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## Technical Brief

# Kuder Career Interests Assessment<sup>®</sup> - Likert (KCIA-L)

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Prepared by:  
Hoi K. Suen, Ed.D.  
Distinguished Professor Emeritus  
Educational Psychology  
The Pennsylvania State University

Kuder, Inc.  
302 Visions Parkway  
Adel, IA 50003  
800.314.8972 (ph)  
515.993.5422 (fx)  
[www.kuder.com](http://www.kuder.com)

The **Kuder Careers Interests Assessment®-Likert (KCIA-L)** is designed to be optimally efficient, while meeting or exceeding the latest technical standards of reliability, validity, and fairness set forth by the Joint Committee of the American Psychological Association, the American Educational Research Association, and the National Council on Measurement in Education (AERA/APA/NCME, 1999, 2014). The aim of the KCIA-L is to determine the relative level of interest a respondent has in each of the six Holland areas of interests. In the United States, these six interest scores are then used to identify the national career pathways and clusters as well as O\*NET occupations that best match the respondent's Holland interest profile, based on the value of a Euclidean distance similarity index. The Holland scores for O\*NET occupations are compiled from the most recent version of the O\*NET database.

The Holland scores for national clusters and pathways are based upon the median scores for occupations that Advance CTE (formerly National Association of State Directors of Career Technical Education Consortium (NASDCTE)) has identified as composing the respective clusters and pathways. In contexts outside the United States and where sufficient information is available, similar processes are used to identify career clusters and occupation areas from parallel taxonomies (e.g., ISCO, ANZSCO). To ensure that KCIA-L scores continue to reliably and validly reflect interests in the six Holland areas, with efficiency and without bias, a number of psychometric research and development activities were undertaken in 2017 and concluded in January 2018. These activities involved the use of a) focus groups and think-aloud protocols to collect direct and indirect feedback, respectively, from U.S. middle and high school students; b) item-by-item response data from 2,874 U.S. students to evaluate U.S. discrimination power of each item of the previous KCIA-L; and c) an initial pool of 113 items generated for field testing. Below is a summary of the developmental and analytic activities completed to date.

1. Data from 3,194 U.S. students were submitted to Classical item analyses to optimize reliability and item discrimination. Final reliability coefficient values ranged from 0.907 to 0.950. All item discrimination values are very high. See tables 1 and 2.
2. Differential item functioning (DIF) analysis (polytomous logistic regression, Zumbo-Thomas criterion) to detect potential gender and race/ethnic biases. All final items meet the Zumbo-Thomas criterion of fairness.
3. Confirmatory factor analysis was conducted using structural equation modeling to evaluate structural validity (Mean and Variance adjusted Weighted Least Squares estimation) Root Mean Square Error found to be 0.068, where values less than 0.08 indicate a good fit.
4. Standardized factor loading evaluation shows all items to be loaded strongly on their respective intended Holland construct, with all estimates ranging between 0.682-0.899, all p-values approximately zero, and standard errors of 0.004-0.011. See table 3.
5. A formal Delphi process with three iterations was implemented to arrive at consensus best items and to ensure adequate representation and relevance of item content.

The result of these R&D activities is the final version of the KCIA-L that includes only the best 60 items from the initial pool of 113. These 60 items together measure the levels of interest of a respondent in the six Holland areas with high levels of reliability, strong evidence of validity based on content, strong evidence of validity based on internal structure, strong evidence of freedom from gender or race/ethnic bias, and strong evidence of freedom from biased, insensitive, stereotypic, or offensive content, context, or language.

**Table 1**  
*Item Discrimination Values for KCIA-L (Nov 2017 Sample, N=3,194)*

Scale	Range of Discrimination Values	Average Discrimination Value
Realistic (R)	0.712 - 0.849	0.788
Investigative (I)	0.662 - 0.805	0.734
Artistic (A)	0.581 - 0.752	0.674
Social (S)	0.650 - 0.796	0.711
Enterprising (E)	0.589 - 0.739	0.666
Conventional (C)	0.660 - 0.781	0.718

**Table 2**  
*Score Reliabilities for KCIA-L via Cronbach Alpha Value (Oct/Nov 2017 sample, N=3,194)*

Scale	U.S. Version, KCIA-L (N=2,045)
Realistic (R)	0.950
Investigative (I)	0.933
Artistic (A)	0.910
Social (S)	0.924
Enterprising (E)	0.907
Conventional (C)	0.927

In addition to the model fit statistic, standardized factor loadings are also evaluated. All items loaded strongly on their respective intended Holland construct as shown below.

**Table 3**  
*Factor Loadings for KCIA Loadings for KCIA-L-SG 2016 Scale*

Scale	Average Factor Loading Estimate
Realistic (R)	0.861
Investigative (I)	0.803
Artistic (A)	0.766
Social (S)	0.79
Enterprising (E)	0.748
Conventional (C)	0.785