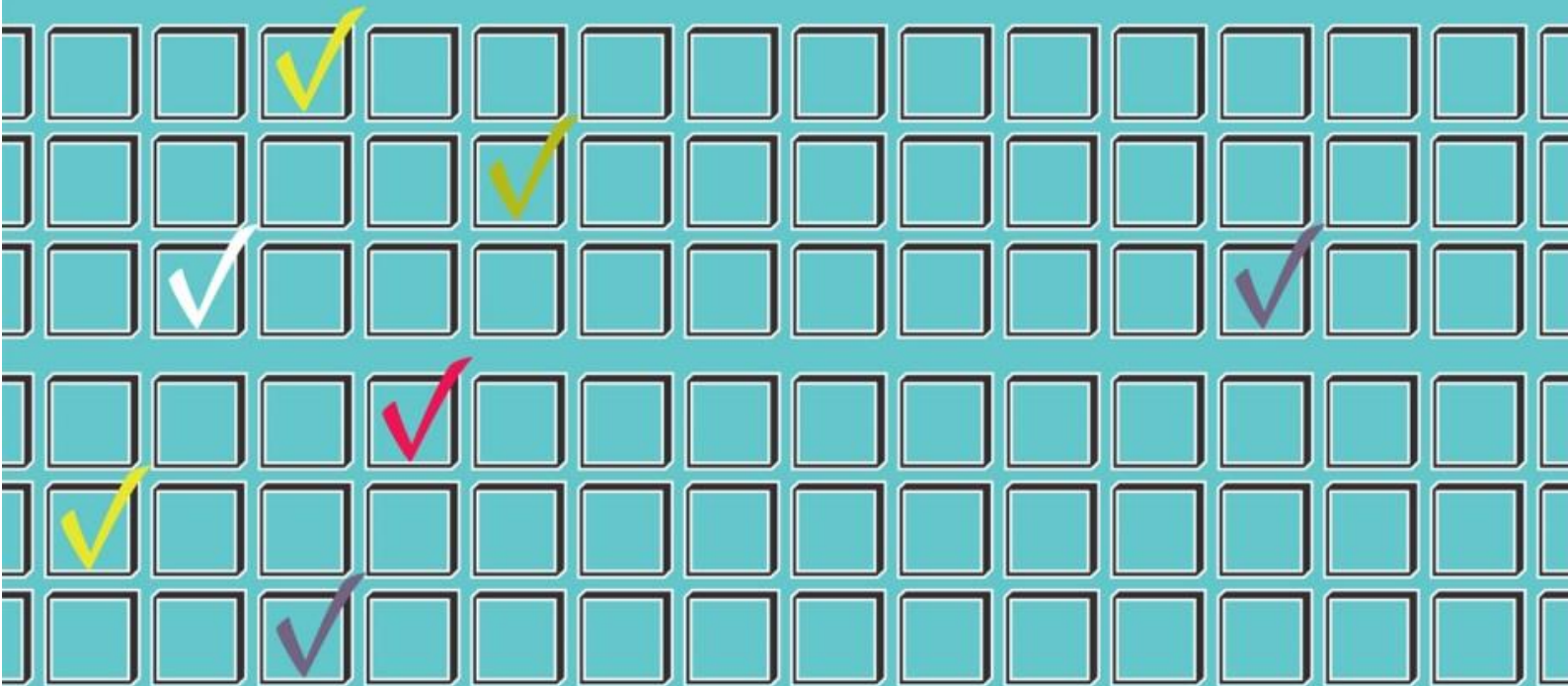




# TECHNICAL MANUAL

QUICK CHECK TEST



DEVELOPED BY JVR PSYCHOMETRICS



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## About the developer

JvR Psychometrics (previously known as Jopie van Rooyen and Partners) was founded in 1993. The initial focus of the emerging entrepreneurial concern was to import, research, and distribute psychological tests.

Today, JvR represents international test publishers and distributors in Southern Africa who are well known and highly respected worldwide. JvR also actively sources, develops, and promotes psychological tests of the highest quality, developed in Southern Africa. JvR takes great pride in being South African and is privileged to have shown significant growth in the past 20 years since its inception. Distributing and publishing in excess of 200 tests, JvR is able to provide the best assessments in all the specialist fields of psychology including corporate, clinical, educational, neurological, counselling, and forensic application.

Psychology as a science is dependent on continuous research. This “evidence based” approach has become the cornerstone of JvR’s business and values. The JvR Research Department continuously evaluates the statistical integrity of the assessments distributed, and has also been involved in the development of psychometric instruments. The Quick Check Test (QCT) is one of the assessments designed and developed by the JvR Research Department to meet a specific need in the selection and development industry. The QCT is housed on the JvR Online platform allowing for state-of-the-art user functionality, data protection and collection, and effortless client interface. The growth of the South African and JvR developed range allows clients to choose world class technology and methodology while leveraging local knowledge and expertise.



# CHAPTER 1

## Introduction

### 1.1 Brief Overview

The QCT is a mass screening instrument used to measure the detail orientation of candidates for further assessment, selection or consideration. The instrument is used to determine if candidates have the necessary detail-checking ability to cope with the clerical tasks which are a mainstay of most white collar work contexts. The QCT categorises candidates as either below average, average or above average with regards to their detail checking ability. The assessment has a total of 42 items and takes approximately 10 to 15 minutes to complete. The QCT is an online assessment hosted by JvR Online.

### 1.2 Purpose and rationale

The QCT is a screening instrument. The primary purpose of the instrument is to determine which candidates have the minimum required detail-checking ability to conscientiously and thoroughly deal with clerical work. Being accurate when completing projects and/or checking the work of others is an important requirement of most jobs.

As psychological assessment processes are expensive, labour intensive, and time-consuming; assessing candidates who do not have the minimum capabilities to meet the job requirements reduces the efficiency and/or cost effectiveness of the assessment process. The QCT allows large numbers of prospective employees to be assessed quickly and inexpensively. Candidates who do not meet the minimum requirements are not considered good prospects and are precluded at an early stage in the process. Those

candidates who do meet the minimum requirements are classified as prospects for further assessment and consideration.

### **1.3 Administration and overview**

The QCT is an online assessment available on the JvR Online platform and accessibility to this and other assessments is managed through the JvR Bureau Service. JvR Online is an online administration platform that was developed to host our local and self-published assessments as well as a number of international assessments. Individual user portals can be set up by the JvR Bureau Service so clients can easily manage their assessments and have access to client reports straight after completion of an assessment. The portal was designed to be easily managed and reporting of assessment results and number of assessments completed can be automated. For more information on JvR Online and to set up your free portal please contact the JvR Bureau Service.

The QCT is used for the corporate screening of applicants entering the organisation and is not an educational, clinical, counselling, correctional, research or preventative assessment. As the assessment is administered, scored and interpreted through JvR Online, any human resource professional may use the assessment for screening purposes.

The QCT is recommended for jobs that require clerical accuracy and may also be used to whittle down large talent pools where there is doubt that the pool of candidates has the rudimentary capacities to meet basic job demands.





# CHAPTER 2

## The Conceptual Framework

### 2.1 History of the product

The QCT was developed as part of JvR's Prospect Screener in 2012 and was released in 2013 by JvR Psychometrics. The instrument was developed due to a demand for a screening tool that can identify prospective candidates with the necessary detail checking capacity to complete and check clerical work effectively.

### 2.2 Theoretical background and conceptual framework

French (1974) and Beach (1970) outline the personnel selection process as “the sorting out or elimination of those judged unqualified to meet job and organisation requirements” (Beach, 1970, p 232). Grobler, Wörnich, Carrell, Elbert and Hatfield (2002, p.174) take a more positive view indicating that “selection is the process of choosing from a group of applicants the individual best suited for a particular position”. In general, the personnel selection process has to determine from a large pool of recruited applicants which candidate(s) are best suited to meet the requirements of the job for which they are being assessed (Grobler et al., 2002).

The personnel selection process has a very important initial stage where it has to identify those individuals who are most promising for selection, and then initiate screening (interviews, psychometric assessment, reference checking etc.) to determine which individuals are best suited to the job-tasks (Muchinsky et al., 2004). Van der Merwe (2002) outlines the basic selection process as is generically used throughout the world and

indicates that most of these processes have a preliminary screening phase. This preliminary screening phase is usually composed of relatively cost effective and easy to implement techniques to determine the candidate's suitability for a job or position. These techniques include reference checking, prior training, job-experience, biographical blanks, preliminary interviews, and résumé checking (Gatewood et al., 2011) to name a few. Many of these techniques are valid methods for screening out candidates based on the most salient job requirements; however, they do not necessarily reveal psychological constructs that are assessed at a later phase in the selection process (Gatewood et al., 2011) nor are they considered strictly objective, reliable, valid, or standardized for all selection contexts (Muchinsky et al., 2004). The strongest preliminary assessment methods tend to be biographical data (biodata) and structured interviews which tend to be relatively valid, fair and applicable for candidate screening (Muchinsky et al., 2004).

The QCT aims to support the initial personnel selection stage by quantitatively determining a salient construct (detail checking) required for most job positions. The utility of detail checking reaches as far back as 1947 when the Personnel Research Section of the United States Army published a report on the predictive validity of clerical checking instruments (Personnel Research Section of the United States Armed Forces, 1947). These reports indicate that clerical checking instruments (primarily based on verbal and numerical detail checking) had utility for the selection and prediction of performance for wartime civilian personnel no matter their professional skills (Personnel Research Section of the United States Armed Forces, 1947). An even earlier article by Andrews in 1937 reported on the structural validity of a number of numerical and verbal checking tests and their benefit for use in selection. Dudycha (1939) even went so far as to correlate clerical checking with dependability. This research reported a strong relationship between clerical checking, dependability and trustworthiness (Dudycha, 1939). This research would later inform studies on conscientiousness for personality.

Clerical checking is also related to intelligence. Humphreys (1979) compiled a number of different aptitude tests including numerical and verbal clerical tests and administered them to job-incumbents to determine whether clerical checking constructs related to intelligence. Findings of this study suggest that numerical and verbal checking were related to intelligence but also accounted for variance beyond general intelligence (Humphreys, 1979). Unfortunately, the popularity of clerical checking tests waned after World War II with only a few clerical tests being used in industry.

A more recent article by Whetzel, McCloy, Hooper, Russell, Waters, Campbell, & Ramos (2011) reported that clerical checking tests are still stable (reliable) and valid for selection of large numbers of job-applicants and incumbents. This study meta-analysed a large number of studies using clerical checking instruments for job-selection and the prediction of performance (Whetzel, et al., 2011).

### **2.3 Conceptual framework**

The QCT measures the entry-level detail checking ability of prospective candidates that has been demonstrated, through extensive research, to be important predictors of job-performance with most occupations, jobs or tasks (Muchinsky et al., 2004; Whetzel et al., 2011). The QCT makes use of the format for most clerical checking instruments used in the past, with a numerical and word checking format (Whetzel et al., 2011).



# CHAPTER 3

## Interpreting and the use of the results

### 3.1 QCT Individual Report

The QCT has an Individual Report (See Appendix A) that communicates whether a candidate has sufficient detail-orientation to succeed with most clerical tasks. The report is divided into three categories that report on candidates' capacity to deal with detail. These sections are divided into stanine ranges with a stanine score between 1 and 3 being below average, 4 – 6 being average and 6 – 9 being above average. These stanine scores are based on a sample of candidates who have applied for entry-level positions in organisations. The individual report also displays this information as percentiles.

### 3.2 Development and standardisation

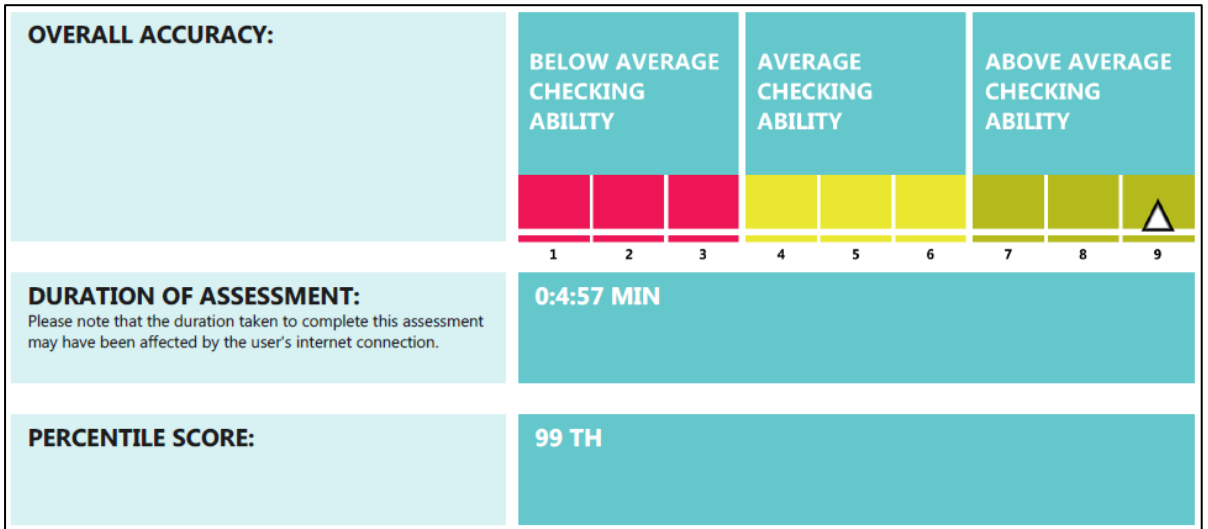
The items for the QCT were selected from numerous item banks used in assessment and research. The items have been shown, in previous research, to have adequate psychometric properties (see the Prospect Screener Technical/User Manual). The items with the best psychometric properties were selected for inclusion in the Quick Check Test. Research has shown that detail-checking is important for entry-level white collar positions (Bobko & McFarland, 2005; Chiswick & Miller, 2010; Kuncel et al., 2004; Muchinsky et al., 2004; Rothmann & Coetzer, 2007; Salgado, 2003; Schmidt & Hunter, 2004; Specter, 1982; Whetzel et al., 2011).

The QCT is composed of verbal and numerical information that is replicated in a copy column. The candidate is asked to determine whether the copy column contains exactly the same information as the original column. Small differences exist between the information in some of the original and copy columns. The candidate thus chooses from two options, 'correct' or 'incorrect'. In the 'correct' option there are no differences in the information in the original and copy columns (the copy is correct). The 'incorrect' option is selected if there are differences between the information in the original and copy columns (the copy is incorrect). These items measure whether a candidate is detail conscious and able to differentiate between information with small (subtle) differences. This is an especially important construct for administrative positions where one is often required to detect small mistakes or differences in written information (Whetzel et al., 2011) or work with exceptional accuracy.

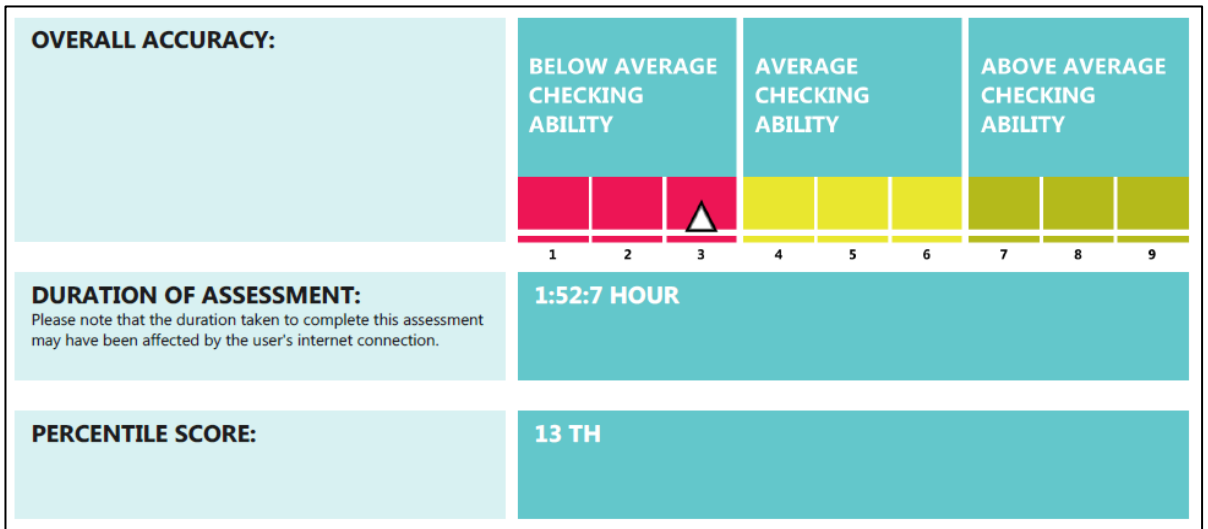
### **3.3 Group Case Study**

A small company wishes to hire an individual in an administrative position that requires extreme efficiency and accuracy with regards to detail checking. An advertisement is placed and a large number of CVs are received. As part of their screening process, the company uses the QCT to sort potential candidates. Based on other criteria (before using the QCT results), the following four candidates appear to be most suitable.

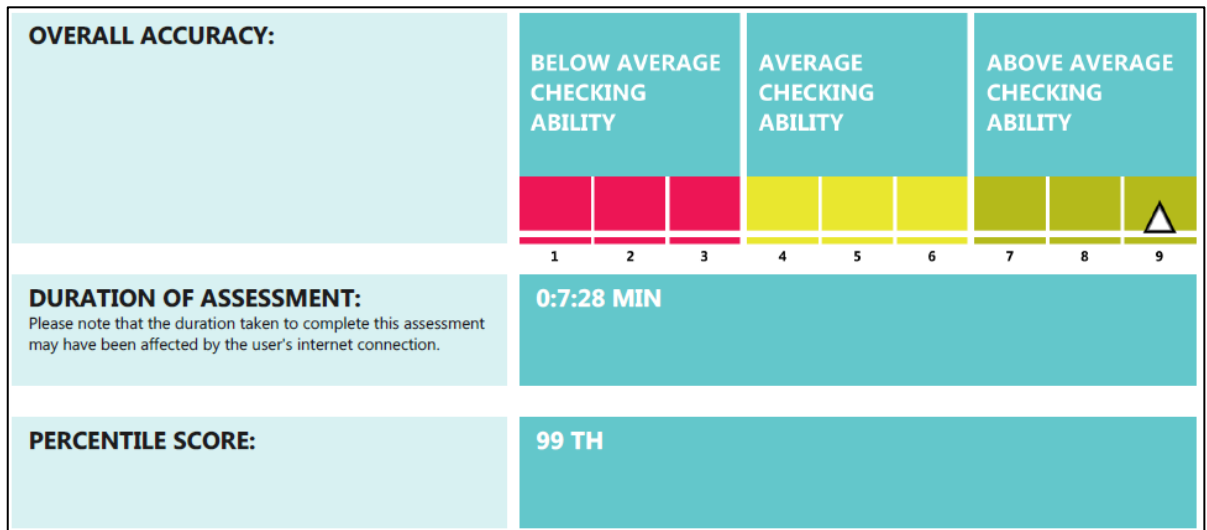
Candidate 1



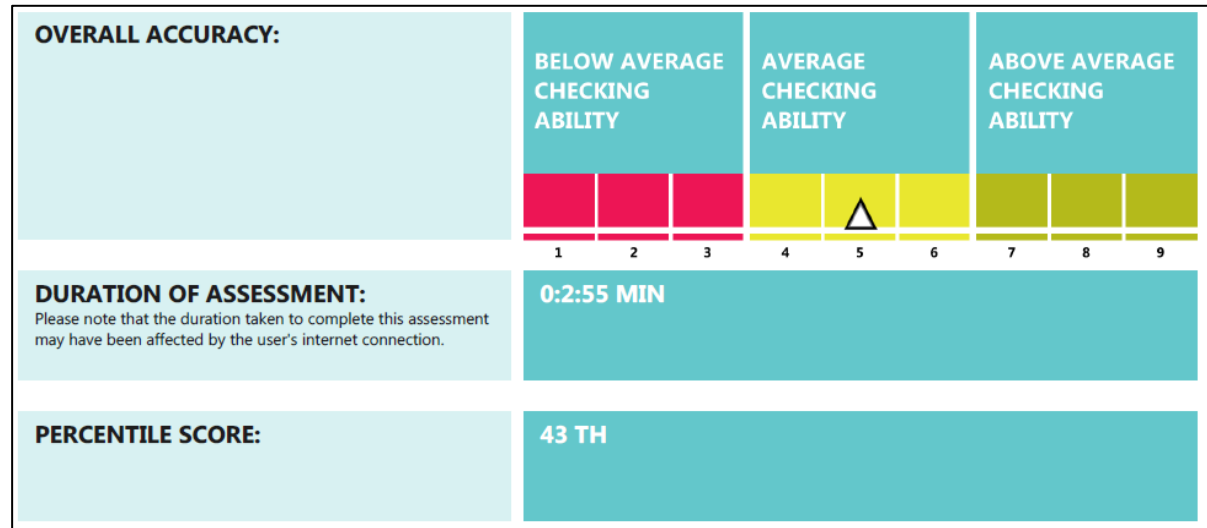
Candidate 2



Candidate 3



Candidate 4



If we were to rank the Candidates in terms of Overall Accuracy, we would place Candidate 1 and Candidate 3 at the top of the list, with Candidate 4 and Candidate 2 following on.

1. Candidate 1
2. Candidate 3
3. Candidate 4
4. Candidate 2

Using the QCT as a screening 'out' tool, would suggest that Candidate 2 is disregarded as a strong candidate. Candidate 4 has an average stanine score of 5, complete the test in 2 minutes and 55 seconds. This suggests an individual who has great speed, but their accuracy suffers in the process.

Looking at our top two candidates (Candidate 1 and 3) we note that both fell within the 99th percentile with a stanine score of 9. To differentiate them further, we could consider the time taken for each candidate to complete the assessment as both time and accuracy are considerations when it comes to our selection criteria. With this in mind, Candidate 1, who took 4 minutes 57 seconds, becomes the favourite with regards to detail checking, as Candidate 3 took 7 minutes 28 seconds.

Please note, to make this distinction based on time taken, it is important that the two assessments were administered in standardised conditions with no interruptions from either network problems or external distractions (e.g., cell phone interruptions).

As both Candidates 1 and 3 are good prospects, both should proceed to the next round of the selection process. It is just interesting to note that Candidate 1 is likely to be both accurate and fast, whereas Candidate 3 is definitely accurate, but there may be a question as to how fast he/she can work. The question could be tested further or included in the interview phase. It is of course critical that final selection decisions are made on a holistic battery with multiple sources of reliable data.





# CHAPTER 4

## Norming

### 4.1 Sample

The sample used for the initial psychometric analysis and norming was composed of 432 ( $n=432$ ) job applicants applying for entry-level positions. The norm group was composed mostly of woman (59.7%) followed by men (40.3%). Zulu was the primary home language for the group followed closely by Sotho, although 41% note 'other' as their language. The mean age of the group was 22 years with the oldest person being 29 years old and the youngest person 18 years old. The demographics of the sample fit with most entry-level candidates applying for first-time positions in an organisation in South Africa.

**Table 1: Descriptive statistics for the norm sample**

Variable	Category	Frequency	Percentage
Gender	Men	179	40.3
	Women	256	59.7
Language	Zulu	138	32
	Sotho	103	24
	English	14	3
	Other	176	41
Age	18-20	145	34
	21-23	195	45
	24-26	74	17
	27-29	18	4



# CHAPTER 5

## Reliability and validity

### 5.1 Psychometric Properties

Any assessment instrument which is to be used for the assessment of candidates needs to demonstrate adequate psychometric properties (Salkind, 2011). The most important psychometric properties are reliability and validity. Reliability indicates to what degree a test or assessment consistently measures what it is intended to measure (Salkind, 2011).

The most commonly used reliability statistic is Cronbach's Alpha ( $\alpha$ ) internal consistency reliability although a more robust measure is Guttman's Lambda 6 which also reports on the internal consistency of test scales. These reliability statistics determine whether the test or measure consistently measures the constructs under consideration (Tavakol & Dennick, 2011).

The Validity of an instrument indicates the degree that an instrument or assessment measures what it claims to measure (Kimberlin & Winterstein, 2008). In other words does the test measure the constructs it claims to measure, and to what degree does it do so. The most commonly used validity evidence is construct and criterion validity (Kimberlin & Winterstein, 2008). Construct validity determines whether an assessment measures the construct under consideration by looking at the theoretical evidence of such constructs. This may include the factor structure of an assessment, or whether an assessment is related to similar constructs and is not related to a construct which it should differ from. Construct validity can also be determined through a Rasch analysis which investigates how

well items in a test measure the constructs, discriminates between candidates of differing abilities/characteristics, and fits the theoretical model on which the scale is built.

Criterion validity is also used to determine whether an assessment measures what it claims to measure (Kimberlin & Winterstein, 2008). This is usually done through concurrent or predictive methods (Crocker & Algina, 1986). In concurrent methods the relationship between the assessment and a related construct is determined concurrently (at the same time); whereas predictive methods determine whether the assessment is predictive of a construct under consideration (such as performance) (Kimberlin & Winterstein, 2008).

The Quick Check Test's psychometric properties were investigated by analysing the reliability of the instrument (internal consistency reliability) and investigating the instrument's construct validity (factor analysis and Rasch analysis). An analysis of variance was also completed for men and women in order to determine whether gender has any biasing effect on scale scores (i.e. whether men consistently score higher or lower than women or vice versa). Criterion research still needs to be completed in order to fully understand the whether the instrument predicts performance on the job. However, numerous studies support the predictive validity of clerical checking instruments (Whetzel et al., 2011).

## 5.2 Scale reliabilities

Although Cronbach's alpha internal consistency reliability ( $\alpha$ ) is considered adequate for the evaluation of an instrument's reliability it often under or overestimates the reliability of test-scales (Revelle, 1979). Guttman's Lambda 6 ( $\lambda_6$ ) is considered a more accurate estimate of reliability as it considers the variance accounted for by each item instead of the split-half correlations used to calculate  $\alpha$  (Sijtsma, 2009). Guttman's  $\lambda_6$  is therefore not sensitive to extremes of split-half reliabilities that can confound reliability results (Revelle, 1979). Consequently, both of these reliability statistics will be reported.

The QCT has a Cronbach's  $\alpha$  of .86 with a Guttman's  $\lambda_6$  internal consistency reliability of .91. These reliability coefficients indicate good consistency of measurement with Guttman's  $\lambda_6$  being the more rigorous estimate of reliability.

**Table 2: Reliability coefficients for the Quick Check Test**

Cronbach's $\alpha$	Guttman's $\lambda_6$
.86	.91

Item-scale total correlations are presented in Table 3. These correlations indicate the degree to which each of the 42 items of the QCT correlate with all the other items in the scale. Correlations above .35 are considered good for consistency of measurement (Revelle, 1979). Most of the QCT items fall above this requirement with a mean item-scale correlation of .41.

**Table 3: Item correlations of the total detail checking scale**

Item	Item-Scale Correlation	S.D.	Item	Item-scale Correlation	S.D.
1	.51	.05	22	.214	.480
2	.55	.03	23	.533	.460
3	.38	.04	24	.48	.03
4	.44	.04	25	.51	.04
5	.49	.03	26	.43	.04
6	.34	.03	27	.22	.03
7	.47	.03	28	.53	.03
8	.46	.05	29	.58	.03
9	.41	.03	30	.41	.02
10	.47	.04	31	.32	.05
11	.41	.04	32	.58	.03
12	.45	.03	33	.27	.05
13	.09	.03	34	.62	.03
14	.23	.04	35	.46	.02
15	.36	.05	36	.11	.04
16	.53	.05	37	.41	.05
17	.54	.04	38	.18	.05
18	.18	.03	39	.40	.02
19	.42	.05	40	.38	.02
20	.40	.02	41	.46	.03
21	.452	.270	42	.46	.03

### 5.3 Group mean differences

ANOVA results are presented in Table 4. No statistically significant mean differences across gender groups were found for the Quick Check Test. This indicates that men and women respond to the QCT in a similar manner with gender having no biasing effect on the responses of candidates.

**Table 4: Analysis of variance between the mean scores based on gender**

Gender			
Scale	Men	Women	ANOVA Significance
Mean Score	19.40	18.95	No

#### 5.4 Construct Validity: Rasch Item Analysis

Rasch analysis determines how well items fit the Rasch model which is rigorously constrained to measure only one construct (latent trait) under consideration. This model tries to determine items' relative fit to a unidimensional model (a model that measures only one underlying construct). This is determined through the INFIT and OUTFIT mean square statistics that are indicators of how well items measure the underlying construct (Bond & Fox, 2007).

An INFIT and OUTFIT statistic close to 1 represents good fit, any INFIT or OUTFIT statistic below 0.75 or above 1.35 represent poor fit (also referred to as misfit). Poor fit indicates that the item(s) either do not measure the construct under consideration (underfit) or arbitrarily measure only the same variance (covariance) of the construct under consideration (overfit) (Bond & Fox, 2007). In terms of overfit, numerous items tend to measure the construct under consideration repeatedly. Some items may therefore be removed as they measure the same thing and become arbitrary. Underfit on the other hand is more confounding as it indicates the item(s) are measuring something other than the construct under consideration.

Rasch analysis also determines the item location parameters for an assessment (Bond & Fox, 2007). These are the relative difficulty (or agreeability/endorsability) of the items based on the sample of individuals. It is important for any measure to have a good spread of item difficulty in order to discriminate between candidates with lower and higher ability or who have more or less of a particular trait (Bond & Fox, 2007). Negative item location statistics indicate that the items are easy to agree with (Bond & Fox, 2007). Positive item location statistics indicate that the items are more difficult to agree with (Bond & Fox, 2007). In general, item difficulty parameters should range between relatively similar positive and negative item location statistics to have good item spread.

**Table 5 Item statistics and fit statistics**

Item Label	Item Location	S.E.	INFIT MNSQ
Item 1	0.51	0.11	0.87
Item 2	-0.68	0.15	0.84
Item 3	-0.1	0.13	0.93
Item 4	-0.99	0.16	0.92
Item 5	-1.21	0.17	0.96
Item 6	-1.4	0.18	1
Item 7	0.74	0.11	0.88
Item 8	-0.84	0.15	0.9
Item 9	0.02	0.12	0.93
Item 10	-0.5	0.14	0.85
Item 11	4.15	0.17	1.22
Item 12	-1.5	0.19	0.96
Item 13	3.09	0.13	1.02
Item 14	0.61	0.11	1.1
Item 15	0.7	0.11	0.93
Item 16	-0.75	0.15	0.92
Item 17	-0.72	0.15	0.8
Item 18	1.81	0.11	1.26
Item 19	-1.79	0.21	0.99
Item 20	-1.43	0.19	1.01
Item 21	0.85	0.11	0.87
Item 22	0.48	0.12	1.08
Item 23	-1.5	0.19	0.91
Item 24	4.1	0.17	1.27
Item 25	-0.09	0.13	0.8
Item 26	3.15	0.13	1.33
Item 27	-0.77	0.15	1.15
Item 28	-1.12	0.17	0.93
Item 29	-1.21	0.17	0.92
Item 30	-2.22	0.25	0.95
Item 31	1.27	0.11	0.86
Item 32	-0.96	0.16	0.88
Item 33	1.94	0.11	0.93
Item 34	-1.36	0.18	0.83
Item 35	-1.66	0.2	0.96
Item 36	2.89	0.12	1.09
Item 37	1.32	0.11	0.92
Item 38	2.09	0.11	1.25
Item 39	-2.22	0.25	0.95
Item 40	-1.83	0.22	0.94
Item 41	-1.54	0.19	0.97
Item 42	-1.33	0.18	0.98



Fit statistics can be seen in Table 5. Item location parameters indicate that the items of the QCT range in difficulty from -2.22 logits to 4.15 logits. This is a good spread of item difficulty with the most difficult items being items 11, 24, and 36 and the easiest items being 39, 30, and 40. The INFIT statistics are satisfactory with no items falling below the .75 range or peaking above the 1.35 range.

### **5.5 Psychometric Summary**

The psychometric properties of the QCT indicate that the assessment can be used effectively to assess the entry level capacities and characteristics of candidates. The assessment is based on one of the most prevalent competencies required by most jobs and can be used to successfully pre-screen large groups of candidates.



# CHAPTER 6

## Concluding Comments

The psychometric properties of the QCT show that it provides a good, reliable, and interpretable way to measure a candidate's accuracy when checking details. As we assess more candidates on the JvR Online platform we will be able to produce various norms that will assist in differentiating scores between candidates in different industries or different age groups.

JvR Psychometrics is pleased to provide a South African developed tool to assess clerical checking and meet a need in the selection industry. We trust that the QCT will assist in the screening process, thereby enabling companies to make better selection decisions. If used as an internal assessment tool, our hope is that it can be used to structure development programmes to help incumbents improve their detail checking, accuracy and efficiency. We believe it is a welcome addition to the growing JvR South African Product Range.



# CHAPTER 7

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# APPENDIX A

## Individual Profile Report



# QUICK CHECK TEST

## INDIVIDUAL REPORT

**DEVELOPED BY:**  
JvR PSYCHOMETRICS (PTY) LTD.

**NAME:** Jane Sample  
**GENDER:** Female  
**REPORT DATE:** 21/06/2013

### CONFIDENTIAL REPORT

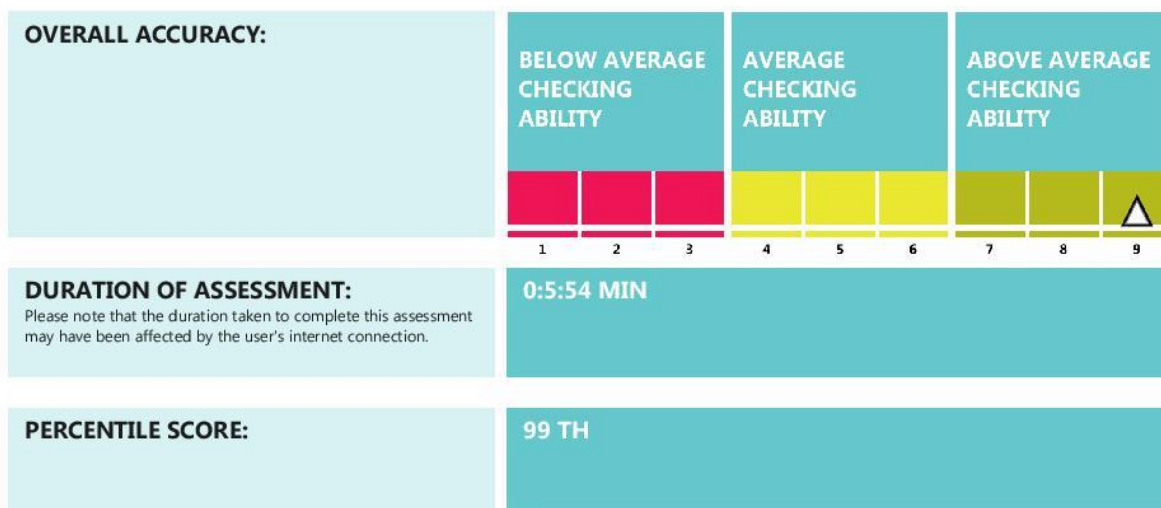
The information in this report is confidential and must not be made known to anyone other than authorised personnel, unless released by the expressed written permission of the person taking the assessment. The information should be considered together with all other information gathered in the assessment process.

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## QUICK CHECK TEST (QCT)

The QCT is designed to measure a candidate's checking accuracy. Candidates are presented with detail orientation pairs of words, numbers and a combination of both words and numbers. Candidates are asked to determine whether the pairs are identical or not. An accurate detail checking ability is important for jobs that require individuals to have a high level of detail orientation.



## INTERPRETATION GUIDELINES

### BELOW AVERAGE OVERALL CHECKING ABILITY (STANINE 1 - 3):

A candidate falling in the below average checking ability range is less able to accurately check detail and may be less proficient with work which requires a great deal of detail-orientation. A candidate in this range may find it difficult to identify or rectify mistakes in the work of others and may be prone to making careless mistakes in their own work.

### AVERAGE OVERALL CHECKING ABILITY (STANINE 4 - 6):

A candidate scoring in the average checking ability range will be able to check work which requires a detail orientation with relative proficiency. A candidate in this range may make a mistake on the odd occasion when identifying and rectifying the mistakes in their own and others' work.

### ABOVE OVERALL CHECKING ABILITY (STANINE 7 - 9):

Candidates that fall in the above detail checking ability range can proficiently recognise and rectify mistakes in work which requires a great deal of detail-consciousness. Candidates falling in this range exhibit a high level of accuracy when identifying and rectifying mistakes in their own work and the work of others.

### PERCENTILE SCORE DESCRIPTION:

The percentile score of an individual is the percentage of people who score the same as, and below, your score. Please bear in mind that a percentile score should not be confused with a percentage as a percentile score is the 'position' of a person based on the norm reference group.

For more information on the Quick Check Test and other tools that may be useful in your context please contact JvR Psychometrics on 011 781 3705/6/7 (JHB) or 0861 333 916 (CPT).



**INDIVIDUAL REPORT:** Jane Sample

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