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Statistical Analysis

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# Statistical Report

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## Background Information

*TruTalent® Skills* is a self-assessment and report for individuals to measure their current skills and receive a personalized report that identifies their strengths, potential challenge areas, and ways to develop themselves and plan for the future according to their unique skills profile.

*TruTalent Skills* is founded on the premise that individuals equipped with an understanding of their unique skillset and techniques for further skill development are in a better position to succeed at school and in the workplace. On this basis, the skills we have elected to focus upon have been drawn from a selection of capabilities identified by employers and educators as crucial for academic and employment success.

In the past, skills have been narrowly defined and categorized under such labels as "soft", "employability", "21st century" and "transferable". *TruTalent Skills* aims to take a broader approach to characterizing skills so they can be applied effectively in a variety of circumstances. When defined this way, skills take on some of the characteristics of traits in that they can appear to come more naturally to some people than others. However, they still require development and practice as they do in the traditional view of skills.

## Development of the Assessment Instrument

The process involved examining two types of resources: the first consisted of data from research-based organizations such as the American Psychological Association (American Psychological Association, 2002), Partnership for 21st Century Learning (P21) (Partnership for 21<sup>st</sup> Century Learning, 2019), the O\*NET Resource Center and the U.S. Institute for Education Sciences (National Center for O\*NET Development n.d.); the second consisted of findings from large, in-the-field, survey-based organizations, such as LinkedIn (Van Nuys, A. 2019), Monster (Bortz, D. 2018), Indeed (Indeed Editorial Team, 2021) and Forbes (Peart, N. 2019). From those sources, our team established a preliminary list of 58 skills deemed critical for academic and workplace success.

Then our research team examined the literature to find similarities and agreement between the sources. From that list the team worked to remove redundancy, overlap, and factors that do not measure well under self-assessment conditions.

We arrived at a final list of 19 skill factors or scales. Many of the 19 skills factors (See Table 1) aligned with personality research documented in the International Personality Item Pool (IPIP) research collaborative, indicating a level of convergent validity. Because of the alignment, we were able to test items in a confirmatory factor analysis as part of an initial analysis.

## Assessment Design and Initial Statistical Analysis

This study used Human eSources proprietary assessment application to deliver the assessment to 372 individuals, aged 16 and up distributed across North America. Assessment items are displayed online, one at a time to individuals.

Two styles of items were delivered. Scale-rated items are followed by six options which prompt readers to indicate how well they believe the statement describes themselves. The scale provides labels at the ends of the scale, “Not at all” at the left end, and “Definitely” at the right end. There are also numbers over each option, 0-5, which correspond the values used in the reliability measurements. See image below.

### Scale-rated item

I put my talents on display whenever I can.

☐ 0  
Not at all

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5  
Definitely

Forced choice items present two options from which the respondent must choose the one “that better describes” them. See image below. Forced choice items consisted of statements that were opposite in nature. This question style helps improve accuracy of the measure when using self-rating instruments (Höhne & Lenzner, 2018).

### Forced-choice item

Even if it is not ideal, choose the answer that better describes you.

☐ Follow my hunches

☐ Follow procedure

A total of 79 items were tested in the confirmatory factor analysis, each factor having between four and six items predicted to be loaded on it. Initial analysis of the 19 scales revealed the reliability values summarized in Table 2.

## Revisions Based on Results of Initial Analysis

Table 2 also summarizes the revisions made before the second analysis. Two factors and their associated items performed well enough to be kept as is: Confidence and Organization. One factor performed well, but was renamed for better understanding: Charisma renamed to Influence. Six factors performed well enough to keep, but needed modification to their items to improve their reliability: Thoroughness, Curiosity, Resilience, Innovation, Practicality and Modesty.

Within the remaining 10 factors, some of the items loaded better onto different factors than predicted. Those items were repurposed for a single new factor that was a combination of two original factors. Some of those factors were also relabeled to better fit the new set items loaded onto the factor. Ten of the original 79 items, which did not load onto any remaining factors, were discarded. This recombination of factors left 15 remaining factors and 69 items.

## Secondary Analysis

A second round of testing was performed with 1734 participants, using 69 items and 15 factors. The testing group included individuals located across the U.S. aged 16 and up. Analysis was done using Bayesian Unidimensional Reliability. We measured Cronbach alpha, mean score as a percent of total possible score, and McDonald's omega. The results shown in Table 3.1. Average Cronbach alpha for the entire instrument does meet the minimum acceptable threshold at 0.71. McDonald's omega also meets the minimum acceptable threshold at 0.72. Average factor load of the items onto each skill facet was 0.696 and all items had a load above 0.500.

## Assessment Report Design Based on User Feedback

We tested those 15 factors for understanding within our target audiences of students, educators, workers and employers, and based on feedback, condensed those factors into five "skills areas" by combining the factors in various ways. We then applied the label "skill facet" to the original 15 factors and created a final list of the five "skills" as described in AchieveWorks Skills: Creativity, Conscientiousness, Leadership, Social-Emotional, and Critical Thinking.

The five skill areas or "skills" are a shorter list and allow easier understanding for individuals reading the results of their assessment. The relationships between skills and skills facets were determined through a face validity exercise with a focus group of four educators and five employers. The focus group studied the definitions of the skill facets (Table 1) and the definitions of the skills (Table 4). The focus group was also instructed to consider that the skills are not mutually exclusive to each other – that skill facets can relate to more than one skill.

Partway through the exercise, the focus group noted that some facets can be more or less important than other skill facets in how they impact a particular skill. The exercise then expanded to include weightings for each skill facet to quantify the relative importance of each skill facet with respect to the related skill as an integer value. The relationships between skill and skill facets, and the weightings, indicated in brackets, are shown in the table below.

Skill	Related Skill Facets and Weightings
Conscientiousness	Discipline (2), Modesty (1), Organization (2), Practicality (1), and Thoroughness (2)
Creativity	Achievement (1), Innovation (3), Curiosity (1), Resilience (1), and Sincerity (1)
Critical Thinking	Achievement (1), Curiosity (2), Modesty (1), Practicality (1), and Self-Awareness (2)
Leadership	Achievement (1), Confidence (2), Influence (2), Resilience (1), and Sociability (1)
Social-Emotional	Consideration (2), Resilience (1), Self-Awareness (1), Sincerity (1), and Sociability (2)

The five skills are not considered measurable factors and are only used for ease of understanding. Therefore, the reliability of the skills does not need to be measured. However, the skill facets (factors) that

inform the skills *does* need statistical validation, so a confirmatory factor analysis of the skill facets for each skill was performed. That confirmatory factor analysis yielded the results in Table 3.2. Goodness of fit for each skill was above the 0.95 threshold for confirming the factor model. Values for the root mean square error of approximation varied from 0.060 to 0.079, which can be interpreted as acceptable considering the complexity of this model.

Table 1 – Original Skill Factors

Skill Factor	Definition
1. Acceptance	The ability to remain content and productive with varied circumstances and viewpoints, particularly those that differ from an individual's preferred ones.
2. Ambition	The motivation to strive toward self-improvement and improvement of the conditions around oneself.
3. Confidence	The belief that one can accomplish tasks successfully.
4. Charisma	The ability to motivate and influence others.
5. Curiosity	The motivation to seek and learn new information and solve problems.
6. Innovation	The willingness to apply new or unusual knowledge and techniques in various situations.
7. Modesty	The ability to recognize one's own limitations and willingness to use external help.
8. Networking	The ability to make and maintain connections with other people that results in productive information and skill sharing.
9. Openness	The willingness to adjust one's viewpoint or beliefs as new information becomes available.
10. Optimism	The ability to maintain a positive attitude in a wide variety of situations.
11. Organization	The ability to manage physical and informational resources in a logical and easy-to-access manner.
12. Perceptiveness	Attentiveness to the environment, both the physical and the demeanor of other people.
13. Planning	The ability to schedule one's time and sequence events in a way that optimizes efficiency and prioritizes things accordingly.
14. Practicality	The ability to make efficient use of resources, minimizing waste or extravagance.
15. Principled	Following guiding principles and rules of organizations that one is part of; resisting temptation to advance one's own agenda when it conflicts with the greater good.
16. Receptiveness	A willingness to listen to feedback or criticism in an earnest manner.
17. Resilience	The ability to handle adversity and maintain focus during setbacks or challenges.
18. Sincerity	Maintaining transparency in equal measure when describing positives and negatives; forthcoming with accurate and complete information.
19. Thoroughness	Attention to detail and in completion of work.

Table 2 – First Testing Round and Resulting Revisions

Scale Name	Cronbach Alpha n=372	Decision	Factor Label in Next Iteration
Acceptance	0.472	Combine with Perceptiveness	Consideration
Perceptiveness	0.516	Combine with Acceptance	
Ambition	0.573	Combine with Optimism	Achievement
Optimism	0.575	Combine with Ambition	
Confidence	0.762	Retain	Confidence
Charisma	0.790	Retain but rename	Influence
Curiosity	0.634	Improve items	Curiosity
Innovation	0.635	Improve items	Innovation
Modesty	0.660	Improve items	Modesty
Practicality	0.644	Improve items	Practicality
Networking	0.784	Retain but rename	Sociability
Openness	0.558	Combine with Receptiveness	Self-awareness
Receptiveness	0.407	Combine with Openness	
Organization	0.788	Retain	Organization
Planning	0.568	Combine with Principled	Discipline
Principled	0.439	Combine with Planning	
Thoroughness	0.620	Improve items	Thoroughness
Openness	0.558	Combine with Sincerity	Sincerity
Sincerity	0.474	Combine with Openness	
Resilience	0.663	Improve Items	Resilience
AVERAGE	0.606		

Table 3.1 – Second Round Testing – Descriptive Statistics & Reliability

Scale Name (factor)	Cronbach Alpha n=1734	Mean Score (%) n=1734	McDonald's Omega n=1734	Average Factor Load	Lowest Factor Load Item
Achievement	0.668	66	0.677	0.656	0.574
Confidence	0.660	56	0.670	0.595	0.532
Consideration	0.783	66	0.785	0.730	0.643
Curiosity	0.667	74	0.669	0.681	0.533
Discipline	0.728	65	0.730	0.724	0.566
Influence	0.783	61	0.788	0.748	0.568
Innovation	0.674	64	0.679	0.632	0.542
Modesty	0.688	49	0.692	0.650	0.608
Organization	0.817	78	0.822	0.797	0.632
Practicality	0.723	58	0.738	0.783	0.609
Resilience	0.709	57	0.710	0.711	0.595
Self-awareness	0.675	85	0.678	0.638	0.501
Sincerity	0.639	65	0.637	0.609	0.505
Sociability	0.804	59	0.806	0.804	0.685
Thoroughness	0.663	70	0.665	0.687	0.588
Average	0.712	65	0.716	0.696	0.579

Table 3.2 – Second Round Testing – Confirmatory Factor Analysis via Goodness of Fit

Skill Area	Goodness of Fit Index (GFI)	Comparative Fit Index (CFI)	Tucker- Lewis Index (TLI)	Root mean square error of approximation (RMSEA)	p
Conscientiousness	0.965	0.96	0.95	0.060	< .001
Creativity	0.973	0.93	0.91	0.063	< .001
Critical Thinking	0.966	0.92	0.90	0.076	< .001
Leadership	0.974	0.95	0.94	0.078	< .001
Social Emotional	0.960	0.91	0.90	0.079	< .001



Table 4 – Definition of the Five Skills

Skill	Definition
Conscientiousness	<p>Focus and organization, and completing tasks in a timely, thorough manner, are the hallmarks of this skill. It also involves self-regulation, allowing one to create and follow plans and accomplish specific goals. Guided by a sense of practicality, the conscientious individual makes efficient use of resources and exhibits modesty in recognizing and valuing others' contributions.</p> <p>While useful in all careers, this skill is especially important for those in finance, transportation, administration, security, technology and trades.</p>
Creativity	<p>Driven by a desire to explore different ideas and experiences, people with this skill seek new and original ways to express themselves. They tend to be more resilient and sincere as they present their unique ideas despite judgment or social expectations.</p> <p>While useful in all careers, this skill is especially important for those in the arts, entertainment and design.</p>
Critical Thinking	<p>A knack for gathering, evaluating and understanding information is core to this skill, which is key to making rational decisions and creating solutions. Critical thinkers also require self-awareness to recognize their biases and to be aware of their influence on people and situations.</p> <p>While useful in all careers, this skill is especially important for those in science, medicine, law and ethics, and journalism.</p>
Leadership	<p>Inspiring others, managing people and projects, and building and maintaining a network of contacts are all aspects of this skill. It also includes decisiveness—and accepting any consequences that may result—along with a capacity to tolerate stress.</p> <p>While useful in all careers, this skill is especially important for those in management, coaching and development, politics and entrepreneurship.</p>
Social-Emotional	<p>This skill is founded on the ability to work with others in a positive and productive manner. That includes connecting with people in a genuine and sincere way, being considerate of their needs and tolerant of differences. It also requires self-awareness to understand how one's actions affect other people.</p> <p>While useful in all careers, this skill is especially important for those in education, sales, communications and services.</p>

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