

## Effect Size Analysis and Norm Development for a New Competency Mapping Scale Focusing Professional Social Workers

**Pradip D. Garole**

Director, CCTR and WDMC

Yashwantrao Chavan Academy of Development Administration (YASHADA) Pune,  
Maharashtra, India

\* Corresponding e-mail of the author: [pradip.garole@yashada.org](mailto:pradip.garole@yashada.org)

### Abstract

*This study investigates the norming process for a Competency Scale tailored for professional social workers, aiming to establish normative data and benchmarks for accurate, reliable, and interpretable competency assessments. Norming involves administering the Competency Scale to a large, representative sample of 665 social workers, followed by statistical analysis using SPSS to determine the suitability of the data for further analysis, reliability, and validity, as well as factor analysis of the data, were checked in an earlier research paper. This comprehensive approach ensures the scale's effectiveness by providing clear guidelines for interpreting scores in context. Additionally, the present study examines the measures of central tendency, variability, and standard scores. Also find the effect size on groups based on demographic variables such as gender, age, territory, education, employment status and, experience by using independent sample t-tests and effect size calculations (Cohen's d, Hedges' correction, Glass's Delta). Results indicate minimal differences between sub-groups, justifying the use of a single norm. However, further research with larger samples is recommended to enhance the competency framework's robustness. This research contributes to the development of standardized norms and highlights the importance of diverse competencies in social work, with implications for professional development in related fields.*

**Keywords:** *competencies, competency mapping, standardizing the scale, Norming, finding effect size, developing the Norms, , Cohen's d, , Hedges' correction, Glass's Delta*

### Introduction

Norming is a crucial step in the process of standardizing assessment tools, such as a Competency Scale, to ensure that the results can be meaningfully interpreted and compared across different individuals and groups. Norming involves establishing normative data by administering the assessment tool to a large, representative sample of the target population, creating benchmarks or standards (norms) that allow for the comparison of individual scores against a reference group. Norming is important from several viewpoints such as i) Norms provide context for interpreting individual scores, such as knowing that a score in the 75th percentile means the individual performed better than 75% of the reference group. ii) Norming ensures that scores are compared against a relevant standard, making it possible to fairly evaluate and compare the competencies of different individuals. iii)

Establishing norms enhances the validity and reliability of the assessment tool by demonstrating that it produces consistent and meaningful results across different segments of the population. iv) Normative data aids in making informed decisions in various contexts, such as recruitment, training, and performance evaluation, by providing a benchmark for what constitutes typical or exceptional performance. The objectives of this study are: i) To establish normative data by administering the scale to a large, representative sample of professional social workers. ii) To develop normative benchmarks to compare individual scores against a standard reference group. iii) To use these benchmarks to interpret the results and provide context for the competencies assessed by the scale.

### Review of Literature

Anastasi, A., & Urbina, S. (1997). "Psychological Testing" is a seminal text that delves deeply into the principles and practices of psychological assessment. The authors provide a

thorough exploration of test construction, standardization, and norming, making it an invaluable resource for understanding the foundational aspects of creating reliable and valid psychological tests. The book emphasizes the importance of representative sampling and the careful administration of tests to ensure that normative data accurately reflect the target population. With detailed explanations and numerous examples, Anastasi and Urbina effectively illustrate how norms are established and utilized to interpret individual test scores within a broader context.

Cohen, R. J., Swerdlik, M. E., & Sturman, E. D. (2013). "Psychological Testing and Assessment: An Introduction to Tests and Measurement" gives a comprehensive introduction to the field of psychological measurement. The book covers a wide range of topics, including test construction, administration, and the critical process of norming. The authors emphasize the role of normative data in making meaningful comparisons across different individuals and groups. Through detailed discussions and practical examples, the text explains how to create and interpret normative benchmarks, such as percentiles and standard scores, to ensure fair and accurate assessment outcomes. This edition also highlights contemporary issues and advancements in the field, making it a relevant and essential guide for students and professionals involved in psychological testing and assessment.

### Methodology

The norming process for the Competency Scale involves several systematic steps to ensure accurate, reliable, and interpretable measurements of competencies. First, a large and diverse representative sample is selected, considering demographic variables such as Gender, Age, Territory, Education, Status of Employment & Experience. The Competency Scale is then administered to this sample under standardized conditions to ensure consistency in data collection. Responses are gathered and compiled into a comprehensive dataset. Statistical analysis is conducted using measures of central tendency (mean, median, mode), variability (standard deviation, range), to understand score distribution and typical performance levels. Agreeableness percentage is calculated to identify the various

competencies as indicated in earlier research papers [3], [4], [5]. Kaiser-Meyer-Olkin tests, correlation analyses, Bartlett's tests of Sphericity, and assessments of multicollinearity and heteroscedasticity, confirmed the suitability of the dataset. Further assessment of reliability, validity, and standardization of the scale revealed prominent levels of reliability and validity, supported by Cronbach's alpha values, average variance extracted, and composite reliability coefficients as reported in earlier research [6]. Factor analysis, specifically Exploratory Factor Analysis using Principal Axis Factoring with Oblique Promax Rotation, was employed to extract three latent factors or competency clusters, as detailed in earlier research [7]. This paper focuses on addressing variations in dataset composition compared to the intended user group, groups are divided into sub-groups, and independent sample t-tests are conducted. Effect sizes, including Cohen's d, Hedges' correction, and Glass's Delta, are calculated to determine the impact size on groups, ensuring the norming process accurately reflects the differences in sub-groups. If, impact size is less than -0.8 or 0.8 then there is no need to establish normative benchmarks and provide guideline for interpretation. If, impact size is more than -0.8 or 0.8 then need to establish normative benchmarks and provide guideline for interpretation. Normative benchmarks were established based on this analysis, including calculating percentiles and standard scores (e.g., z-scores, T-scores) to facilitate comparison. Normative tables are developed to detail benchmarks and reference points for different population segments. Clear guidelines are provided for interpreting individual scores in relation to the normative data, explaining the significance of different percentiles and standard scores in terms of competency levels. This methodology ensures the Competency Scale's effectiveness as a tool for professional development in social work and other fields.

### Result & Discussion

In this section the results obtained with the statistical software SPSS are presented. Following steps are used in statistical analysis

4.1 Calculate Descriptive Statistics: Descriptive statistics were calculated to summarize the main



features of the dataset, allowing for comparison between groups.

4.2 Apply Independent Samples t-Test: An independent samples t-test was conducted to determine if there was a statistically significant difference between the means of the two Sub-groups.

4.3 Calculate Independent Samples Effect: Cohen's d, Hedges' correction, and Glass's Delta were calculated to understand the magnitude of the difference between groups beyond statistical significance alone.

Table 4.1 Group Statistics, Independent Sample t-Test & Effect Size Analysis

Groups and Sub-groups	N	Mean	Mean Diff.	SD	Std. Error	t-stat	D.F.	p-value	Effect Size Criteria	Point Estimate
<b>Age:</b> 1. Up to 25 Yrs.	3	5.	-	1.3	.0	-	6	.0	Cohen's d	-.22
	2	42	0.	07	72	2.	6	04		
	9	93	27	72	10	8	3		Hedges' correction	-.22
	3	5.	38	1.1	.0	7			Glass's delta	-.23
2. Above 25 Yrs.	3	70		45	62	4				
	6	31		50	49					
<b>Gender:</b> 1. Male	4	5.	-	1.3	.0	-	6	.3	Cohen's d	-.07
	3	53	0.	25	63	0.	6	81		
	3	70	08	85	72	8	3		Hedges' correction	-.07
	2	5.	80	1.0	.0	7			Glass's delta	-.08
2. Female	3	62		45	68	6				
	2	50		24	62					
<b>Education:</b> 1. Up to PG	1	5.	-	1.4	.1	-	6	.0	Cohen's d	-.32
	9	29	0.	85	06	3.	6	00		
	5	10	39	84	40	7	3		Hedges' correction	-.32
	4	5.	14	1.0	.0	5			Glass's delta	-.35
2. PG and Above	7	68		96	50	7				
	0	24		17	56					

										delt a	7
<b>Territory:</b> 1. Vidarbha	3	5.	-	1.3	.0	-	6	.0	Cohen's d	-.14	
	3	48	0.	34	72	1.	6	72			
	9	30	17	94	50	8	3		Hedges' correction	-.14	
	3	5.	27	1.1	.0	0			Glass's delta	-.15	
2. Rest of Maharashtra	2	65		17	61	5					
	6	57		22	88						
<b>Employment:</b> 1. Unemployed	4	5.	-	1.2	.0	-	6	.0	Cohen's d	-.17	
	2	48	0.	66	61	2.	6	27			
	2	76	21	34	64	2	3		Hedges' correction	-.17	
	2	5.	92	1.1	.0	1			Glass's delta	-.18	
2. Employed	4	70		68	74	1					
	3	68		49	96						
<b>Experience:</b> 1. Up to 5 Yrs.	4	5.	-	1.2	.0	-	6	.0	Cohen's d	-.20	
	8	50	0.	45	56	2.	6	20			
	8	05	25	78	39	3	3		Hedges' correction	-.20	
	1	5.	23	1.1	.0	3			Glass's delta	-.21	
2. Above 5 Yrs.	7	75		89	89	6					
	7	28		14	38						

1) Age Sub-group Comparison: The t-test result is negative and significant, indicating that the subgroup aged up to 25 years has a significantly lower mean than the subgroup above 25 years. Additionally, the effect size is significant but small in magnitude. 2) Gender Sub-group Comparison: The t-test result is negative and non-significant, indicating that there is no significant difference in the means between the subgroups of males and females. Additionally, the effect size is very small and non-significant. 3) Education Sub-group Comparison: The t-test result is negative and significant, indicating that the subgroup with education below PG has a significantly lower mean than the subgroup with PG and above. Additionally, the effect size is significant but small to

medium in magnitude. 4) Territory Sub-group Comparison: The t-test result is negative but non-significant, indicating that there is no significant difference in the means between the subgroups of Vidarbha and the rest of Maharashtra. Additionally, the effect size is very small and non-significant. 5) Employment Sub-group Comparison: The t-test result is negative and significant, indicating that the subgroup of unemployed individuals has a significantly lower mean than the subgroup of employed individuals. Additionally, the effect size is significant but small in magnitude. 6) Experience Sub-group Comparison: The t-test result is negative and significant, indicating that the subgroup with up to 5 years of experience has a significantly lower mean than the subgroup with more than 5 years of experience. Additionally, the effect size is significant but small in magnitude.

### Conclusion

The objective of this study was to assess the impact size on various demographic groups and to establish norms for a newly developed competency mapping scale. Analysis using Cohen's d, Hedges' correction, and Glass's Delta revealed that the impact size across all subsets of groups, including gender, age, territory, education, employment status, and experience, fell within the range of -0.8 to 0.8. This suggests that a single norm can be applied to these groups. However, to strengthen the validity of competency mapping decisions, further research with a significantly larger sample size is recommended. Despite this need for additional investigation, our study contributes significantly by providing insights into the impact size across demographic groups and by laying the groundwork for norm development in competency assessment within the context of professional social work.

### References

- 1] Anastasi, A., & Urbina, S. (1997). *Psychological Testing* (7th ed.). Prentice Hall.
- 2] Cohen, R. J., Swerdlik, M. E., & Sturman, E. D. (2013). *Psychological Testing and Assessment: An Introduction to Tests and Measurement* (8th ed.). McGraw-Hill Education.
- 3] Garole P. D., (2024). Exploring Technical Job-specific or Domain-departmental or Horizontal Competencies: A Study on Professional Social Workers: *Aayushi International Interdisciplinary Research Journal* 11(3), 14-16
- 4] Garole P. D., (2024). Unveiling Organizational Development-specific or Generic-administrative or Vertical Competencies: A Study on Professional Social Workers: *Aayushi International Interdisciplinary Research Journal* 11(3), 26-29
- 5] Garole P. D., (2024). Investigating Personal-social Progression-specific or Psycho-social or Spherical Competencies: A Study on Professional Social Workers: *Aayushi International Interdisciplinary Research Journal* 11(3), 36-39
- 6] Garole P. D., (2024). Creating and Standardizing a New Scale for Competency Mapping: A Study on Professional Social Workers: *Aayushi International Interdisciplinary Research Journal* 11(4), 01-04
- 7] Garole P. D., (2024). Extraction of Latent Factors or Competency Clusters using Factor Analysis: A Study on Professional Social Workers: *Aayushi International Interdisciplinary Research Journal* 11(4), 13-16