



## Construction and Standardization of Cognitive Hardiness Scale for B.ed. Student-Teachers

### KEYWORDS

Cognitive Hardiness, B.Ed. student-teachers, Factor analysis, Reliability and Validity

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**ABSTRACT** This article makes attempt to develop the cognitive hardiness scale for B.Ed. student-teachers. The area of coping and stress management enforced and introduced by Kobasa 1979. Hardiness is a combination of 3c (challenge, commitment and control) attitudes that provides the necessary courage, motivation and capability to turn developmental and environmental stressors into opportunities for growth and many positive outcomes (Maddi 2006). The scale has been constructed with four points 'Likert' type scale for each item, with 89 statements for factor determination with sample of 320 B.Ed. student-teachers. Factor analysis was used to determine various factors in cognitive hardiness scale. Six components were identified, the final form of the tool consist of sixty (60) items with ten (10) items in each components. Reliability and validity were established for this tool on a sample of 100 B.Ed. student-teachers by adopting random sampling technique. General norms and Percentile norms are also determined.

### Introduction

The thematic area of coping, stress management are enforced and introduced by Kobasa (1979). This hardiness is derived from existential psychology it is considered as a pattern of personality characteristics comprising three mutually related dispositions - commitment, control, and challenge. Hardiness is a combination of 3c (challenge, commitment and control) attitudes that provides the necessary courage, motivation and capability to turn developmental and environmental stressors into opportunities for growth and many positive outcomes (Maddi 2006). If individuals are strong in commitment, they believe it is important to remain involved with the events and people around them, no matter how stressful things become. If individuals are strong in control, they want to continue to have an influence on the outcomes going on around them, no matter how difficult this becomes. If individuals are strong in challenge, they see stresses as a normal part of living and an opportunity to learn, develop, and grow in wisdom (Maddi 2005, 2006).

### Definitions of Hardiness

**Lambert, C. E., & Lambert, V. A. (1999)**, "Hardiness is a constellation of attitudes, beliefs, and behavioral tendencies that consist of three components: commitment, challenge, and control".

**Sanrock (2006)**, "Hardiness is a personality style, which is characterised by a sense of commitment (rather than alienation), and of control (rather than powerlessness) and a perception of problems as challenges (rather than threats)."

**Maqbool Ahmad (2008)**, as defined hardiness as, "A personality style that minimizes stress responses by means of challenge, commitment and control. A set of positive attitude in response to stress that enable a person who has been exposed to life threatening situations to carry on with a sense of fortitude, control and commitment."

### Cognitive Hardiness

By considering the present social environmental conditions and the technological developments the cognitive hardiness may be defined as, "It is a personality style of an individual that enables him to reduce stress by facing the life challenges with commitment and control to achieve his objectives with the help of available opportunities including the technological development".

### Operational Definition

**Cognitive Hardiness:** In this study the cognitive hardiness refers to the personality style of the B.Ed. student-teachers that enables them to reduce stress by facing the life challenges with commitment and control to achieve their objectives to become an effective human resource with the help of available opportunities including the technological development".

**Student-teachers:** The students those who are studying in pre-service of secondary teacher education course.

### Need and Significance of the problem

The measurement of hardiness has been concern for many authors (Beehr & Bowling, 2005; Funk, 1992; Maddi, 1997). It was originally measured by several existing scales. Since then, several hardiness scales have been produced, most notable scales are the 'personal views Survey (Maddi, 1997), the related 'Dispositional Scale' (Bartone, 2000), and the Cognitive Hardiness Scale (Greene & Nowack, 1995). Most of the tools were constructed based on only the dimensions suggested by Kosaba (1979), Maddi (1997), Barton (2000). So, it is a felt need to construct a tool to assess the hardiness of an individual by considering the present psychological, social environments and the technological developments which influences an individual life.

### Objectives of the study

1. To construct a Cognitive Hardiness Scale (CHS) to assess the cognitive hardiness of B.Ed. student-teachers..

2. To determine the factors that contributes for Cognitive Hardiness
3. To standardize the Cognitive Hardiness Scale.

## Methodology

### Method

Normative survey method was employed in this study.

### Sample and Sampling technique

Data were collected from a sample of 320 B.Ed. student-teachers those who are studying in the secondary teacher education course in Tamil Nadu by adopting cluster random sampling technique for factor analysis.

### Development of the tool

While selecting and editing the statements, the items were referred to the past, present and future aspects of the individual. After reviewing many related literature in the field of hardiness, cognitive hardiness in India and other countries the following dimensions are reported in several studies i.e challenge, commitment and control. The investigator keeping view on the current context and Indian scenario few more components were identified and considered for construction of the rough tool.

### Framing Items

90 items were framed and included in the rough tool. Repeated items and similar meaning items were rejected. Finally 89 items were framed with both positive and negative items. All the positive and negative items were randomly presented in the scale.

The rough tool was submitted to jury's opinion. The jury was included from Department of Education and Department of Psychology. They were requested to check the construction of the items and the representations from the content which is related to cognitive hardiness. Based on it some items were modified.

### Scoring procedure

The scale was constructed by using four points 'Likert' type scale. Each statement consists of responses like strongly agree, agree, disagree and strongly disagree. As the items were both positive and negative thus, if one choose the response of strongly agree in positive statement, the individual will score 4, likewise for agree 3, disagree 2 and strongly disagree 1. In case of negative items the reverse scoring was adopted i.e strongly agree 1, agree 2, disagree 3 and strongly disagree 4. Individual cognitive hardiness score was calculated by the sum of scores of all the items.

### Factor analysis

Determining the factors is one of the main objectives of the study. Data was collected from the sample of 320 B.Ed. students-teachers and used to determine the factors contributing for cognitive hardiness. The collected data was analysed by following factor loading method by using SPSS version 20.0.

### Factor loading and item selection

After factor loading, 6 components were emerged. The table 1 shows the factor loading and item selected for the final tool.

**Table 1**  
**Factor extraction method – Rotated factor matrix**

Sl.No	Item code	Components/ Factor						Item selected / rejected
		I	II	III	IV	V	VI	
1	Item 1	0.666						Selected*
2	Item 2	0.461						Selected*
3	Item 3	0.543						Selected*
4	Item 4	0.455						Selected*
5	Item 5	0.675						Selected*
6	Item 6	0.384						Rejected
7	Item 7	0.470						Selected*
8	Item 8	0.304						Rejected
9	Item 9	0.666						Selected*
10	Item 10	0.645						Selected*
11	Item 11	0.469						Selected*
12	Item 12	0.473						Selected*
13	Item 13	0.274						Rejected
14	Item 14	0.345						Rejected
15	Item 15	0.371						Rejected
16	Item 16		0.556					Selected*
17	Item 17		0.495					Selected*
18	Item 18		0.354					Rejected
19	Item 19		0.374					Rejected
20	Item 20		0.676					Selected*
21	Item 21		0.530					Selected*
22	Item 22		0.590					Selected*
23	Item 23		0.462					Selected*
24	Item 24		0.369					Rejected
25	Item 25		0.489					Selected*
26	Item 26		0.366					Rejected
27	Item 27		0.603					Selected*
28	Item 28		0.466					Selected*
29	Item 29		0.339					Rejected
30	Item 30		0.479					Selected*
31	Item 31			0.571				Selected*
32	Item 32			0.363				Rejected
33	Item 33			0.341				Rejected
34	Item 34			0.576				Selected*
35	Item 35			0.369				Rejected

36	Item 36			0.624			Selected*
37	Item 37			0.511			Selected*
38	Item 38			0.539			Selected*
39	Item 39			0.560			Selected*
40	Item 40			0.384			Rejected
41	Item 41			0.309			Rejected
42	Item 42			0.639			Selected*
43	Item 43			0.550			Selected*
44	Item 44			0.435			Selected*
45	Item 45			0.626			Selected*
46	Item 46				0.456		Selected*
47	Item 47				0.344		Rejected
48	Item 48				0.302		Rejected
49	Item 49				0.615		Selected*
50	Item 50				0.505		Selected*
51	Item 51				0.580		Selected*
52	Item 52				0.610		Selected*
53	Item 53				0.460		Selected*
54	Item 54				0.519		Selected*
55	Item 55				0.515		Selected*
56	Item 56				0.610		Selected*
57	Item 57				0.709		Selected*
58	Item 58				0.349		Rejected
59	Item 59				0.244		Rejected
60	Item 60					0.564	Selected*
61	Item 61					0.489	Selected*
62	Item 62					0.352	Rejected
63	Item 63					0.487	Selected*
64	Item 64					0.307	Rejected
65	Item 65					0.642	Selected*
66	Item 66					0.344	Rejected
67	Item 67					0.532	Selected*
68	Item 68					0.510	Selected*
69	Item 69					0.568	Selected*
70	Item 70					0.264	Rejected
71	Item 71					0.442	Selected*
72	Item 72					0.439	Selected*
73	Item 73					0.357	Rejected
74	Item 74					0.486	Selected*
75	Item 75					0.548	Selected*
76	Item 76					0.530	Selected*
77	Item 77					0.437	Selected*
78	Item 78					0.365	Rejected
79	Item 79					0.378	Rejected
80	Item 80					0.621	Selected*
81	Item 81					0.343	Rejected
82	Item 82					0.505	Selected*
83	Item 83					0.288	Rejected
84	Item 84					0.496	Selected*
85	Item 85					0.434	Selected*
86	Item 86					0.327	Rejected
87	Item 87					0.625	Selected*
88	Item 88					0.542	Selected*
89	Item 89					0.610	Selected*

\* selected for final form of the tool

From the above table it's understood that six factors were emerged by factor extraction method and the value of each item by rotated matrix are given. The items were selected on the basis of using cut-off of 0.40 and above to identify by high loading (Ajai, S. Gaur & Sanjaya, S. Gaur. 2007). 60 items were selected for validation of the tool and 29 items were rejected as the cut-off value is less than 0.4. The factor analysis method has led to six over all factors namely 1. Challenge 2. Commitment 3. Control 4. Sense of mastery 5. Perceived health and 6. Technology usage as the components of Cognitive Hardiness. Each six components consist of 10 items and the final tool consists of 60 items. The range of the scores measured by the scale will be 60-240.

#### Standardisation of the tool

For the final form of the tool 60 items were assigned with six components and each component consists of ten items.

The test was administered to 100 B.Ed. student-teachers. The subjects were included both men and women. The subjects were asked to put tick mark against one response which they agree after reading the each items. The directions were clearly mentioned on the test booklet.

#### Reliability

**Split-half method:** The test was administered to a random sample of 100 B.Ed. student-teachers. Split-half reliability was used. In the "split-half reliability" method, the test is first divided into two equivalent "halves" and the correlation was found for these halves- tests. The procedure is to make up two sets of scores by combining alternate items in the test. The first set of scores represents performance on the odd numbered items 1, 3, 5, 7.....59 and the second set of scores represents performance on the even numbered items 2, 4, 6, 8.....60.

The reliability of cognitive hardiness scale as measured by the split-half method comes out to be 0.87. Hence the result indicates that the test has high split-half reliability.

**Test- retest method:** The cognitive hardiness scale was administered to 100 B.Ed. student-teachers and the data were collected. The same test was administered to the same sample with three weeks interval again the data was collected. The correlation was computed and its value was 0.79 which indicates the scale has a high reliability value.

**Internal consistency:** Refers to the test which measures the degree of which the items consistently measure the underlying latent construct. It estimates the homogeneity or the degree to which the item on test jointly measures the same construct. The six components of Cognitive Hardiness show significant positive inter-correlations with each other. So, the internal consistency is adequate for each of the six components. The internal consistency for the six factors ranged from 0.10 to 0.43.

### Validity

**Content validity:** Refers to the degree to which a test covers the content area to be measured. It is based upon the judgment of the juries. In the present study the scale was submitted to the juries and their opinion and suggestions were taken for final form of the tool. The juries agree that the items in the scale are relevant. It ensures the face and content validity.

**Concurrent validity:** It refers to the extent to which the results of a particular test or measurement correspond to those of a previously established measurement for the same construct. The developed cognitive hardiness scale was compared with already established cognitive hardiness scale to make sure that the constructed tool is valid.

The constructed tool was administered to the sample of 100 B.Ed. student-teachers along with Personal view survey, (Maddi, 1997). The results of both the tests were compared and the correlation coefficient was calculated as 0.82 which is highly positively correlated. Hence the concurrent validity was established for the present tool.

### Norms

**General Norms:** It is the most common form of norms which represents the simplest method of presenting the data for comparative purposes. In the cognitive hardiness scale the general norms was established by taking two standard deviations above mean. The level of cognitive hardiness scale is interpreted as 'very low cognitive hardiness', 'low cognitive hardiness', 'high cognitive hardiness' and very high cognitive hardiness' which is indicated in table 2. These interpretations are made irrespective of associated variables.

**Table 2**  
**Norms for the Level of Cognitive Hardiness Scale**

Score Range	Level of cognitive hardiness
60-105	Very low cognitive hardiness
106-150	Low cognitive hardiness
151- 195	High cognitive hardiness
196-240	Very high cognitive hardiness

**Percentile Rank:** the term percentile rank may be defined as the number representing the percentage of the total number of cases lying below the given score. The percen-

tile rank for the cognitive hardiness scale is presented in table.3.

**Table 3**  
**Percentile Rank for the Cognitive Hardiness Scale**

Score	Percentile Rank
140	10 <sup>th</sup>
146	20 <sup>th</sup>
147	25 <sup>th</sup>
149	30 <sup>th</sup>
152	40 <sup>th</sup>
155	50 <sup>th</sup>
159	60 <sup>th</sup>
163	70 <sup>th</sup>
165	75 <sup>th</sup>
170	80 <sup>th</sup>
180	90 <sup>th</sup>

### Conclusion

The cognitive hardiness scale to measure the cognitive hardiness was constructed and standardised. The scale included 6 components with 10 items in each component and a total of 60 items. The reliability, internal consistency and validity of the scale were established. The general norm and the percentile rank norms were found out. It can be used for secondary B.Ed. student-teachers and also for the students of age group 20-30 years.

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