribute to HIT literature. As a conclusion, HIT-M is a valid and reliable psychometric instrument to measure and assess CD among Malaysians. It is expected that many individuals will benefit by having this HIT-M. It is highly recommended to use this HIT-M in Malaysian settings such as in education, psychological assessment, government sectors, employee recruitment, and counseling for screening and rehabilitation purposes.

Acknowledgment

The authors would like to express their sincerest gratitude and thanks to Universiti Sains Malaysia and the USM Vice Chancellor Award Programme for supporting this study. Appreciation is also extended to the Malaysia Department of Prisons for allowing the researchers to conduct this study. Due acknowledgement is also made to Research Press for allowing the translation and validation of the questionnaire into Malay language. The authors also thank Prof. Khaidzir Hj Ismail, Ms. Nurul Hazrina Mazlan, and Ms. Siti Khairina for their assistance and support.

References


2. Barriga AQ, Landau JR, Stinson BL, Liau AK, Gibbs JC. Cognitive distortion and problem behaviors in


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