TalentClick

Technical Manuals

(Consolidated Documentation)

Workstyle & Performance Profile
- Page 2

Work Values & Attitude
- Page 22

Safety Quotient
- Page 40

Driver Safety Quotient
- Page 54

Workstyle and Performance Profile

Technical Manual

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TalentClick

Development of a Proprietary Measure of Workplace Personality

Within the field of Industrial Psychology, consensus currently exists that the myriad of measures and labels in the area of personality assessment can be reduced to five factors. Consistent with research in the area of personality, this has been referred to as the Five-Factor Model (FFM; cf. deRaad & Perugini, 2002; Digman, 1990; Goldberg, 1992; John, 1990, p. 72; McCrae & Costa, 1987). The FFM model suggests that we think about and describe others and ourselves (Goldberg, 1990) in terms of five broad themes:

1. ***Extraversion*** - the degree to which a person is outgoing and talkative.
2. ***Agreeableness*** - the degree to which a person is rewarding to deal with and pleasant.
3. ***Conscientiousness*** - the degree to which a person complies with rules, norms, and standards.
4. ***Emotional Stability*** - the degree to which a person appears calm and self-accepting.
5. ***Openness to Experience*** - the degree to which a person is creative and open-minded.

These factors have been subject to a number of different meta-analyses of their criterion-related validity including Barrick & Mount, 1991. In general, the conclusions arising from these meta-analyses are as follows:

- The five factors provide a useful way to organize different measures and conduct cross-measure research on the areas which might be predicted by each factor.
- The five factors show different patterns in predicting work outcomes depending on the job and the outcome to be predicted.
- Measurement of personality attributes shows promise in accounting for incremental variance in performance measures and work outcomes over and above the variance accounted for by cognitive ability measures.
- Measures of personality attributes have substantially less difference in mean scores among various racial and ethnic groups. Gender differences occur on certain dimensions and not on others.

For these reasons, it was determined to use the FFM as the basis for the development of a new personality inventory, the Workstyle and Performance Profile (WPP). An overview of the WPP is provided in the next section.

The Workstyle and Performance Profile

The WPP is based on the five factor model (FFM) with two additional dimensions, Non-dominant vs. Dominant and Contented vs. Achievement-focused. The dimensions initially

targeted to be measured, their corresponding FFM factor, and their definitions/descriptions are shown in Exhibit 1.

The WPP is administered remotely via the Internet. Respondents use a five-point Likert scale ranging from Strongly Agree to Strongly Disagree to respond to statements.

The inventory was to be used to help organizations understand a candidate's profile on both a developmental basis and a pre-hire basis. It was critical that development of the WPP proceed in a sound, research-based manner and demonstrate equivalence to the FFM. The next section provides a broad overview of the research steps taken to develop and establish the equivalence of the WPP to the FFM.

Exhibit 1
Dimensions and Definitions Targeted for Measurement by the WPP

Dimension	Definition	"Left Pole" Characteristics	"Right Pole" Characteristics
Reactive vs. Calm *(FFM Emotional Stability)*	The degree to which a person is calm and even-tempered.	**Reactive:** Has a strong sense of urgency. Reactive to stress and pressure. Prone to feeling apprehensive and tense.	**Calm:** Even-tempered and calm. Content and easygoing. Tolerant of stress and discomfort.
Reserved vs. Outgoing *(FFM Extraversion)*	The degree to which a person desires and is comfortable with social interaction.	**Reserved:** Has a low need for social interaction. Reserved and prefers to work independently or with familiar people.	**Outgoing:** Seeks out and enjoys social interaction. Comfortable initiating contact with new people. Prefers interacting with others to working independently.
Direct vs. Empathetic *(FFM Agreeableness)*	The degree to which a person is sensitive to the feelings of others and empathetic.	**Direct:** Not focused on the feelings of others or pleasing others. Straightforward when interacting with others.	**Empathetic:** Sensitive to the needs of others, accommodating, considerate, and feeling-focused.
Spontaneous vs. Regimented *(FFM Conscientiousness)*	The degree to which a person is detail focused, planful and methodical.	**Spontaneous:** Prefers to improvise and be spontaneous rather than focus on details and following set plans and procedures.	**Regimented:** Focuses on details and completing planned tasks. Values structure and order and strives to be meticulous.
Conventional vs. Open-minded *(FFM Openness/Intellect)*	The degree to which a person is curious, imaginative and open to new ideas.	**Conventional:** Prefers familiar ideas and processes. Less interested in abstract, novel or impractical ideas.	**Open-minded:** Curious, imaginative and idea-focused. Enjoys variety in tasks, exploring new ideas and learning new things.
Non-dominant vs. Dominant *(Non- FFM)*	The degree to which a person is competitive and takes charge.	**Non-dominant:** Cooperative. And focused on helping to reach team goals rather than furthering one's own agenda.	**Dominant**: Competitive, assertive, and focused on achieving success. Prefers to take charge.
Contented vs. Achievement-Focused *(FFM Conscientiousness)*	The degree to which a person is focused on achieving challenging goals.	**Contented:** Satisfied with how things currently are and are have modest expectations about what they will achieve.	**Achievement-Focused:** Motivated to reach challenging goals, high expectations of oneself

Unlikely Virtues *(Faking Good / Non-FFM)*	The degree to which a person presents themselves in an unrealistically favorable way. (e.g., "I never lie.")	**Low scores:** There is little indication the person made a deliberate attempt to present themselves in an unrealistically favorable way.	**High scores:** There are indications that the person may have made a deliberate attempt to present themselves in an unrealistically favorable way. Use of caution is recommended in interpreting assessment results. Assessment results should be considered in the context of all available information about the applicant's job qualifications.

WPP Development and Refinement

Development of the WPP proceeded in a planned methodical way. First, dimensions for measurement were selected and defined. Second, marker items were identified for each dimension. Marker items provide a linkage to previously conducted research by allowing the researcher to correlate new items with items measuring known characteristics (markers). The marker items provided the measurement target for the newly defined proprietary dimensions. Third, items were drafted and refined for use. Fourth, a sample of 620 applicants for jobs completed the entirety of the survey. Fifth, data were analyzed to determine the factor structure and internal consistency of the marker items and newly created items. Based on the results of the factor analysis and internal consistency analysis as well as judgment processes, a final reduced item set was determined for use. Each step is described in more detail below.

Determination of Dimensions

The first step involved determining the dimensions to be included in the measure. It was desired to include the same factors as the FFM based on the reasons discussed earlier. This step involved consideration of whether additional dimensions should be included and if so, which ones.

The WPP was always intended to be used in the work place as a means of describing preferred work styles both for developmental purposes as well as for pre-hire assessment purposes. Of critical importance to organizations is identifying people who are comfortable with the role of leader as well as who desire to be a leader. While this is related to the factor of Extraversion, there is an additional element which involves social and interpersonal dominance. Further support for investigating an additional factor comes from the work of Hough (1997) who suggested that better prediction of work outcomes comes from separating the Extraversion factor into Affiliation and Surgency sub-factors. It was decided to develop and investigate a dimension related to Surgency which we referred to as Non-dominant vs. Dominant. The Affiliation factor was measured by the Reserved vs. Outgoing factor of the WPP.

In hiring situations where a job is at stake, organization decision makers are concerned with extreme impression management or faking responses designed to make the applicant appear more suitable for a particular position. It was determined to develop a scale called Unlikely Virtues to be able to identify patterns in responses that were unlikely and could potentially identify people who were extreme on trying to project a positive impression. The Unlikely Virtues scale consists of socially desirable items which are stated extremely, for example "I never lie." Responses to a handful of items like this can help determine people who might be 'going overboard' in impression

management. Accordingly, it was determined to develop an Unlikely Virtues scale both to investigate its relation to the other factors as well as to provide a method to check on extremes of impression management among candidates.

Selection of Marker Items

As part of developing the WPP, it was deemed essential to link the content of the new measure to the wealth of research evidence available on existing measures of personality. As discussed earlier, the Five Factor Model (FFM) was chosen as a parsimonious model of personality as well as a model that is widely accepted in the field.

The International Personality Item Pool (IPIP) was chosen as source for items to serve as marker items for the FFM. This item pool is in the public domain and can be found online at *ipip.ori.org*. Specifically, the "10 Item Marker Scales" (10 items for each scale) developed by Goldberg (1992) were chosen for administrative flexibility. Exhibit 2 shows characteristics of the marker scales included.

Exhibit 2
Characteristics of Marker Scales Chosen for Inclusion

FFM Domain	# of Items	Internal Consistency
Emotional Stability	10	.86
Openness to Experience	10	.84
Conscientiousness	10	.79
Extraversion	10	.87
Agreeableness	10	.82

Each of the scales chosen had professionally acceptable internal consistency (above .75 in all cases). A total of 50 items were included as markers.

Drafting of Additional Items

Additional items were drafted for each of the five factors. Original items were drafted for the Non-dominant vs. Dominant factor as well as the Unlikely Virtues scale. Items were drafted to be consistent with the length and format of items from the IPIP database. Additionally, a balance of positively and negatively worded items was attempted.

Items were ordered randomly in the measure to ensure that all factors had equal likelihood of occurring relatively early in the administration as well as to ensure that both positively and negatively worded items were equally likely to appear. The version on which initial data was collected included 177 items distributed across the seven scales. As mentioned above, 50 of the items were from the marker scales.

127 original items were developed for inclusion into the initial WPP. The breakdown of original items for each of the WPP scales was as follows:

- Reactive vs. Calm -15 items,
- Conventional vs. Open-Minded - 20 items,
- Spontaneous vs. Regimented - 23 items,
- Reserved vs. Outgoing- 19 items,
- Direct vs. Empathetic- 21 items,
- Non-dominant vs. Dominant- 22 items,
- Unlikely Virtues - 7 items.

Administration of Items to Development Sample

Beginning in April of 2010 and ending in January 2011, the 177-item WPP was provided to 620 applicants for professional positions. The applicants were being considered for employment by a number of organizations. As part of providing information to the external recruiters, the applicants were asked to complete the WPP. Applicants completed the WPP online, in an unproctored fashion. On average, it took applicants 33 minutes to complete the 177 item WPP.

Exhibit 3 provides information on characteristics of the development sample. The WPP development sample was almost equally split among female and male candidates. The candidates represented a wide range of job levels ranging from administrative/support personnel to executive levels. The two largest groups of candidates were Managers (30.6%) and Professional (32.7%) which together were almost two thirds of the sample. The equal representation by gender and wide representation of various job levels provides a representative sample upon which the WPP was developed and refined.

Exhibit 3
Characteristics of the WPP Development Sample

Characteristic	Group	Number	Percent
Gender	Female	282	45.5%
	Male	338	54.5%
	Total	**620**	**100.0%**
Current or Most Recent Job	Administrative/Support	111	17.9%
	C-Level Executive	6	1.0%
	Director	55	8.9%
	Manager	190	30.6%
	Professional	203	32.7%

	Senior Vice President	4	0.6%
	Vice President	22	3.5%
	Information not provided	29	4.7%
	Total	**620**	**100.0%**

Exhibit 4 provides further support for the proposition that the WPP development sample was generally representative of the wider population of applicants. The exhibit shows that the job applicants represented a wide range of industries. It can be concluded that the WPP was developed on a wide enough range of genders, job levels and industries to remove lack of representativeness of the sample as a concern.

Exhibit 4
Industries Represented by WPP Development Sample

Industry	Number	Percent
Accounting	59	9.5%
Advertising	3	0.5%
Aerospace / Aviation / Automotive	3	0.5%
Agriculture / Forestry / Fishing	7	1.1%
Biotechnology	1	0.2%
Business / Professional Services	24	3.9%
Business Services (Hotels, Lodging Places)	6	1.0%
Communications	1	0.2%
Computers (Hardware, Desktop Software)	25	4.0%
Construction / Home Improvement	46	7.4%
Consulting	26	4.2%
Education	5	0.8%
Engineering / Architecture	35	5.6%
Entertainment / Recreation	2	0.3%
Finance / Banking / Insurance	34	5.5%
Food Service	6	1.0%
Government / Military	7	1.1%
Healthcare / Medical	37	6.0%
Internet	4	0.6%
Legal	1	0.2%
Manufacturing	53	8.5%
Marketing / Market Research / Public Relations	23	3.7%

Media / Printing / Publishing	10	1.6%
Mining	15	2.4%
Non-Profit	16	2.6%
Other	72	11.6%
Pharmaceutical / Chemical	3	0.5%
Real Estate	16	2.6%
Retail	31	5.0%
Telecommunications	7	1.1%
Transportation / Distribution	17	2.7%
Utilities	12	1.9%
Wholesale	5	0.8%
Information not provided	8	1.3%
Total	**620**	**100.0%**

Analysis of the WPP

A number of analyses were conducted of the WPP. First, the 50 marker items (10 each for each factor in the FFM) were factor analyzed, assessed for internal consistency, and correlated with one another separately from the rest of the WPP. Internal consistency as measured by *coefficient alpha* is used to indicate how well the items hang together in terms of measuring a single factor. *Coefficient alpha* ranges from 0.00 to 1.00 and numbers closer to 1.00 indicate the items are measuring a single factor. Analyses were performed to ensure that the marker scales were working as intended within the sample as well as to provide a baseline of information regarding the interrelationship of the scales and the internal consistency of the scales.

Prior to conducting any analyses, appropriate items were reverse scored based on their *a priori* measurement target. All factor analyses were conducted in SPSS using Principal Components Analysis and Varimax rotation of factors. Various factor solutions were pursued including only extracting and rotating five factors (consistent with the FFM) and rotation of all factors with eigen values greater than 1.00. Twelve factors resulted from this method. Upon further review of the factor solutions, it was determined that the five factor solution was superior on a number of fronts. First, the purposes of the research were to determine the relationship of the WPP to the FFM. Second, the pattern of rotated factor loadings showed that all the items in the *a priori* scales tended to come out on the appropriate factor with the other items measuring the same factor. Third, less than 10% of the marker items had significant cross loadings with the other *a priori* scales. For these reasons, it was determined to stick with the five factor solution.

Exhibit 5 shows the internal consistency of each of the 10-item marker scales as well as their intercorrelations.

Exhibit 5
Internal Consistency (in parentheses) and Intercorrelation of FFM Marker Scales

Marker Scales	**Correlation with item number on left . . .**				
Five Factor Model Domain	**1**	**2**	**3**	**4**	**5**
1. Emotional Stability	(.85)				
2. Openness	.24	(.80)			
3. Conscientiousness	.31	.17	(.78)		
4. Extraversion	.29	.49	.16	(.86)	
5.Agreeableness	.27	.39	.29	.41	(.80)

Parenthetical entries are coefficient alpha. All correlations significant at p<.05

Comparing Exhibit 2 and Exhibit 5 shows great similarity in the internal consistencies of each of the scales. The highest and lowest reliabilities in the current sample (Extraversion and Conscientiousness) are the highest and lowest reliabilities for the scales as reported on the IPIP web site (and reproduced in Exhibit 2). While the intercorrelations clearly indicate that each scale is measuring something different, there are relatively high correlations among Openness and Extraversion and Agreeableness.

The next step involved comparing the marker scales to the new content developed for the WPP. The marker scales were correlated with the *a priori* content on the seven scales (FFM plus Non-dominant vs. Dominant and Unlikely Virtues). Exhibit 6 shows the internal consistencies of both the marker scales and the WPP scales as well as the intercorrelation.

Exhibit 6 shows the internal consistencies of the WPP original content scales approaches that of the marker variables. All but one of the WPP scales showed professionally-acceptable levels of reliability. Typically, .70 is taken as the lower bound of professionally acceptable reliability. The WPP Direct vs. Empathetic had internal consistency (.69) approaching this standard. As scale content was further refined, internal consistency continued to be assessed and monitored. The reliability for the new scales, Non-dominant vs. Dominant and Unlikely Virtues, was very high (.87 and .77 respectively).

The entries that are bold-faced in Exhibit 6 show the correlation between the marker scale and the WPP scale intended to measure the same content. With the exception of the WPP Direct vs. Empathetic scale, these correlations ranged from .70 to .80 indicating a high degree of success in measuring similar content in the WPP to the marker scales.

The Non-dominant vs. Dominant scale correlated most highly with FFM Openness and FFM Extraversion. The correlation with Extraversion was expected since Non-dominant vs. Dominant was conceived to measure one aspect of this construct (Dominance or Surgency). The Unlikely Virtues scale had fairly low correlations with each of the other constructs potentially indicating that it was measuring a different content area entirely (extremes of Impression Management) and operating as intended.

In general, the pattern of intercorrelations was quite similar among the marker scales and the WPP scales. There did not appear to be major differences in the pattern of correlations. This similarity of pattern coupled with the relatively high correlations among the marker scales and the WPP scale intended to measure the same content suggested that combining the items from the marker and WPP scales would be appropriate to further refine the WPP.

A factor analysis was conducted of all 177 items. Based on the *a priori* nature of the factors, it was determined to further investigate extraction and rotation of 7 factors (FFM scales, Non-dominant vs. Dominant, and Unlikely Virtues scale) for refinement of item and scale content. It was desired that the final WPP consist of as few items as possible to meet the objectives of reliable measurement of factors, accurate measurement of factors, and minimization of administration time to support a program of ongoing research. Factor analysis results were used to point the direction for the final refinement of the WPP.

In general, the factor analysis showed that the marker scales and the WPP scales tended to load on the same factor. For example, the items from the marker scale Agreeableness tended to load in a similar pattern to the items from the WPP scale Direct vs. Empathetic. The final WPP was constructed on the basis of the factor analysis results and taking the following into account:

- Each final scale, with the exception of the Unlikely Virtues scale, should have the same number of items. Fifteen items was chosen as the appropriate number. The Unlikely Virtues scale should have as many items as needed to maximize reliable measurement.
- There should be a mix of marker items and original content to allow ongoing research to link back to the professional literature as well as to provide unique content.
- Given a target number of 15 items per scale, 5 items were targeted to be from the marker scale and 10 items from the original WPP content.
- Given appropriate factor loadings and item content, there should be a balance of positively and negatively worded items on the final scale.
- Scales should be composed to be as diverse as possible and cover as much of the construct space as possible. Redundancy and high similarity of content within a scale should be minimized.
- Finally, item cross loadings on other factors should be minimized where possible. That is, if there were two equally good items and one item had higher cross loadings on other factors, the item without the cross-loadings would be chosen for the final scale.

The initial WPP item set consisted of 97 items, 15 items for each of six factors and seven items for the Unlikely Virtue scale. This represents approximately a 50% reduction from the original 177 items and provided an opportunity to shorten administration time while adding additional research content.

Exhibit 6

Internal Consistency (in parentheses) and Intercorrelation of Marker Scales and WPP Scales (First Version)

Variable	Correlation with item number on left . . .											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1. Emotional Stability	(.85)											
2. Openness	.24	(.80)										
3. Conscientiousness	.31	.17	(.78)									
4. Extraversion	.29	.49	.16	(.86)								
5. Agreeableness	.27	.39	.29	.41	(.80)							
6. Non-dominant vs. Dominant	.17	.44	.11	.58	.14	(.87)						
7. Spontaneous vs. Regimented	.19	.07	**.74**	.11	.24	.09	(.78)					
8. Reactive vs. Calm	**.81**	.22	.21	.23	.20	.12	.06	(.81)				
9. Reserved vs. Outgoing	.41	.46	.20	**.83**	.49	.49	.16	.34	(.88)			
10. Direct vs. Empathetic	.14	-.05	.10	-.10	**.44**	-.38	.14	.12	.04	(.69)		
11. Conventional vs. Open-minded	.32	**.73**	.23	.52	.44	.46	.15	.26	.56	.02	(.77)	
12. Unlikely Virtues	.28	.01	.27	.04	.04	.01	.27	.32	.11	.17	.07	(.77)

Correlations less than -.07 and greater than .07 are statistically significant at p<.05.
Parenthetical entries are coefficient alpha. **Bold** entries are correlations among marker scales and WPP scale intended to measure the area.

Exhibit 7 shows the internal consistency of the WPP scales as well as the intercorrelation among the scales.

Exhibit 7
WPP Internal Consistency (Coefficient alphas in parentheses) and Intercorrelations
(Second Version)

Scale	Correlation with scale number on left . . .						
	1	**2**	**3**	**4**	**5**	**6**	**7**
1. Reactive vs. Calm	**(.86)**						
2. Conventional vs. Open-minded	.19	**(.83)**					
3. Spontaneous vs. Regimented	.14	.12	**(.81)**				
4. Reserved vs. Outgoing	.27	.45	.15	**(.90)**			
5. Direct vs. Empathetic	.02	.27	.18	.26	**(.79)**		
6. Non-dominant vs. Dominant	.00	.36	.08	.35	-.01	**(.83)**	
7. Unlikely Virtues	.31	.05	.28	.08	.09	.02	**(.77)**

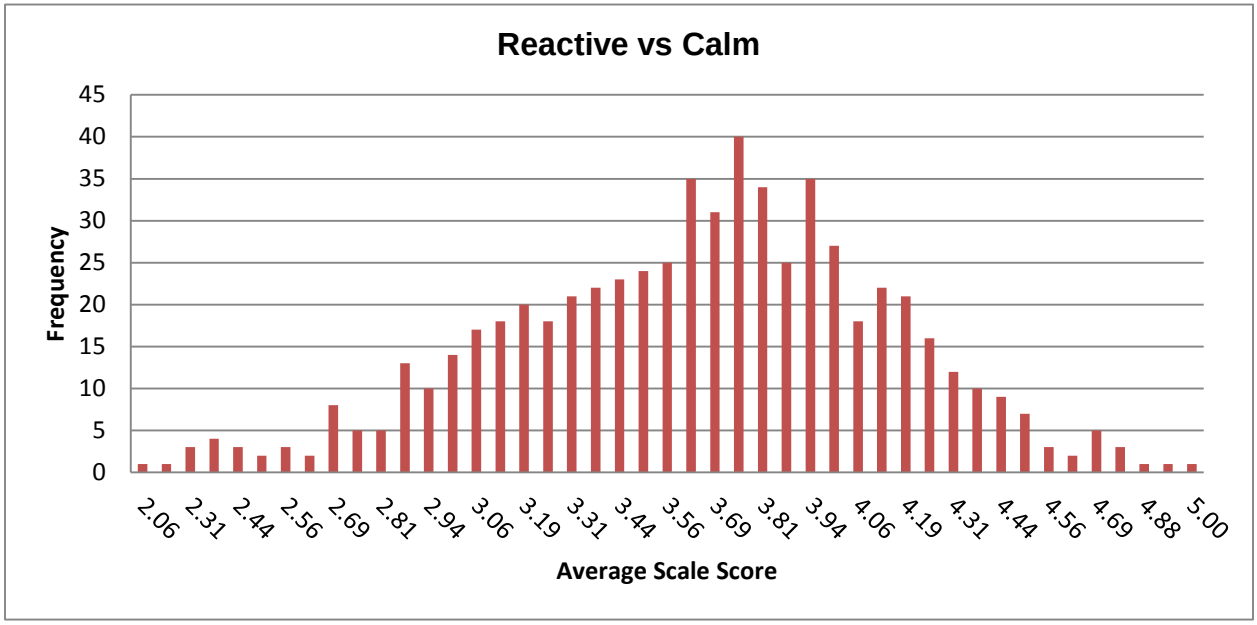
Correlations less than -.07 and greater than .07 are statistically significant at p<.05. Parenthetical entries are coefficient alpha

All the internal consistency reliabilities for the final scales met professional standards for reliability. Recall that the Direct vs. Empathetic scale of original content originally had less than professionally acceptable reliability. Refining the content of the scales and adding the five marker items raised the reliability substantially to .79.

The Non-dominant vs. Dominant scale continued to correlate most highly with Conventional vs. Open-minded and Reserved vs. Outgoing. The Unlikely Virtues scale correlated positively with Reactive vs. Calm and Spontaneous vs. Regimented.

As another step in the scale refinement process, the distributions of each of the seven scales were examined to determine whether they were normal in shape or skewed positively or negatively. Exhibit 8 graphically shows the distributions for each of the 7 scales.

Exhibit 8
Frequency Distributions of Seven WPP Scales



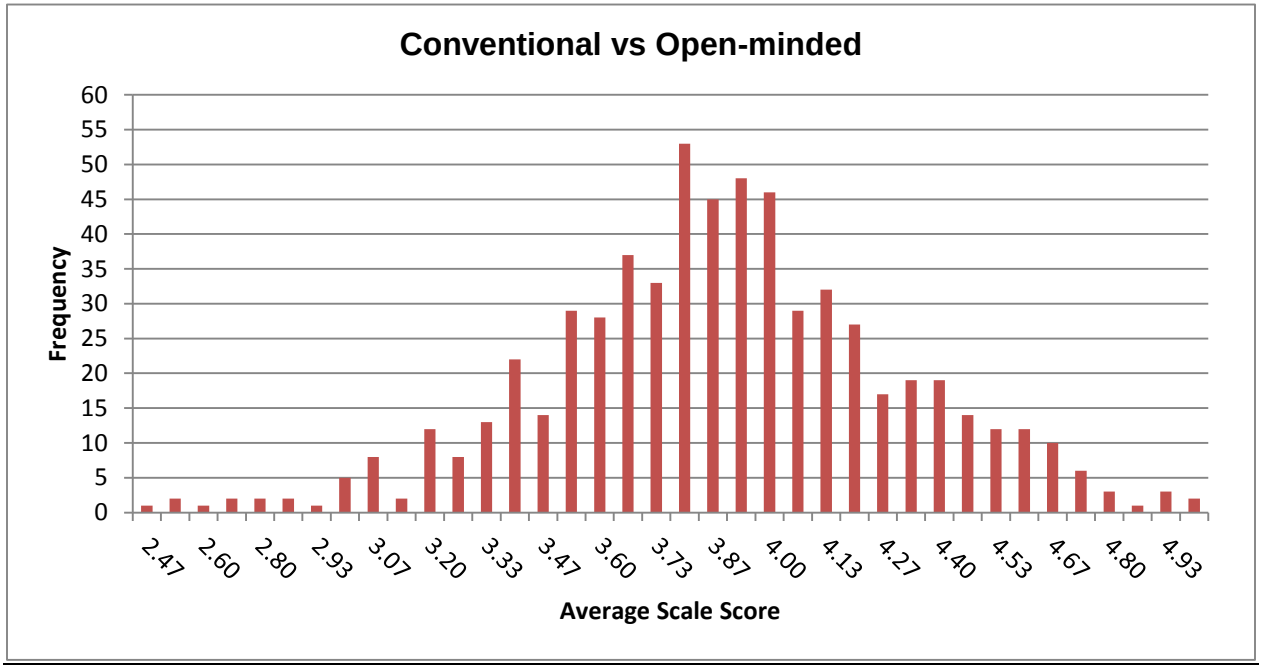
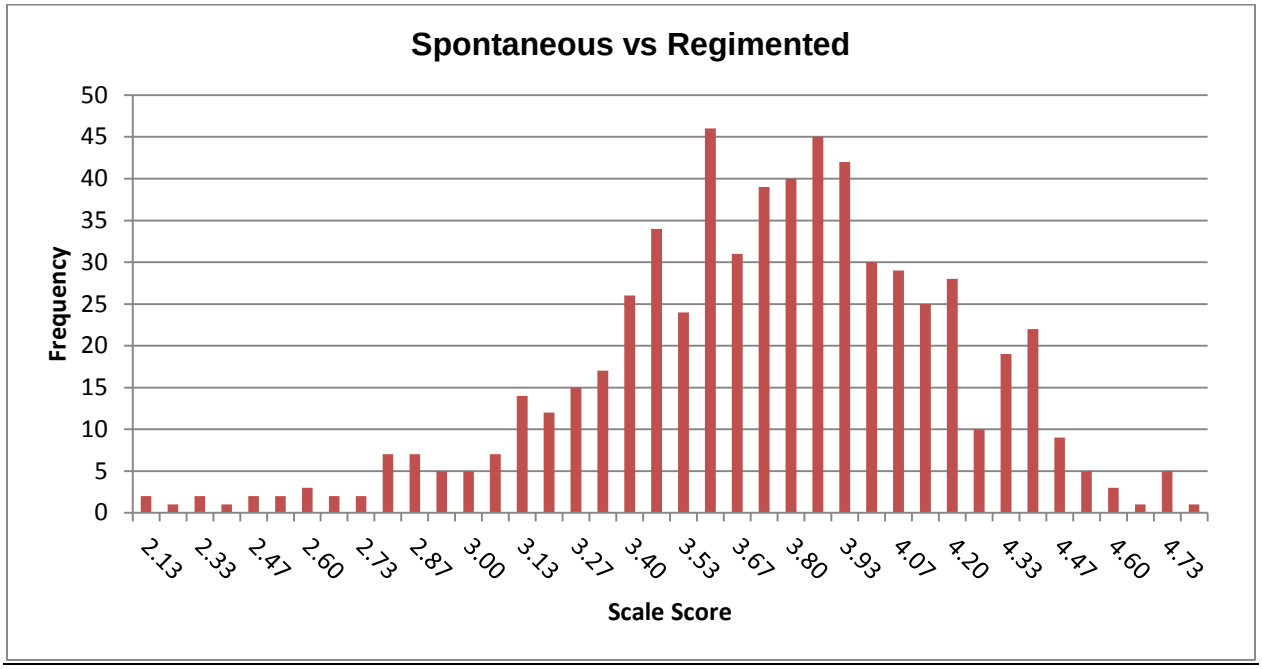


Exhibit 8 (continued)



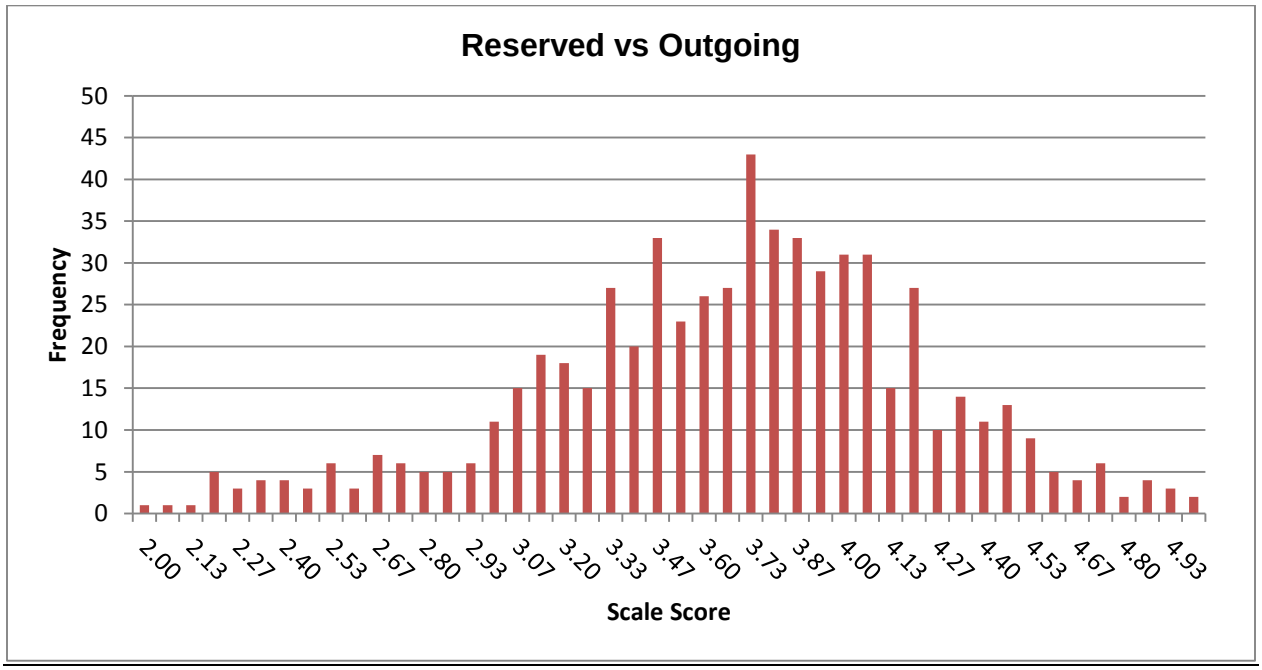
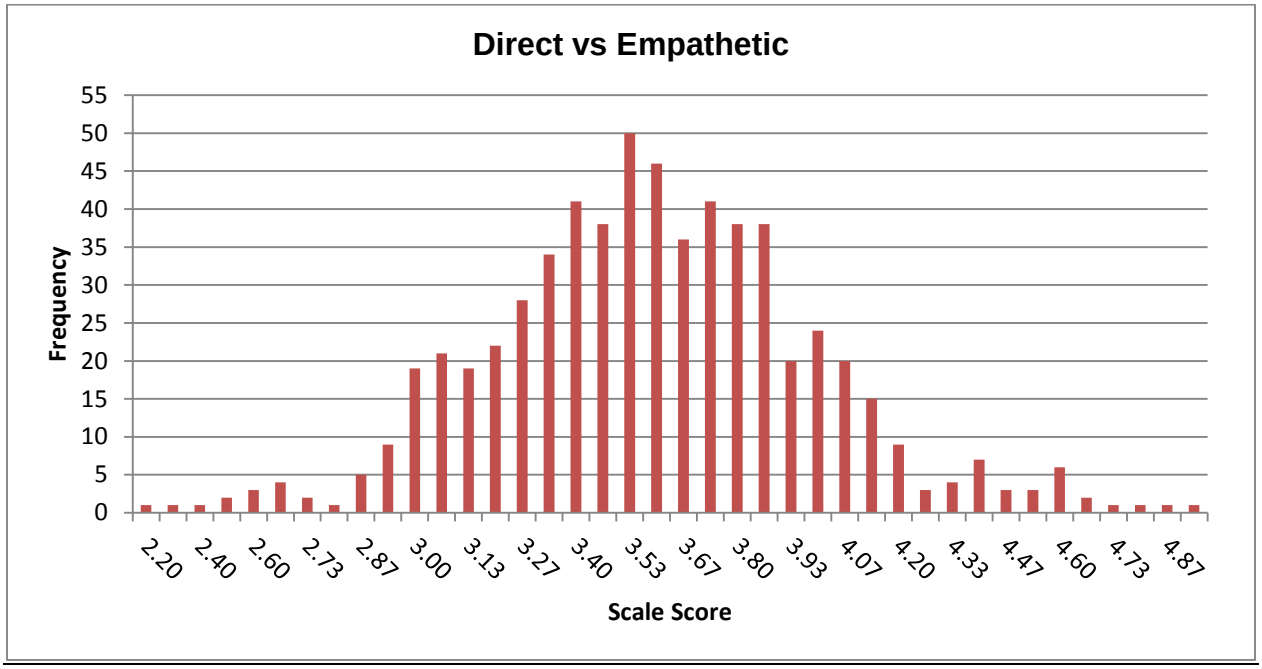


Exhibit 8 (continued)



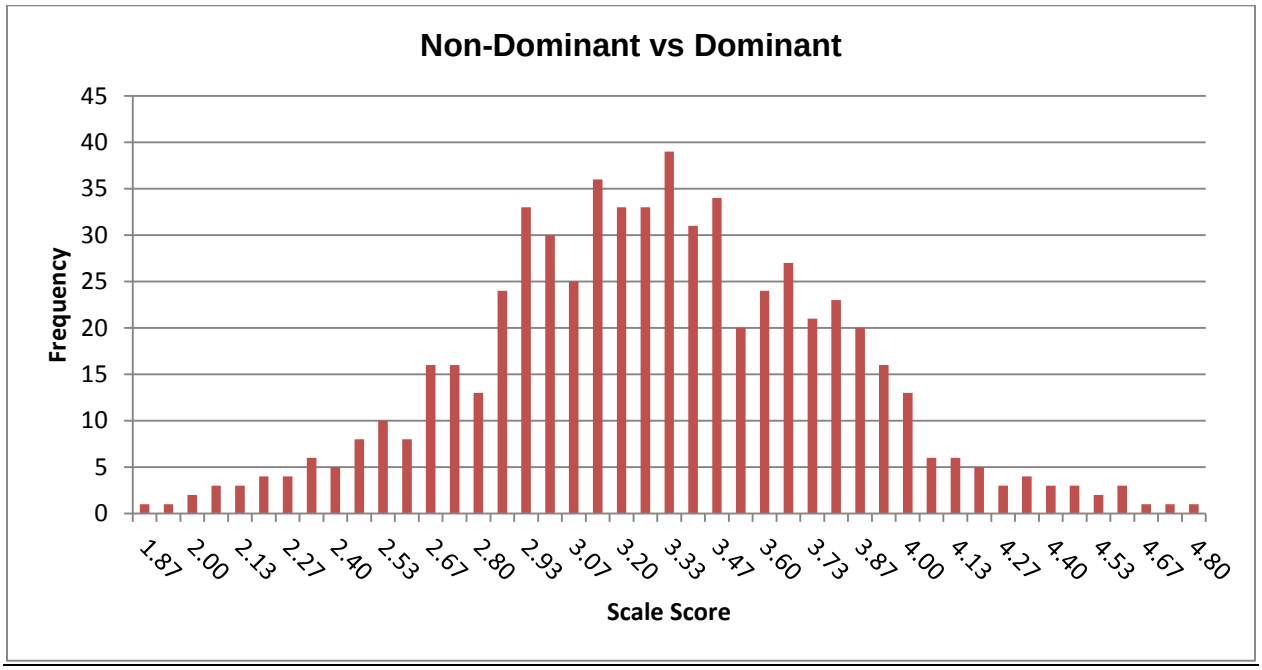
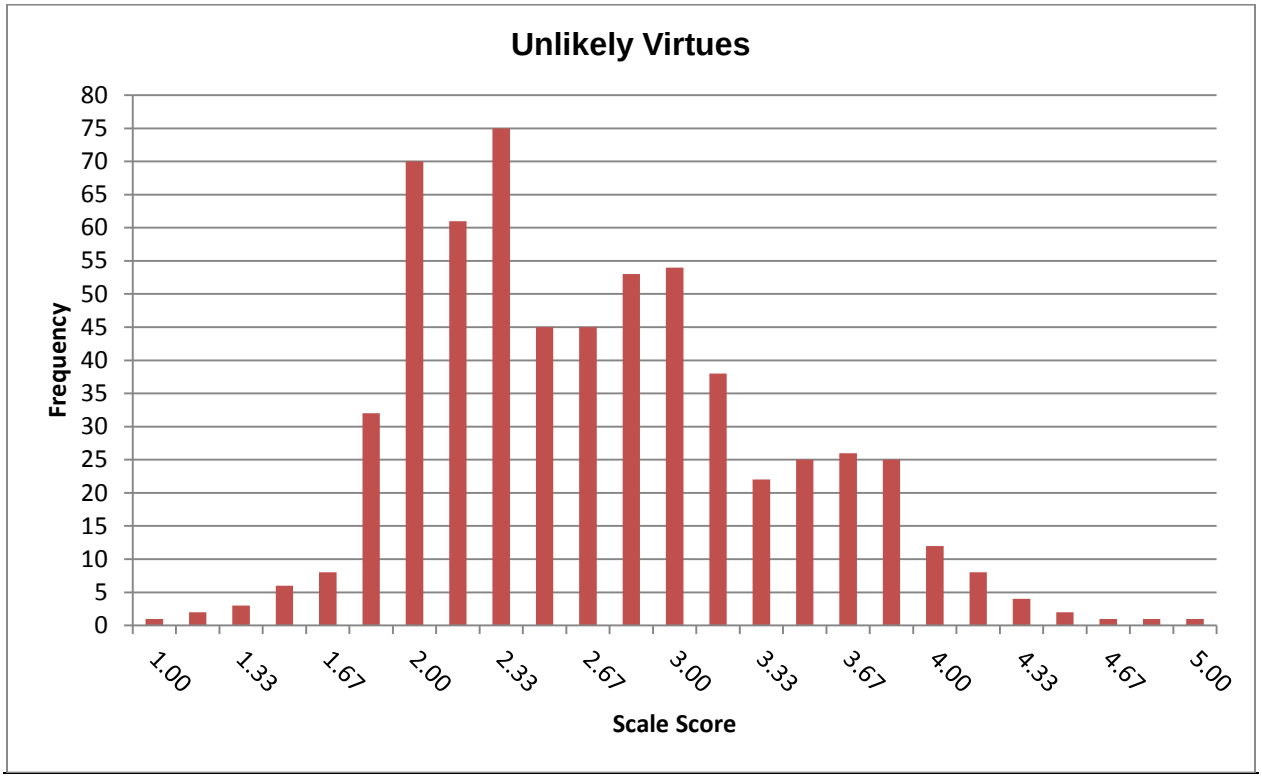


Exhibit 8 (continued)



As can be seen by the graphic presentation in Exhibit 8, the distributions for six of the seven scales approximate the normal distribution to a fairly high degree. This suggests that the measures will serve to differentiate people in ways that should be meaningful.

The exception to the normal distribution was the Unlikely Virtues scale. This scale exhibited quite a bit of positive skew, suggesting that most people tend to score fairly low. That is, most people did not seem too excessive on their impression management. Based on an analysis of the distribution as well as rational judgment, it was determined an average score of 4.00/5.00 across the seven items in the scale could indicate an extreme of impression management on the part of the applicant. This value corresponded to the 95th percentile of the distribution. A percentile of 95 indicates that less than five people out of a 100 people averaged agreeing slightly (scale value of 4.00) across the seven items in the scale. For people scoring at this level, we recommend attempting to follow-up on information during the interview or a background check as appropriate to ensure its accuracy.

Addition of the 'Contented vs. Achievement-focused' Scale

Hough (1997) summarized the relationship among personality constructs and various job performance constructs. She argued convincingly that it is important to investigate these relationships at the facet level. She computed the average correlation among the facet score and

the measure of job performance across studies. Her results showed that the Achievement facet/subfactor of Conscientiousness demonstrated strong relationships to the criteria of Job Proficiency (.15) Educational Success (.29), Irresponsible Behavior (-.19) and Sales Effectiveness (.27).

In order to better assess the Achievement facet of Conscientiousness with the WPP, items addressing achievement-focus were added to the WPP item set in 2013. Data was collected on these items for the third analysis.

Third Analysis

In 2014, a third analysis (n=514) was conducted to:

1) Examine whether the number of items per dimension could be reduced without lowering reliability.

2) Establish the reliability of the Contented vs. Achievement-focused scale.

A number of analyses were conducted:

1) **Internal Consistency** - Internal consistency reliability of the scales was assessed using coefficient alpha. Internal consistency as measured by *coefficient alpha* is used to indicate how well the items hang together in terms of measuring a single factor. *Coefficient alpha* ranges from 0.00 to 1.00 and numbers closer to 1.00 indicate the items are measuring a single factor.

2) **Scale Refinement** – The existing scales and the new 'Contented vs. Achievement-focused' scale were refined through examining the correlations with other items and adding items to the scales based on both a content basis (rational) as well as enhancing the internal consistency of the scale (empirical).

   A number of iterations of scale content and item composition were performed. The number of items in each scale were reduced in such a fashion as to minimize loss of internal consistency, keeping the content of the scale clear and interpretable, and minimizing the number of items for administrative efficiency. Exhibit 8 shows the scale names, number of items, intercorrelation among the scales as well as the internal consistency of the scales.

Exhibit 8
WPP Internal Consistency (Coefficient alphas in parentheses) and Intercorrelations (Current Version)

Scale and number of items	Correlation with scale number on left . . .						
	1	**2**	**3**	**4**	**5**	**6**	**7**
1. Reactive vs. Calm (10)	(.84)						
2. Conventional vs. Open-minded (11)	.33	(.78)					
3. Spontaneous vs. Regimented (10)	.22	.16	(.76)				
4. Reserved vs. Outgoing (10)	.38	.44	.18	(.86)			
5. Direct vs. Empathetic (11)	-.04	.10	.10	.10	(.76)		
6. Non-dominant vs. Dominant (11)	-.01	.33	.02	.25	-.13	(.82)	
7. Contented vs. Achievement-focused (10)	.27	.62	.32	.36	.13	.53	(.83)
8. Unlikely Virtues (Caution vs. Acceptable) (6)	.30	.11	.26	.15	.08	.04	(.77)

Correlations less than -.07 and greater than .07 are statistically significant at p<.05. Parenthetical entries are coefficient alpha

All the internal consistency reliabilities for the final scales met professional standards for reliability (greater than 0.7).

Determining and Updating Norms

Norms were initially set by the development sample and secondary samples. Subsequent to that, updates to norms are done on a regular basis. Current 'General Population' Norms are calculated from sample of 11,855 working adults in a variety of job types and industries and were updated in 2016.

Criterion-related Validity

A number of criterion-related validity studies have been performed on the WPP assessment and are documented as 'case studies'. These can be reviewed separately from this technical manual.

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About the Authors

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Stephen Race is the Chief Product Officer and Co-Founder of TalentClick. He is responsible for the creation and development of TalentClick's proprietary products and professional services delivery. Within the area of industrial psychology, Stephen has been a specialist in the sciences of behavioral assessment, personality assessment, and cognitive testing for over 20 years. He has helped hundreds of customers across the globe ranging from startups to multinational organizations predict and improve employee performance by measuring the fit between employees, job requirements and organizational culture. He holds a BA Psychology from the University of British Columbia and a Master of Science in Occupational Psychology from the University of London, UK.

Rand Gottschalk, M.A.

Rand Gottschalk is a human resources consultant residing in Detroit, Michigan. His work has encompassed various industries including automotive, software, metal, raw material, consumer products, and service. Some of his clients have included Ford Motor Company, Alcoa, Saturn Corporation, KB Homes, Pepsi Bottling Group, Chrysler, and the American Medical Association. During the course of his 30+ year consulting career, he has specialized in the development, validation, and implementation of assessment tools in industry. He has been involved in the development, validation, and implementation of various types of tests including physical, cognitive, and non-cognitive as well as structured interviews and assessment center exercises. Rand holds a Master of Arts in Industrial Psychology from Michigan State University.

Work Values and Attitude

Technical Manual

Stephen Race, MSc. and Rand Gottschalk, M.A.

TalentClick

The WVA Assessment

The Work Values & Attitude (WVA) assessment is designed for employers to use for employee screening, selection and development. The results provide a preview into a person's work values, communication style, interpersonal style, and attitude. The WVA reports offer insight that helps organizations decrease negative outcomes such as employee absenteeism, turnover, theft, fraud and violence, and increase positive outcomes such as teamwork, employee engagement, productivity, customer satisfaction, profitability, and more.

Employers can use the WVA to:

- Identify and develop talent for all levels of the organization
- Identify people who align with the organization's values and culture
- Reduce turnover rates and administrative costs associated with hiring wrong fit employees
- Improve interview and onboarding processes
- Reduce management challenges, employer-employee work dissatisfaction, and negative workplace morale
- Increase retention rates, productivity and employee engagement
- Reduce absenteeism, lost expertise, lost training resources and customer dissatisfaction

Development of a Work Values Assessment to Measure Person-Organization Fit

Person-Job Fit vs. Person-Organization Fit

TalentClick's most popular assessments such as the Workstyle and Performance Profile assessment measure dimensions that are directly linked to job requirements (person-job fit). Person-job fit is defined as the match between the abilities of a person and the demands of a job or the needs/desires of a person and what is provided by a job (Edwards, 1991).

Whereas person-job fit (P-J fit) is relevant to an individual's compatibility with a specific job, person-organization fit (P-O fit) pertains to how an individual matches an organization's values, goals, and mission. Person-organization fit is broadly defined as the compatibility between people and organizations (Kristof, 1996).

In contrast to P-J assessments, the WVA is intended to be used for all positions to also assess person-organization fit:

1. Characteristics desired in all members of the organization, regardless of role
2. Whether a person's values and behaviors are aligned with organizational values
3. If a person's attitudes and behaviors have the potential to put themselves and/or others at risk of negative events such as turnover, fraud, theft, violence, etc.

Researchers and practitioners contend that P-O fit is the key to maintaining the flexible and committed workforce that is necessary in a competitive business environment and a tight labor market (Bowen, Ledford & Nathan, 1991; Kristof, 1996).

Person-Organization Fit is Typically Assessed with Interviews

Sekiguchi (2004) highlights that despite the extensive focus on P-J fit in traditional selection research, researchers argue that elements of P-O fit have been already included in employee selection practices (Chatman, 1989; Ferris & Judge, 1991; Judge & Ferris, 1992). That is, managers make P-O fit evaluations or holistic judgments about an applicant's fit with their organizations in actual selection processes (Rynes & Gerhart, 1990). Many researchers who advocate this view refer to employment interviews to show that P-O fit plays a crucial role in selection processes.

Researchers suggest that managers are reluctant to abandon the interview despite its questionable reliability and validity (e.g., Harris, 1989). This is because the employment interview may be the most effective way of selecting applicants who appear to fit well with the organization (Chatman, 1989; Ferris & Judge, 1991; Judge & Ferris, 1992).

The WVA is a complementary practice for employers who attempt to assess P-O fit subjectively with varying degrees of effectiveness via unstructured interviews. The WVA provides an objective, standardized assessment for use to corroborate, refute, or encourage probing for more information in an interview and serves to offset biases and other shortcomings of the interview's subjective nature.

Reasons for expanding employee selection criteria beyond Person-Job fit to include Person-Organization-fit to include:

1) Employers should consider that employees will likely hold multiple jobs over the course of their employment with an organization (e.g., U. S. Department of Labor, 1991, 1992). This leads to the perspective that focuses on key characteristics such as general cognitive ability (g) in selecting job applicant rather than specific Person-Job fit (Behling, 1998; Ree & Earles, 1992; Schmidt & Hunter, 1998).

2) Researchers who advocate the P-O fit perspective argue that managers should select job applicants who share the values and visions of the organization (Bowen et al., 1991).

3) Researchers argue that P-J fit based on job analysis is based on the outdated ideas about jobs themselves (Carson & Stewart, 1996). This argument acknowledges the changing nature of work (Brides, 1994a, 1994b) and suggests that an expanded predictor domain including teamwork and flexibility is needed in employee selection.

Meta-Analytic Research Demonstrating the Criterion-Related Validity of Person-Organization Fit Measures

The use of person-organization fit in employment decision making: An assessment of its criterion-related validity.

Arthur Jr., Winfred; Bell, Suzanne T.; Villado, Anton J.; Doverspike, Dennis
Journal of Applied Psychology, Vol 91(4), Jul 2006, 786-801.

Abstract: Because measures of person-organization (P-O) fit are accountable to the same psychometric and legal standards used for other employment tests when they are used for personnel decision making, the authors assessed the criterion-related validity of P-O fit as a predictor of job performance and turnover.

Meta-analyses resulted in estimated true criterion-related validities of .15 (k = 36, N = 5,377) for P-O fit as a predictor of job performance and .24 (k = 8, N = 2,476) as a predictor of turnover, compared with a stronger effect of .31 (k = 109, N = 108,328) for the more commonly studied relation between P-O fit and work attitudes.

A meta-analysis of relations between person–organization fit and work attitudes

Michelle L Verquer, Terry A Beehr, Stephen H Wagner, Journal of Vocational Behavior, Volume 63, Issue 3, 2003, Pages 473-489.

Abstract: This article presents a meta-analytic review of 21 studies on relations of person–organization fit with job satisfaction, organizational commitment, and intent to turnover. Four specific moderators were investigated: the type of fit measure, method of calculating fit, dimensions of fit, and use of an established measure of person–organization fit. Mean effect sizes for the outcome variables ranged from −.18 for intent to turnover to .28 for organizational commitment. Subjective fit measures, the use of correlations to calculate fit, value congruence as the fit dimension, and the use of an established measure of person–organization fit increased effect sizes.

What is Measured

The WVA measures a person's job-relevant values related to person-organization fit. The results contain data on each person's measured level of the values compared to a normative sample and recommended interview questions for use in a hiring situation.

The WVA is administered remotely via the Internet or in a proctored setting. Respondents use a five-point Likert scale ranging from Strongly Agree to Strongly Disagree to respond to statements.

The assessment is intended to be used to help organizations understand the profile of an individual participant on both a developmental basis and a pre-hire basis. It was critical that development of the WVA proceed in a sound, research-based manner. The next section provides a broad overview of the research steps taken to develop the WVA.

Exhibit 1
Dimensions and Definitions Targeted for Measurement by the WVA

Dimension	Definition (Low Range)	Definition (Average and High Range)
Conformity	More likely to disregard rules and be distrustful. Places a low importance on honesty, principles and ethics.	Respectful of rules and regulations, places a high importance on honesty, ethics and trusting others.
Responsibility	More likely to avoid responsibilities and commitments. Not driven to meet others' expectations and timelines.	Takes responsibilities seriously, is punctual, strives to meet others' expectations and timelines.
Coachability	More likely to respond negatively to suggestions for improvement and be resistant to changing behaviors.	Responds positively to suggestions for improvement. Aware of own capabilities and willing to change behaviors.
Positivity	More likely to have negative feelings and impulses, more likely to become upset or angry when frustrated or provoked.	Controls negative feelings and impulses, unlikely to become upset or angry if frustrated or provoked.
Aggression Control	More likely to engage in aggressive behavior with others by being verbally or physically confrontational.	Avoids engaging in aggressive behavior with others. Non-combative and non-confrontational.
Open Communication	More likely to be uncommunicative, secretive and suspicious, keeping others at a distance.	Open, communicative, approachable and trusting. Initiates communication with others.

WVA Development and Refinement

Development of the WVA proceeded in a planned methodical way through the following steps.

1. A review of academic literature was conducted to generate ideas for items and constructs to be measured.

2. Based on input from potential user organizations and partners, there was a strong desire for the WVA to be used in the workplace as a means of describing values in both pre-hire and post-hire assessment purposes. Of critical importance to organizations is identifying the characteristics of potential employees who may have a low level of fit with the organization's values and culture.

3. "Expert Panel" and web research concerning which values were deemed most important for person-organization fit. This data was incorporated into the content of constructs for which items were to be drafted.

   TalentClick conducted its own research project to document organizational or core values or organizational values in a wide range of organizations. The most common clusters of values that emerged were:

   - Responsibility/Reliability
   - Integrity/Trust/Honesty/Ethical Behavior
   - Open Communication/Transparency
   - Performance/Achievement/Growth/Continuous Improvement
   - Teamwork/Collaboration
   - Health/Safety
   - Environment/Community/Stewardship

4. Items were drafted following the findings of the previous steps. Drafted items were then reviewed and refined for use.

5. A large development sample of 3,987 participants completed the entirety of the item set.

6. Analyses were conducted to determine the factor structure and internal consistency of the resulting scales. Based on the results of the factor analysis and internal consistency analysis as well as an expert judgment processes, an interim reduced item set was determined for use.

Drafting of Items

Items were drafted in accordance with the following guidelines:

1. Items should appear work-related, avoiding items that are related to peoples' personal lives and may be perceived as invasive or inappropriate.

2. Items should be as non-transparent as possible to minimize the risk of participants "faking good".

3. The item set should be balanced for positive and negative wording.

4. The item set should be at or below a 5th grade reading level. Keeping the items at a relatively simple reading level would ensure uniformity of understanding as well as providing a fit for job applicants with relatively less formal education.

5. Items must be responded to on a 5 point Likert scale ranging from Strongly Agree to Strongly Disagree. Use of the common scale for all items allows respondents to become more familiar with the rating scale and answer more quickly with their initial reactions to the item.

Administration of Items to the Development Sample

Throughout 2015 and 2016 a 155-item assessment was provided to a sample of 3,987 participants comprised of job applicants and existing employees in organizations in a wide variety of job types and industries. Participants completed the assessment online, in proctored and unproctored settings.

Exhibit 2 provides information on characteristics of the development sample.

Analysis of the Assessment

A number of analyses were conducted:

1) Factor Analysis - First, a series of exploratory factor analyses were conducted. All factor analyses were conducted in SPSS (Statistical Package for the Social Sciences) using Principal Components Analysis and Varimax rotation of factors. Various factor solutions were pursued including extracting and rotating from five factors to 12 factors, and rotation of all factors with eigenvalues greater than 1.00. Based on review of the factor analysis results, it was decided to follow the factor analysis with further rational/empirical analyses to determine the final factor structure of the instrument.

2) Item Selection - The intent was to develop a set of scales that would predict employee outcomes in organizations. The rational/empirical approach followed involved grouping items that clustered together in the factor analysis results into factors and refining these factors based on internal consistency, item content, and correlations with other items.

3) **Internal Consistency** - Internal consistency reliability of the scales was assessed using coefficient alpha. Internal consistency as measured by *coefficient alpha* is used to indicate how well the items hang together in terms of measuring a single factor. *Coefficient alpha* ranges from 0.00 to 1.00 and numbers closer to 1.00 indicate the items are measuring a single factor.

4) **Scale Refinement** - Once the preliminary scales were formed, they were refined through examining the correlations with other items and adding items to the scales based on both a content basis (rational) as well as enhancing the internal consistency of the scale (empirical).

   A number of iterations of scale content and item composition were performed. At the last iteration, the number of items in each scale were reduced in such a fashion as to minimize loss of internal consistency, keeping the content of the scale clear and interpretable, and minimizing the number of items for administrative efficiency. Exhibit 2 and Exhibit 3 shows the scale names, number of items, and item content for the six preliminary and final scales. Exhibit 4 shows the intercorrelations among the six scales as well as the internal consistency of the scales for the final WVA Scales.

Exhibit 2

Characteristics of the WVA Development Sample

Gender	Count	Percent
Female	1269	31.4%
I decline to disclose this information	12	0.3%
Male	2704	67.8%
Other	2	0.1%
Total	**3987**	**100.0%**

Job Type	Count	Percent
Accounting & Finance	175	4.4%
Administration / Corporate	325	8.2%
Carpenter	21	0.5%
CEO	27	0.7%
Digital Artist	3	0.1%
Dock Worker/Stevedore	1	0.0%
Driver/Operator	1021	25.6%
Electrician	41	1.0%
Engineer	100	2.5%
Foreman	29	0.7%
Health & Safety - Management	136	3.4%
Human Resources	138	3.5%
Insulator	109	2.7%
Ironworker	13	0.3%
Laborer	190	4.8%
Log Truck Driver	14	0.4%
Manager- Onsite	202	5.1%
Manager-Offsite	33	0.8%
Marketing & Communications	58	1.5%
Mechanic	196	4.9%
Millwright	32	0.8%
Operator	76	1.9%
Other	574	14.4%
Painter	8	0.2%
Pipefitter	11	0.3%
Project Staff	31	0.8%
Rigger	2	0.1%
Sales	195	4.9%
Scaffolder	76	1.9%
Superintendent-Field	12	0.3%
Surveyor	4	0.1%
Vice President	22	0.6%
Warehouse	72	1.8%
Welder	37	0.9%
Other	3	0.4%
Total	**3987**	**100.00%**

Industry	Count	Percent
Accounting	65	1.6%
Advertising	7	0.2%
Aerospace / Aviation / Automotive	69	1.7%
Agriculture / Forestry / Fishing	27	0.7%
Biotechnology	3	0.1%
Business / Professional Services	150	3.8%
Business Services (Hotels, Lodging Places)	18	0.5%
Communications	37	0.9%
Computers (Hardware, Desktop Software)	33	0.8%
Construction	460	11.5%
Consulting	51	1.3%
Education	77	1.9%
Engineering / Architecture	57	1.4%
Entertainment / Recreation	28	0.7%
Finance / Banking / Insurance	54	1.4%
Food Service	162	4.1%
Forestry	15	0.4%
Government / Military	49	1.2%
Healthcare / Medical	87	2.2%
Internet	12	0.3%
Legal	11	0.3%
Manufacturing	206	5.2%
Marketing / Market Research / Public Relations	38	1.0%
Media / Printing / Publishing	21	0.5%
Mining	266	6.7%
Non-Profit	42	1.1%
Not Applicable	72	1.8%
Oil & Gas	460	11.5%
Other	411	10.3%
Pharmaceutical / Chemical	7	0.2%
Real Estate	15	0.4%
Research / Science	5	0.1%
Retail	150	3.8%
Telecommunications	61	1.5%
Tourism & Hospitality	54	1.4%
Transportation / Distribution	635	15.9%
Utilities	46	1.2%
Wholesale	26	0.7%
Total	**3987**	**100.00%**

Job Level	Number	Percent
Administrative/Support Personnel (Non-Management)	847	21.3%
C-Level Executive	55	1.4%
Director	107	2.7%
Manager	556	14.0%
Not Applicable	1299	32.6%
Professional (Non-Management)	1076	27.0%
Senior Vice President	13	0.3%
Vice President	32	0.8%
Other	2	0.1%
Total	**3987**	**100.0%**

Exhibit 3
Scales and Item Content of the WVA (Preliminary Version)

Dimension	Number of Items	Definition (Low Range)	Definition (Average and High Range)
Conformity	12	More likely to disregard rules and be distrustful. Places a low importance on honesty, principles and ethics.	Respectful of rules and regulations, places a high importance on honesty, ethics and trusting others.
Responsibility	8	More likely to avoid responsibilities and commitments. Not driven to meet others' expectations and timelines.	Takes responsibilities seriously, is punctual, strives to meet others' expectations and timelines.
Coachability	8	More likely to respond negatively to suggestions for improvement and be resistant to changing behaviors.	Responds positively to suggestions for improvement. Aware of own capabilities and willing to change behaviors.
Positivity	12	More likely to have negative feelings and impulses, more likely to become upset or angry when frustrated or provoked.	Controls negative feelings and impulses, unlikely to become upset or angry if frustrated or provoked.
Aggression Control	11	More likely to engage in aggressive behavior with others by being verbally or physically confrontational.	Avoids engaging in aggressive behavior with others. Non-combative and non-confrontational.
Open Communication	14	More likely to be uncommunicative, secretive and suspicious, keeping others at a distance.	Open, communicative, approachable and trusting. Initiates communication with others.
Validity Category (Acceptable vs. Caution) (6)	6	'Caution' scores: There are indications that the person may have made a deliberate attempt to present themselves in an unrealistically favorable way. Use of caution is recommended in interpreting assessment results. Assessment results should be considered in the context of all available information about the applicant's job qualifications.	**'**Acceptable' scores: There is little indication the person made a deliberate attempt to present themselves in an unrealistically favorable way.

Exhibit 4

Scales and Item Content of the WVA (Current Version)

Dimension	Number of Items	Definition (Low Range)	Definition (Average and High Range)
Conformity	**9**	More likely to disregard rules and be distrustful. Places a low importance on honesty, principles and ethics.	Respectful of rules and regulations, places a high importance on honesty, ethics and trusting others.
Responsibility	**11**	More likely to avoid responsibilities and commitments. Not driven to meet others' expectations and timelines.	Takes responsibilities seriously, is punctual, strives to meet others' expectations and timelines.
Coachability	**11**	More likely to respond negatively to suggestions for improvement and be resistant to changing behaviors.	Responds positively to suggestions for improvement. Aware of own capabilities and willing to change behaviors.
Positive Attitude	**8**	More likely to have negative feelings and impulses, more likely to become upset or angry when frustrated or provoked.	Controls negative feelings and impulses, unlikely to become upset or angry if frustrated or provoked.
Aggression Control	**10**	More likely to engage in aggressive behavior with others by being verbally or physically confrontational.	Avoids engaging in aggressive behavior with others. Non-combative and non-confrontational.
Open Communication	**9**	More likely to be uncommunicative, secretive and suspicious, keeping others at a distance.	Open, communicative, approachable and trusting. Initiates communication with others.
Validity Category (Acceptable vs. Caution)	**6**	'Caution' scores: There are indications that the person may have made a deliberate attempt to present themselves in an unrealistically favorable way. Use of caution is recommended in interpreting assessment results. Assessment results should be considered in the context of all available information about the applicant's job qualifications.	**'**Acceptable' scores: There is little indication the person made a deliberate attempt to present themselves in an unrealistically favorable way.

Exhibit 5
Internal Consistency - Cronbach's Alpha (in parentheses) and Intercorrelations of WVA Assessment Scales (Current Version)

WVA Scale	Correlation with scale number on left . . .					
	1	**2**	**3**	**4**	**5**	**6**
1. Conformity	**(.79)**					
2. Responsibility	.58	**(.76)**				
3. Coachability	.56	.64	**(.76)**			
4. Positive Attitude	.48	.39	.50	**(.81)**		
5. Aggression Control	.58	.41	.45	.59	**(.73)**	
6. Open Communication	.31	.32	.46	.39	.28	**(.83)**

All correlations are significant at p<.01.

All internal consistency reliabilities (Cronbach's alpha) for the final scales were above .73 and exceeded professional standards for reliability (greater than .70).

Although some of the correlations among scales were somewhat high, it was decided to retain the six factor solution. The correlation among the scales seemed rational given the scale content.

The major purpose for developing the Work Values and Attitude assessment was to measure individual characteristics related to person-organization fit. Given that the six scales exhibited different correlations among themselves, it was decided to retain all six scales for research into which scales may predict workplace outcomes.

Addition of the Validity Category Scale

An additional scale for 'Validity Category' was added to the dimensions measured in the WVA. This scale measures the likelihood that the participant has presented themselves in an unrealistically favorable way (e.g., "I never lie.").

This scale had previously been developed for the TalentClick Workstyle and Performance Profile. Further detail on the development of this scale can be found in the Workstyle and Performance Profile (WPP) Technical Manual.

Determining and Updating Norms

Norms were initially set by the development sample. Subsequent to this, updates to norms are done on a regular basis.

Criterion-related Validity

Criterion-related validity studies have been performed on the WVA and are documented as ‘case studies’. These can be reviewed separately from this technical manual.

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Arthur Jr., Winfred; Bell, Suzanne T.; Villado, Anton J.; Doverspike, Dennis, The use of person-organization fit in employment decision making: An assessment of its criterion-related validity. Journal of Applied Psychology, Vol 91(4), Jul 2006, 786-801.

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Rand Gottschalk is a human resources consultant residing in Detroit, Michigan. His work has encompassed various industries including automotive, software, metal, raw material, consumer products, and service. Some of his clients have included Ford Motor Company, Alcoa, Saturn Corporation, KB Homes, Pepsi Bottling Group, Chrysler, and the American Medical Association. During the course of his 30+ year consulting career, he has specialized in the development, validation, and implementation of assessment tools in industry. He has been involved in the development, validation, and implementation of various types of tests including physical, cognitive, and non-cognitive as well as structured interviews and assessment center exercises. Rand holds a Master of Arts in Industrial Psychology from Michigan State University.

Safety Quotient

Technical Manual

Stephen Race, MSc. and Rand Gottschalk M.A.

TalentClick

Development of a Measure of Safety-Related Personality Traits

Background

Safety at work is important to society as a whole, employers, and working individuals. Providing a workplace that is safe and free from undue hazard allows individuals to work productively in the pursuit of individual and organizational goals.

Additionally, there are large direct and indirect costs if people are injured at work. The average direct cost per injury in the U.S. is estimated at $36,000 (National Safety Council, 2011). Injury costs are estimated to equal ¼ of each dollar of pretax corporate profits (Liberty Mutual Research Institute for Safety, 2009). Overall, the average annual cost of workplace injuries is estimated to be $50 billion/yr (Liberty Mutual Research Institute for Safety, 2009).

For these reasons, organizations are looking for incremental gains in reducing injuries through the application of new methodologies and techniques.

To date, much attention has been paid to alleviating hazardous working conditions by improving equipment, working conditions and processes and procedures. Even in organizations with advanced safety programs, safety incidents often persist because of "human error" involving particular workers who are involved in incidents more frequently than others. Comparatively little attention has been paid to methods of measuring the characteristics of these "Higher Risk" workers and the link between their personality traits and safety incidents.

This research was undertaken to develop a measure of individual differences that could be used to identify individuals who were more likely to work in an unsafe manner and be prone to "human error". This measure was intended to be used in selection and placement to assist in "putting the right person in the right job" as well as in employee training and development to identify workers' individual risk areas and behaviors that could be addressed and changed.

The Safety Quotient Assessment

Development and Refinement

Development of the Safety Quotient Assessment proceeded in a planned methodical way through the following steps.

1. A review of the literature was conducted to generate ideas for items and constructs to be measured.

2. "Expert Panel" data concerning which worker behaviors were linked to safety incidents on the job were collected from superintendents, managers and foremen

through focus groups and interviews. This data was incorporated into the content of constructs for which items were to be drafted.

3. Items were drafted following the findings of the previous steps. Drafted items were then reviewed and refined for use.

4. A large development sample of 2,587 participants completed the entirety of the item set.

5. Analyses were conducted to determine the factor structure and internal consistency of the resulting scales. Based on the results of the factor analysis and internal consistency analysis as well as an expert judgment processes, an interim reduced item set was determined for use.

6. Further analyses were conducted to verify the internal consistency of the resulting scales. Based on the results of an internal consistency analysis as well as an expert judgment processes, a final reduced item set was determined for use.

Determining What to Measure

The first step involved determining the content of the constructs to be measured. Based on input from potential user organizations, the Safety Quotient Assessment was always intended to be used in the work place as a means of describing safety-related behaviors for both pre-hire and post-hire assessment purposes. Of critical importance to organizations is identifying the characteristics of current or potential workers that might make them more likely to be involved in safety incidents. The Safety Quotient Assessment was designed to be a measure of personality characteristics and typical behavior that could be used with inexperienced workers rather than as a measure of acquired knowledge of safety practices or procedures.

1. A review of previously conducted research has identified a number of personality traits linked to positive safety-related outcomes:

    a. Stress Tolerance – Effectively handling stress, pressure and uncertainty. (Liao et al., 2001; Clarke & Robertson, 2005; Kamp & Krause, 1997).

    b. Conscientiousness – Following rules and procedures, being attentive to details, being reliable and responsible. (Cellar, Nelson, York & Bauer, 2001; Clarke & Robertson, 2005; Liao et al., 2001; Wallace & Chen, 2006; Christian et al., 2009).

    c. Agreeableness - Working well with others, avoiding conflict, being accommodating, maintaining control over one's temper. (Clarke & Robertson, 2005; Clarke, 2006).

d. Cautiousness – Avoiding unnecessary risks, thinking through the consequences of one's actions. (Iversen & Rundmo, 2002; Ulleberg & Rundmo, 2003).

2. Previous research had been conducted examining the relationships between the "Big 5" personality factors and safety outcomes (Clarke & Robertson, 2005). For the goal of creating an instrument with a specific focus on safety, the big 5 dimensions appeared to be too broad to be used for measuring safety-related traits only. For example, cautiousness or risk-taking is not one of the big 5 personality factors but may be perceived as a key trait linked to safety outcomes. For this reason it was decided that the constructs measured by the inventory would not be limited to those that conform to the big 5 model.

3. "Expert Panel" data was collected in 2010 using focus groups and structured interviews with more than 30 North American industrial managers, foremen and supervisors from multiple organizations. The expert panel data verified that the constructs identified in the review of previously conducted research were seen by field managers as indeed being most important to on-the-job safety. One notable difference was their view that "Rule-Following" was distinct from "Attentiveness" or being able to remain focused and undistracted while doing repetitive tasks. The expert panel also provided further examples of behaviors that might characterize the constructs.

   The expert panel showed a preference for constructs to be expressed in terms of "Risk Factors" rather than as "Strengths". For example, the strength "Stress Tolerance / Calmness" can be expressed as a risk factor by describing its opposite, "Anxiousness / Nervousness". They viewed this approach as being more useful in a safety context where the typical paradigm is to isolate "Risk Factors" that may lead to incidents. This was initially adopted but later reversed to align with other TalentClick assessment reports.

   Data from the expert panel also provided support for the idea that personality traits and attitudes linked to safety-related behaviors could be used to separate unsafe workers from safe workers. The expert panel felt that it was the traits rather than a lack of knowledge of safety rules and procedures that accounted for differences in safety outcomes. In their words "Every worker here has been through the same safety training. They all know what they *should* be doing but the unsafe workers simply *choose* to do otherwise".

Drafting of Items

Items were drafted in accordance with the following guidelines:

1. Items should appear work-related, avoiding items that are related to peoples' personal lives and may be perceived as invasive or inappropriate.

2. Items should be as non-transparent as possible to minimize the risk of participants "faking good".

3. The item set should be balanced for positive and negative wording. This would help avoid labeling people who simply respond negatively as "unsafe."

4. The item set should be at or below a 6th grade reading level. Keeping the items at a relatively simple reading level would ensure uniformity of understanding as well as providing a fit for job applicants with relatively less formal education.

5. Items must be responded to on a 5 point Likert scale ranging from Strongly Agree to Strongly Disagree. Use of the common scale for all items allows respondents to become more familiar with the rating scale and answer more quickly with their initial reactions to the item.

Administration of Items to the Development Sample

Throughout 2011 and 2012 a 237-item assessment was provided to a sample of 2,587 participants comprised of job applicants (approximately 60%) for trades positions and existing employees (approximately 40%) in organizations in the construction, mining, oil & gas, heavy equipment and transportation industries. Participants completed the assessment online, in proctored and unproctored settings.

Exhibit 1 provides information on characteristics of the development sample. The sample was mostly male candidates in trades positions. The two largest groups of candidates were Pipefitters (14.5%) and Electricians (13.5%) which together comprised over 25% of the sample. The wide representation of various job levels and types provides a potentially representative and relevant sample upon which the assessment was developed and refined.

Analysis of the Safety Inventory

A number of analyses were conducted:

1) Factor Analysis - First, a series of exploratory factor analyses were conducted. All factor analyses were conducted in SPSS (Statistical Package for the Social Sciences) using Principal Components Analysis and Varimax rotation of factors. Various factor solutions were pursued including extracting and rotating from five factors to 12 factors, and rotation of all factors with eigenvalues greater than 1.00. Based on review of the factor analysis results, it was decided to follow the factor analysis with further rational/empirical analyses to determine the final factor structure of the instrument.

2) **Item Selection** - The intent was to develop a set of scales that would predict safety outcomes in organizations. The rational/empirical approach followed involved grouping items that clustered together in the factor analysis results into factors and refining these factors based on internal consistency, item content, and correlations with other items.

3) **Internal Consistency** - Internal consistency reliability of the scales was assessed using coefficient alpha. Internal consistency as measured by *coefficient alpha* is used to indicate how well the items hang together in terms of measuring a single factor. *Coefficient alpha* ranges from 0.00 to 1.00 and numbers closer to 1.00 indicate the items are measuring a single factor.

4) **Scale Refinement** - Once the preliminary scales were formed, they were refined through examining the correlations with other items and adding items to the scales based on both a content basis (rational) as well as enhancing the internal consistency of the scale (empirical).

   A number of iterations of scale content and item composition were performed. At the last iteration, the number of items in each scale were reduced in such a fashion as to minimize loss of internal consistency, keeping the content of the scale clear and interpretable, and minimizing the number of items for administrative efficiency. Exhibit 2 shows the scale names, number of items, and item content for the six final scales. Exhibit 3 shows the intercorrelation among the six scales as well as the internal consistency of the scales.

Exhibit 1
Characteristics of the first Safety Quotient Assessment Development Sample

Characteristic	Group	Number	Percent
Gender	Female	161	6.2
	Male	2,426	93.8
	Total	**2,587**	**100.0**
Current or Most Recent Job	Administrative/Support Personnel	32	1.2
	Carpenter	46	1.8
	Director	18	.7
	Driver/Operator	71	2.7
	Electrician	348	13.5
	Field Engineer	77	3.0
	Field Superintendent	57	2.2
	Foreman	88	3.4
	Insulator	13	.5
	Ironworker	142	5.5
	Laborer	119	4.6
	Manager	95	3.7
	Mechanic	37	1.4
	Millwright	11	.4
	N/A	95	3.7
	Offsite Manager	17	.7
	Offsite Staff	18	.7
	Onsite Manager	39	1.5
	Operator	165	6.4
	Other	152	5.9
	Other Staff	60	2.3
	Pipefitter	376	14.5
	Professional	90	3.5
	Rigger	7	.3
	Scaffolder	163	6.3
	Senior Vice President	2	.1
	Surveyor	15	.6
	Vice President	11	.4
	Warehouse	50	1.9
	Welder	172	6.6
	Total	2,586	100.0

Exhibit 2

Scales and Item Content of the Safety Inventory (Initial Version)

Scale Title (Number of items)	Scale Descriptions
Distractible vs. Focused (13)	Lower scoring individuals tend to seek stimulation and variety, and may be easily distracted. Higher scoring individuals are less likely to seek stimulation and are able to stay focused and alert.
Impatient vs. Patient (12)	Lower scoring individuals may become annoyed by others especially when under stress. Higher scoring individuals tend to be less irritable and are easily able to control their emotions when under stress.
Resistant vs. Accommodating (14)	Lower scoring individuals tend to disregard authority and rules and be resistant to feedback. Higher scoring individuals tend to willingly follow guidelines, follow training and are compliant with rules.
Anxious vs. Calm (11)	Lower scoring individuals tend to become nervous and panicky when faced with unexpected safety-sensitive situations, and may feel unsure about their abilities. Higher scoring individuals tend to be confident and are steady and calm under pressure.
Thrill Seeking vs. Apprehensive (11)	Lower scoring individuals tend to seek excitement and enjoy taking risks. Higher scoring individuals do not seek excitement and tend to be uncomfortable with danger and taking risks.
Impulsive vs. Cautious (12)	Lower scoring individuals tend to make decisions quickly and may underestimate possible negative consequences of their actions. Higher scoring individuals tend to carefully evaluate their options before making decisions.

Exhibit 3
Internal Consistency (in parentheses) and Intercorrelations of Safety Quotient Assessment Scales (Initial Version)

Safety Scale	Correlation with scale number on left . . .					
	1	**2**	**3**	**4**	**5**	**6**
1. Distractible vs. Focused	**(.76)**					
2. Impatient vs. Patient	.28	**(.78)**				
3. Resistant vs. Accommodating	.61	.43	**(.86)**			
4. Anxious vs. Calm	.39	.58	.47	**(.81)**		
5. Thrill Seeking vs. Apprehensive	.23	-.15	.14	-.22	**(.80)**	
6. Impulsive vs. Cautious	.22	.25	.28	.13	-.20	**(.80)**

All correlations are significant at p<.01.

Secondary Analysis

In 2014, a secondary analysis was conducted to examine whether the number of items per dimension could be reduced without lowering reliability.

A number of analyses were conducted:

5) **Internal Consistency** - Internal consistency reliability of the scales was assessed using coefficient alpha. Internal consistency as measured by *coefficient alpha* is used to indicate how well the items hang together in terms of measuring a single factor. *Coefficient alpha* ranges from 0.00 to 1.00 and numbers closer to 1.00 indicate the items are measuring a single factor.

6) **Scale Refinement** – The existing scales were refined through examining the correlations with other items and adding items to the scales based on both a content basis (rational) as well as enhancing the internal consistency of the scale (empirical).

   A number of iterations of scale content and item composition were performed. The number of items in each scale were reduced in such a fashion as to minimize loss of internal consistency, keeping the content of the scale clear and interpretable, and minimizing the number of items for administrative efficiency. Exhibit 4 shows the scale names, number of items, and item content for the six final scales. Exhibit 5 shows the intercorrelation among the six scales as well as the internal consistency of the scales.

Exhibit 4

Scales and Item Content of the Safety Inventory (Current Version)

Scale Title (Number of items)	Scale Descriptions
Distractible vs. Focused (9)	Lower scoring individuals tend to seek stimulation and variety, and may be easily distracted. Higher scoring individuals are less likely to seek stimulation and are able to stay focused and alert.
Impatient vs. Patient (9)	Lower scoring individuals may become annoyed by others especially when under stress. Higher scoring individuals tend to be less irritable and are easily able to control their emotions when under stress.
Resistant vs. Accommodating (8)	Lower scoring individuals tend to disregard authority and rules and be resistant to feedback. Higher scoring individuals tend to willingly follow guidelines, follow training and are compliant with rules.
Anxious vs. Calm (8)	Lower scoring individuals tend to become nervous and panicky when faced with unexpected safety-sensitive situations, and may feel unsure about their abilities. Higher scoring individuals tend to be confident and are steady and calm under pressure.
Thrill Seeking vs. Apprehensive (7)	Lower scoring individuals tend to seek excitement and enjoy taking risks. Higher scoring individuals do not seek excitement and tend to be uncomfortable with danger and taking risks.
Impulsive vs. Cautious (8)	Lower scoring individuals tend to make decisions quickly and may underestimate possible negative consequences of their actions. Higher scoring individuals tend to carefully evaluate their options before making decisions.
Validity Category (Acceptable vs. Caution) (6)	'Acceptable' scores: There is little indication the person made a deliberate attempt to present themselves in an unrealistically favorable way. 'Caution' scores: There are indications that the person may have made a deliberate attempt to present themselves in an unrealistically favorable way. Use of caution is recommended in interpreting assessment results. Assessment results should be considered in the context of all available information about the applicant's job qualifications.

Exhibit 5
Internal Consistency (in parentheses) and Intercorrelations of Safety Quotient Assessment Scales (Current Version)

Safety Scale	Correlation with scale number on left . . .					
	1	**2**	**3**	**4**	**5**	**6**
1. Distractible vs. Focused	**(.74)**					
2. Impatient vs. Patient	.38	**(.78)**				
3. Resistant vs. Accommodating	.56	.32	**(.81)**			
4. Anxious vs. Calm	.37	.64	.30	**(.85)**		
5. Thrill Seeking vs. Apprehensive	.15	-.19	.16	-.36	**(.78)**	
6. Impulsive vs. Cautious	.43	.28	.31	.21	-.09	**(.81)**

All correlations are significant at p<.01.

All the internal consistency reliabilities for the final scales were above .75 and met professional standards for reliability (greater than .70).

Although some of the correlations among scales were somewhat high, it was decided to retain the six factor solution. The correlation among the scales seemed rational given the scale content. For instance, the correlation among Distractible and Resistant was .56. This makes sense given that being distracted while at work is against the rules. However, the correlation of these two scales with other scales was somewhat different indicating that the constructs as measured could be different.

The correlation between Impatient and Anxious was also fairly high at .64. Again, the correlation of these two scales seems rational given the scale context and correlations with the other scales were different.

The major purpose for developing the Safety Quotient Assessment was to measure individual characteristics related to safety performance and incidents. Given that the six scales exhibited different correlations among themselves, it was decided to retain all six scales for research into which scales may predict safety outcomes.

Addition of the Validity Category Scale

An additional scale for ‘Validity Category’ was added to the dimensions measured in the SQ. This scale measures the likelihood that the participant has presented themselves in an unrealistically favorable way (e.g., “I never lie.”).

This scale had previously been developed for the TalentClick Workstyle and Performance Profile. Further detail on the development of this scale can be found in the Workstyle and Performance Profile (WPP) Technical Manual.

Determining and Updating Norms

Norms were initially set by the development sample and secondary samples. Subsequent to that, updates to norms are done on a regular basis. Current ‘General Population’ Norms are calculated from sample of 11,855 working adults in a variety of job types and industries and were updated in 2016.

Criterion-related Validity

A number of criterion-related validity studies have been performed on the Safety Quotient assessment and are documented as ‘case studies’. These can be reviewed separately from this technical manual.

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Rand Gottschalk is a human resources consultant residing in Detroit, Michigan. His work has encompassed various industries including automotive, software, metal, raw material, consumer products, and service. Some of his clients have included Ford Motor Company, Alcoa, Saturn Corporation, KB Homes, Pepsi Bottling Group, Chrysler, and the American Medical Association. During the course of his 30+ year consulting career, he has specialized in the development, validation, and implementation of assessment tools in industry. He has been involved in the development, validation, and implementation of various types of tests including physical, cognitive, and non-cognitive as well as structured interviews and assessment center exercises. Rand holds a Master of Arts in Industrial Psychology from Michigan State University.

DRIVER SAFETY QUOTIENT (DSQ) –

Assessment Development, Use and Validation

The DSQ (Driver Safety Quotient) and SQ (Safety Quotient) are behavioral assessments which have been developed as measures of safety-relevant personality dimensions in individuals working in industrial and safety-sensitive environments such as manufacturing, construction, transportation, utilities, natural resources, and more.

To date, much attention has been paid to alleviating hazardous working conditions by improving equipment, working conditions, and standard operating procedures. Even in organizations with advanced safety programs, incidents often persist because of "human error". This is where the DSQ and SQ come into play. Our safety-focused assessments provide employers with a preview of individuals' higher-risk behaviors and default settings which lead to human error.

While the SQ can be used for any safety-sensitive role, the DSQ is more specialized and designed for employees who drive motor vehicles (short or long haul) or operate heavy equipment machinery (cranes, forklifts, dozers, excavators, etc.) as part of their occupation. The DSQ tool can also be used by companies involved in the transportation of goods via road, rail, air, or sea.

What is Measured

The DSQ assessment was designed to be measures of the personality characteristics which are proven to lead to higher-risk behaviors and consequently to workplace incidents and road crashes.

• Resistant • Anxious • Irritable	• Distractible • Impulsive • Thrill Seeking

The characteristics measured have been selected based on existing knowledge and research relating workplace incidents to personality and incident data collected from managers, supervisors, and foremen from a number of different industrial settings (natural resources, manufacturing, construction, utilities, transportation, and more).

The DSQ provides supervisors, managers, workers, drivers and operators with safety awareness and developmental solutions which help individuals reach a better understanding of personal safety strength, safety risks, and areas for improvement. The reports demonstrate a commitment to employee growth and development with an emphasis on safety related behaviors. The insight gained from the reports leads to overall improvements in safety outcomes, employee morale, job satisfaction, and organizational safety culture, while reducing management challenges, incident and injury rates, absenteeism rates, insurance premiums and lost productivity.

For DSQ, there is a Participant version and an Employer version of the report. The Participant version of the report provides workers with insight and awareness into their own risk areas and how they can self-monitor their risks on an ongoing basis. The Employer version gives Supervisors a guide on how they can manage different types of workers based on their unique personality traits and are given insight on how they can communicate with, mentor and manage workers in order to prevent workplace incidents and injuries.

Which Roles to Assess

- Motor vehicle drivers (including commercial long-haul and fleet drivers)
- Operators of heavy equipment or machinery

When to use it:

1. To identify safety risks within teams, workers, drivers and operators
2. To identify employee management and coaching needs
3. To make team-fit and job-fit considerations
4. To make culture and environment-fit considerations
5. To improve safety behaviors in high risk workers, drivers and operators
6. To identify and fill in gaps in existing safety training programs
7. To identify gaps in an organization’s safety culture
8. To predict which workers, drivers and operators are more likely to be involved in incidents and injuries
9. To accompany and complement existing safety training programs
10. To provide workers, drivers and operators with personalized, action-oriented feedback for self- improvement and self-development

Why use it:

- To identify which job applicants will exhibit “lower risk” behaviors when they become employees
- To reduce workplace injury and incident rates by placing the right people in the right roles and teams
- To identify safety risks in existing employees in order to be able to identify individuals’ coaching and management needs
- To develop safer, more productive teams
- To improve workplace safety culture

Assessment Development

The DSQ and SQ were developed with a specific focus on safety to measure the key personality factors which have been commonly linked to safety outcomes in the workplace and on the road. The assessments were developed by TalentClick occupational psychologists and consultants who have extensive backgrounds, research and experience with creating, validating and implementing assessment tools for workers in high-risk, safety-sensitive environments.

The DSQ is a variant of the SQ which uses the same scoring and dimensions as the SQ but interprets the dimension scores in a driving context. The DSQ was developed in conjunction with consulting partners in the transportation industry and customers with job types that are primarily operating motor vehicles. An expert panel of psychologists and driving specialized consultants was used to write the interpretive text in the reports including the participant’s positive attributes, risks, management consideration and interview questions.

Scale Construction

In 2011 and 2012, the SQ (Safety Quotient) was developed. Please see the SQ Technical Manual for details on its development.

Development of the Safety Quotient Assessment proceeded in a planned methodical way through the following steps.

1. A review of the literature was conducted to generate ideas for items and constructs to be measured.

2. “Expert Panel” data concerning which worker behaviors were linked to safety incidents on the job were collected from superintendents, managers and foremen through focus groups and interviews. This data was incorporated into the content of constructs for which items were to be drafted.

3. Items were drafted following the findings of the previous steps. Drafted items were then reviewed and refined for use.

4. A large development sample of 2,587 participants completed the entirety of the item set.

5. Analyses were conducted to determine the factor structure and internal consistency of the resulting scales. Based on the results of the factor analysis and internal consistency analysis as well as an expert judgment processes, an interim reduced item set was determined for use.

Further analyses were conducted to verify the internal consistency of the resulting scales. Based on the results of an internal consistency analysis as well as an expert judgment processes, a final reduced item set was determined for use.

Adapting the SQ to the DSQ:

In 2014, a secondary analysis of the SQ assessment was conducted using a sample of over 6000 participants that contained Drivers to examine whether the number of items per dimension could be reduced without lowering reliability. This data was used to adapt the SQ to a version that would be suitable for both the SQ and DSQ. The sample used in the 2014 analysis had a larger representation of Drivers and Equipment Operators than the previous sample used in the 2012 analysis.

A number of analyses were conducted in 2014:

1) Internal Consistency - Internal consistency reliability of the scales was assessed using coefficient alpha. Internal consistency as measured by *coefficient alpha* is used to indicate how well the items hang together in terms of measuring a single factor. *Coefficient alpha* ranges from 0.00 to 1.00 and numbers closer to 1.00 indicate the items are measuring a single factor.

2) Scale Refinement – The existing DSQ/SQ scales were refined through examining the correlations with other items and adding items to the scales based on both a content basis (rational) as well as enhancing the internal consistency reliability of the scale (empirical).

A number of iterations of scale content and item composition were performed. The number of items in each scale were reduced in such a fashion as to minimize loss of internal consistency reliability, keeping the content of the scale clear and interpretable, and minimizing the number of items for administrative efficiency. Exhibit 1 shows the scale names, number of items, and item content for the six final scales. Exhibit 2 shows the intercorrelation among the six scales as well as the internal consistency of the scales.

Exhibit 1

Scales and Item Content of the DSQ (Current Version)

Scale Title (Number of items)	Scale Descriptions
Distractible vs. Focused (9)	Lower scoring individuals tend to seek stimulation and variety, and may be easily distracted while driving. Higher scoring individuals are less likely to seek stimulation and are able to stay focused and alert while driving.
Impatient vs. Patient (9)	Lower scoring individuals may become frustrated or annoyed by other drivers especially when under stress. Higher scoring individuals tend to be less irritable and are easily able to control their emotions when under stress.
Resistant vs. Accommodating (8)	Lower scoring individuals tend to question driving rules and guidelines and be resistant to feedback. Higher scoring individuals tend to willingly follow driving rules and guidelines, follow training and are compliant with rules.
Anxious vs. Calm (8)	Lower scoring individuals tend to become nervous and panicky when faced with unexpected driving situations, and may feel unsure about their abilities. Higher scoring individuals tend to be confident and are steady and calm under pressure while driving.
Thrill Seeking vs. Apprehensive (7)	Lower scoring individuals tend to seek excitement and enjoy taking risks when driving. Higher scoring individuals do not seek excitement and tend to be uncomfortable with danger and taking risks.
Impulsive vs. Cautious (8)	Lower scoring individuals tend to make decisions quickly while driving and may underestimate possible negative consequences of their actions. Higher scoring individuals tend to carefully evaluate their driving options before making decisions.
Validity Category (Acceptable vs. Caution) (6)	'Acceptable' scores: There is little indication the person made a deliberate attempt to present themselves in an unrealistically favorable way. 'Caution' scores: There are indications that the person may have made a deliberate attempt to present themselves in an unrealistically favorable way. Use of caution is recommended in interpreting assessment results. Assessment results should be considered in the context of all available information about the applicant's job qualifications.

Exhibit 2
Internal Consistency Reliability (in parentheses) and Intercorrelations of DSQ/SQ

Assessment Scales (Current Version)

Safety Scale	Correlation with scale number on left . . .					
	1	**2**	**3**	**4**	**5**	**6**
1. Distractible vs. Focused	**(.74)**					
2. Impatient vs. Patient	.38	**(.78)**				
3. Resistant vs. Accommodating	.56	.32	**(.81)**			
4. Anxious vs. Calm	.37	.64	.30	**(.85)**		
5. Thrill Seeking vs. Apprehensive	.15	-.19	.16	-.36	**(.78)**	
6. Impulsive vs. Cautious	.43	.28	.31	.21	-.09	**(.81)**

All correlations are significant at p<.01.

All the internal consistency reliabilities for the final scales were above .75 and met professional standards for reliability (greater than .70).

DSQ Criterion Related Validation Research Study #1:

Identifying Driver Safety Risk Factors by Assessing Attitude, Values & Personality

Background: TalentClick and 4 transportation companies collected a research data sample to determine the relationship between attitude, values and personality and high-risk driving behaviors in order to predict and decrease road incidents.

The Companies' objectives were to:

1. To establish which personality characteristics in operators are linked to safety outcomes such as injuries, collisions, moving violations, company rule violations.

2. To help create a business intelligence tool which can be used to:

- help hire safer drivers
- help train & coach existing drivers
- help create a predictive analytics tool which insurance companies may possibly use to reduce insurance premiums for safer drivers and/or companies.

Data Analyzed:

4 companies participated with a total of 176 driver participants.

TalentClick collected job performance data and driver safety-incident data involving any of the 176 drivers. TalentClick analyzed safety incidents, job performance ratings and telematics data in relation to assessment scores.

Highlights of Findings:

The data analysis involved examining the relationships between the TalentClick assessment data and the driver safety incident data.

1. Drivers with certain personality traits have elevated levels of risk for:

o Violations/tickets, crashes, equipment damage.

o Problematic telematics data (lane handling, acceleration, speeding, cornering).

2. Job Performance Ratings do not appear to be a valid measure of driver performance.

    o They did not correlate with driving or personality data.

    o Most drivers were given a 4/5 or 5/5 rating regardless of incident history.

3. An ‘Ideal Profile’ based on this analysis can be used for driver hiring and training

Incident Type #1 – At-Fault Crashes

- Drivers who scored high on the 'Resistant' dimension had a crash rate that was 1.5 times higher than others (53% higher crash rate).

- Drivers who scored high on 'Impulsive' had a history of crashes that was 1.7 times higher than others (68% higher crash rate).

Incident Type #2 – Violations (Traffic Tickets)

- Drivers who scored high on 'Distractibility' had a 3.9 times higher rate of past violations (295% higher violation rate).

Incident Type #3 - Damage to Equipment and Machinery

- Drivers who scored high on 'Distractibility' had a history of equipment damage that was 1.8 times higher than average (80% higher equipment damage rate).
- Drivers who scored high on 'Impulsive' had a history of equipment damage that was 1.7 times higher than average (70% higher equipment damage rate).

Highlights of Findings - Telematics Data

The data analysis involved examining the relationships between the TalentClick assessment data and historical driver safety incident data provided by the companies.

Lane Handling

- Drivers who scored high on 'Distractibility' had a telematics history of improper lane handling that was 5.8 times higher than average (480% higher telematics improper lane handling score).

Speeding

- Drivers who scored high on 'Impulsive' had a telematics history of speeding that was 2.2 times higher than average (120% higher telematics speeding score).
- Drivers who scored high on 'Impatient' had a telematics history of speeding that was 1.4 times higher than average (39% higher telematics speeding score).

Acceleration

- Drivers who scored high on 'Impulsive' had a telematics history of excessive acceleration that was 2.9 times higher than average (190% higher telematics acceleration score).

Patterns in Analysis

Using Workforce Insights To Create an "Ideal Profile"

Through analysis, the Companies learned that by hiring more "ideal profile" employees who are less Impulsive, Distractible, Irritable and Resistant, they could improve the safety of their workforce, saving time, money and lives. The Companies gained:

A clear view of which personality traits were most strongly linked to driving incidents, near misses and property damage. Knowing these risk factors helps ensure the most effective hiring, training, coaching and development programs are available.

A better understanding of how to develop workers by identifying potential challenge areas with the DSQ™ and providing tailored coaching and development skills to compensate for performance “gaps.”

An understanding of the overall level of personality safety risk and which drivers or teams require the most attention to optimize performance.

DSQ Criterion Related Validation Research Study #2:

Identifying Bus Driver Safety Risk Factors by Assessing Attitude, Values & Personality

Background: TalentClick and the largest privately-owned bus transportation company in Canada collected a research data sample to determine the relationship between attitude, values and personality and high-risk driving behaviors in order to predict and decrease road incidents.

The Company' objectives were to:

1. To establish which personality characteristics in drivers and operators are linked to behaviors and outcomes such as safety incidents, collisions, speeding, moving violations, absenteeism, tardiness and company rule violations.

2. To help create a business intelligence tool which can be used to:

- help hire safer drivers
- help train & coach existing drivers

Data Analyzed:

5 divisions in the company participated with a total of 115 driver participants.

TalentClick collected job performance data and driver safety-incident data involving any of the 115 drivers. TalentClick analyzed safety incidents, job performance ratings and telematics data in relation to assessment scores.

Highlights of Findings:

The data analysis involved examining the relationships between the TalentClick assessment data and the driver safety incident data.

1. Drivers with certain personality traits have elevated levels of risk for:

o Problematic telematics data (lane handling, acceleration, speeding, cornering).

o Problematic job performance (complaints, absenteeism, lateness, poor safety scores).

2. Job Performance Ratings were shown to be a valid measure of driver performance.

o Contentedness & Impatience were linked with under performance.

3. An ‘Ideal Profile’ based on this analysis can be used for driver hiring and training

Incident Type #1 – Tardiness

- Drivers who scored high on the ‘Distractible’ dimension had a ‘Late to first stop’ rate that was 6.9 times higher than others (588% higher tardiness rate).
- Drivers who scored high on 'Impulsive' had a ‘Late to first stop’ rate that was 5.6 times higher than others (463% higher tardiness rate).

Incident Type #2 – Complaints

- Drivers who scored high on the 'Contented' dimension had a complaint rate that was 6.2 times higher than others (523% higher complaint rate).
- Drivers who scored high on 'Distractibility' dimension has a complaint rate that was 2.6 times higher than others (159% higher complaint rate).

Incident Type #3 – Performance

- Drivers who scored high on the 'Contented' dimension had a performance rate that was 4.3 times lower than others (325% lower Performance rate).
- Drivers who scored high on the 'Impatient' dimension had performance rate that was 2.8 times lower than others (184% lower Performance rate).

Incident Type #4 – Preventable Collisions

- Drivers who scored high on the 'Contented' dimension had a preventable collision rate that was 6 times higher than others (500% higher preventable collision rate).

Highlights of Findings - Telematics Data

The data analysis involved examining the relationships between the TalentClick assessment data and historical driver safety incident data provided by the company.

Lane Handling

- Drivers who scored high on 'Distractibility' had a telematics history of improper lane handling that was 6.3 times higher than average (529% higher telematics improper lane handling score).

Speeding

- Drivers who scored high on 'Impulsive' had a telematics history of speeding that was 2.2 times higher than average (121% higher telematics speeding score).
- Drivers who scored high on 'Impatient' had a telematics history of speeding that was 1.7 times higher than average (69% higher telematics speeding score).

Acceleration

- Drivers who scored high on 'Impulsive' had a telematics history of excessive acceleration that was 2.9 times higher than average (187% higher telematics acceleration score).

Using Workforce Insights To Create an "Ideal Profile"

Through analysis, the Company learned that by hiring more "ideal profile" employees who are less Impulsive, Distractible, Contented, Irritable and Rule-Resistant, they could improve the safety of their workforce, saving time, money and lives. The Company gained:

Benefits #1

A clear view of which personality traits were most strongly linked to driving incidents, near misses and property damage. Knowing these risk factors helps ensure the most effective hiring, training, coaching and development programs are available.

Benefits #2

A better understanding of how to develop workers by identifying potential challenge areas with the DSQ™ and providing tailored coaching and development skills to compensate for performance “gaps.”

Benefits #3

An understanding of the overall level of personality safety risk and which drivers or teams require the most attention to optimize performance.

Recommendations for Moving Forward:

Using Workforce Insights To Make Better Hiring & Training Decisions

1. Use Dimensions to Make Personnel Decisions

Consider training, coaching and self-coaching initiatives that emphasize key dimensions.

2. Develop “Ideal Profiles” of High Performing Employees

Set “Ideal Profile” ranges for specific job types to screen job applicants.

3. Optimize Job Performance Ratings

Investigate the guidelines for the Job Performance Ratings to ensure that they are as fair and objective as possible and fit the data-driven "ideal job profile."

4. Analyze Long-Term Patterns

Conduct further data analysis to identify long-term trends. This would produce a more complete data set that can be used to guide holistic human resource policies and safety programs.

Recommendations for Hiring:

1. Assess ALL driver candidates.

2. Exercise caution with candidates who have scores outside the Ideal Profile.

3. Use personalized interview questions to probe potential problem areas.

Recommendations for Training and Coaching

1. Use the assessment as a training and post-incident tool.

2. Use the assessment results to guide extra training and coaching.

3. Provide Participant copies of results to drivers for self-awareness.