

Measurement in Psychology: Assumptions, Ideology and Alternatives

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ABSTRACT

Efforts at equating measurement with scientificity of a discipline have been made since long in the history of psychology. Alongside the initial pioneering attempts by psychologists, the new science of psychometrics instilled renewed interest in the measurement issues resulting in the growth of modern psychology and thus establishing psychology from mere philosophical speculation to a more structured discipline. Although much progress has been made at quantifying psychological attributes, psychometrics has not remained insulated from criticism. Building on the earlier critiques, this paper contests some of the core assumptions of psychometrics such as (a) psychological attributes are measurable; (b) “measurement is the assignment of numerals to objects and events according to rule (Stevens, 1946, p. 667)”. Further, the ideology behind the promotion and implications of such quantifying endeavours on the part of psychologists to the field of personality assessment are critically assessed.

Keywords: *Measurement, Assumptions, Scientificity, Psychometrics, Psychological Attributes, Personality Assessment*

The over-identification with science has led psychology to the adoption of a fallacious logic of measurement in dealing with several phenomena at hand. Psychologists hoped that the kind of quantification which was brilliantly successful in natural sciences would prove to be equally thriving in their own discipline. However, it led to unfortunate consequences and affected the methods of enquiry in psychological science to a considerable extent. (*the science news-letter*, 1934). Especially, during the second half of the nineteenth century, measurement and scientificity of a discipline went hand in hand. The notion of scientific measurement was one of the most significant constituting elements of science in that period (michell, 2003, barrett, 2003). “it was widely thought that measurement was a necessary feature of all sciences, knowing something *scientifically* meant *measuring* it (michell, 2008, p. 10)”. And it had an obvious influence on then-emerging field of psychology. The departure of psychology from philosophy, and its progression towards a scientific discipline cannot be devoid of the image of science (in terms of measurability) prevalent throughout the nineteenth century.

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According to Fuchs and Milar (2003), even before the field of psychometric was fairly established, there were many individuals who strived for quantifying psychological qualitative aspects. These individuals were basically psychophysicists like Müller, Hermann Von Helmholtz, e. H. Weber, g. T. Fechner, f. C. Donders etc. Who started attempting to refine the methods of the natural sciences for systematic study of mind and its processes. However, the scope of their study was limited and revolved around physiological, psychophysical, and reaction time measures. They were primarily interested in establishing the general laws concerning physical intensity of stimuli and its perceived intensity. Fuchs and Milar (2003) further observe that a German philosopher-psychologist, j. F. Herbart (1776-1841) also did pioneering work in quantifying psychological attributes. Although herbart was able to assign numbers to different sensory experiences, he was unsuccessful in measuring subjective intensities that corresponded with objective standards. Building on, and taking inspiration from these early pioneers, several psychologists (like Stevens, Binet, Thurston, Pearson, Spearman, Guilford, Cattell, etc.), especially in the first half of the twentieth century, fashioned new tools and techniques for psychological measurement. This eventually led to shaping of the field of psychometrics.

All the conventional definitions of psychometrics are, in one way or another, elaboration of Stevens' approach. Given that all psychological variables are in the first instance, qualitative, putting excessive emphasis on the psychometric properties does not really help in understanding the human behaviour. Historically, quantification in psychology remained relatively less researched or focused area. "even after a century of theory and research on psychological test scores, we are unsure whether the scores really measure something or are nothing more than mere arbitrary summations of item responses (Borsboom, 2005, p. 2)". Also, the beginning and subsequent proliferation in the western world of the use of psychological tests in the military, education and industry cannot be dissociated from then social and economic forces. As we will see, it was not driven by the academic content alone. Thus, psychometrics has been at the target end for obvious reasons.

Building on the earlier critiques, this paper contests in the first section, such core assumptions of psychometrics as psychological attributes are measurable; and "measurement is simply the assignment of numerals to objects and events according to rule (Stevens, 1946, p. 667)". In the second section, the social and economic nexus in terms of an ideology, behind the promotion of psychometrics in particular, and quantification in general, is presented historically and situated in the present context. The implication of such quantifying endeavors on the part of psychologists to the realm of personality assessment is highlighted in the third section. In the final section, keeping in mind the recent advancements in psychometrics as well as in other areas of psychology different alternatives or possibilities are speculated. It's argued that excessive quantification of psychological processes does not really help in understanding the human behaviour in a holistic way. Putting too much emphasis on the psychometric properties of psychological processes may make us forget very essence of our discipline. All that is quantitative in psychology is not always relevant to the existential meaning and understanding of human life.

Science, Psychology, And Measurement: it was during the mid of nineteenth century that psychology as a distinct discipline started taking a definite shape. It would not be an exaggeration to argue that the history of modern scientific psychology and history of philosophy are inseparable. Before nineteenth century, the belief among philosophers that the scientific study of mind was not possible by methods then prevailing in the natural sciences, was widespread. Immanuel Kant (1724–1804) was one of the leading proponents of this view

who believed that psychology could not become a science because mental events could not be quantified and it was very difficult to describe such events mathematically or to subject them to manipulation in laboratory experiments (Loevinger, 1993; Mischel, 1967). Kant further went on concluding that, “psychological data is qualitative and could not be quantitative, that science is quantitative, and therefore psychology could not be a science” (as cited in Loevinger, 1993: p. 1). Kant recommended psychology, the traditional methods of naturalistic observation in order to gain a status of science of human behaviour (Loevinger, 1993).

Especially in the context of the beginning of psychology, it would be worth mentioning that the departure of psychology from philosophy and its progression towards a scientific discipline cannot be devoid of the image of science prevalent throughout the nineteenth century. The notion of scientific measurement was one of the most significant constituting elements of science in that period (Michell, 2003, Barrett, 2003). During the same period, scientificity of a discipline and measurement went hand in hand and it had an obvious influence on the then-emerging field of psychology. As Galton (1879, p. 147) puts it remarkably, “...that until the phenomena of any branch of knowledge have been subjected to measurement and number, it cannot assume the status and dignity of a science.” The same mind-set was quite evident in the emergence of psychological tests in various field such as the military, education, and industry, in Britain and the united states, in hope of placing psychology on equal footing as those of then established sciences (Michell, 1999).

According to Michell (2001), efforts at quantifying the psychological attributes have been, in one way or another, influenced substantially by Stevens’ formulations. Stevens’ (1946, p. 667) famous definition of measurement, “the assignment of numerals to objects or events (e.g. Behaviour, attributes, responses) according to rules”, not only continues to dominate the discipline but also led to most psychologists think that measurement is simply the assignment of numerals. However, the notion of measurement does not imply universally but only to quantitative attributes which are measurable at the first place (Michell, 2001). “psychometrics concerns the measurement of psychological attributes using the range of procedures collectively known as psychological tests. *However*, as a precondition of psychometric measurement, these attributes must be quantitative³” (Michell, 2001, p. 212; emphasis in italics).

We not only systematically ignored the quantitative structure of psychological attributes but also heavily relied on statistics for measurement issues. It was Kelley (1923, 1923a) who could be credited to a great extent for introducing statistical reasoning and use of statistics in psychology (Stout, 1989; Jones & Thissen, 2007). Kelley (1923) saw the problem of measurement in psychology as one requiring a ‘sound statistical base’ as logical. Under the combined influence of Spearman, Thorndike, and Kelley, issues of psychological measurement gradually became assimilated with statistical issues (Gigerenzer et al., 1989). Especially under Kelley’s influence, the psychometric theory began to be viewed as a branch of statistics. In this way, “quantification was no longer understood in terms of its logical character but, instead, was seen as purely statistical (Michell, 1999, p. 104).” Psychologists first sought help and assistance of statisticians to solve measurement problems, and a generation later increasingly relied on them for the issues of inference (Gigerenzer et al., 1989). Danziger (1984) also draws our attention to the fact that statistics flourished in the

³ We will return to this issue soon in the same section of the paper.

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applied areas, and with the development of applied psychology, the research interest shifted from the individual to group data, and consequently to generalisations.

Psychologists, who were aligned with the tradition of naturalistic observation, thus, were drawn to statistical methods not only for enabling them to describe data statistically (in terms of mean, median and mode) but also for their ability of making inferences in the latter part of the twentieth century (Stout, 1989). After the world war i, instead of viewing human activity directly in a multidimensional environment, psychologists simplified their task by assessing performance in an uni-dimensional manner through the paper-and-pencil test. During this period statistics began to be interpreted as both, ‘statements of measurements and as measurements in themselves’ (Stout, 1989). Serious thought and treatment to the logic of measurement in psychology were given scant attention.

Let’s take an example of the journal, *Psychometrika* (leading journal of mainstream quantitative psychology that was started in 1936), which is supposed to be devoted to both, developments of quantitative rationale and publishing general theoretical articles as applied to measurement in psychology. The development of a ‘popular mental test journal’ was not the principal objective of the psychometric corporation which was organized for the purpose of sponsoring and publishing a professional journal (Dunlap, 1961).

According to Dunlap (1961, p. 68), *Psychometrika* was based on the five basic objectives “development of quantitative rationale for the solution of psychological problems; new mathematical and statistical techniques for the evaluation of psychological data; aids in the publication of statistical techniques such as nomographs, tables, worksheet layouts, forms, and apparatus; critiques or reviews of significant studies involving the use of quantitative techniques; and general theoretical articles on quantitative methodology in the social and biological sciences”.

Dunlap (1961) in his analysis of different volumes (1, 24 and 25) of *Psychometrika* from 1955 to 1959 observed one fundamental disturbing element i.e. the scarcity of theoretical engagement, against the fifth objective set forth. Along the lines suggested by Dunlap, in this paper, we have tried to extend his analysis further by including the volume 50 and 75 of *psychometrika*. Specifically, we tried to examine if there is a scarcity of basic theoretical articles persisting in the journal. The results are shown in table 1.

Table 1: Analysis of Articles against the Objectives Set Forth By *Psychometrika*⁴

Dimensions	Volume Number Of Psychometrika			
	1	24, 25	50	75
Development Of Quantitative Rationale	7	11	--	--
New Mathematical And Statistical Techniques	16	13	--	--
Aids In Application Of Statistical Techniques	3	5	--	--
Critiques Of Significant Studies	1	2	--	--
General Theoretical Articles	3	0	1	2
Total	30	31	--	--

Source: Dunlap, J. W. (1961, P. 68), And Various Issues Of *Psychometrika*.

⁴The analysis is subject to the facts that (a) the tabulation was done by the single person, the author; (b) only the issues included in the volumes 50 and 75 were included in the analysis; and (c) these volumes are considered only for one dimension i.e. General theoretical articles.

As it can be seen clearly from the above table 1, a paucity of publishing the articles of basic theoretical nature still persists in the journal: only one such article was published in the year 1985, volume 50 and two were published in the year 2010, volume 75. Thus, it may be concluded here that over the years psychologists are satisfied with increasing the complexity of numerical and statistical operations within psychometrics. We are still under the hold of such assumptions like psychological attributes are measurable and measurement is simply the assignment of numerals to objects and events according to rule. So what is the status of measurement in psychology as a quantitative science?

According to Trendler (2009: 582), “any attribute must satisfy the conditions of quantity in order to be measurable.” However, how do we decide that whether or not a psychological attribute is quantitative? Unlike extensive quantities (e.g., Length) characterised by the Additivity that is evident from observing manifesting magnitudes of the quantity, for intensive quantities (e.g., temperature, pressure or motivation) conditions of quantity (in terms of Additivity) can be tested only indirectly (Trendler, 2009; Michell, 1999). In simple words, we should make sure “that equal levels of some manifest variable necessarily correspond to equal levels of some latent variable (Trendler, 2009: 584).” For this we have to test the first hypothesis of measurability (Michell, 1999) i.e., do the manipulation in a theoretical construct (motivation, for example) results in equal magnitudes of outcome variable or behaviour (reaction time, for example). It means to say that whether equal levels of motivation (manipulated by means of different amounts of money) are created in the same or different participants and they correspond to equal levels of magnitudes of reaction time. If this criterion is satisfied only then we can say the attribute (here motivation) has the quantitative structure (Trendler, 2009; Michell, 1999). To establish such a causality, and to ascribe quantitative structure to a psychological attribute, we additionally need to control strictly all other disturbances which seems very delusive in psychology⁵ as has been, on the other hand, successful in physical sciences. As Trendler (2009:592) squarely observes, “the problem is not that psychological systems are more complex than physical systems; they might be, but the crucial difference is that, contrary to physical phenomena, psychological phenomena cannot be *made* to depend on a small set of manageable conditions.” On these same grounds, the arguments developed recently by Borsboom (2004; 2005) could be contested though he brings in very important issue of causality in the discussion of measuring psychological (latent) attributes.

Because of the reasons discussed above, and the kind of fallacious logic adopted by the psychologists with regard to measurement, Michell used expressions such as *methodological thought disorder* (1997) and later *pathological science* (2000) to characterize psychologists' attitude to measurement.

Ideology behind the promotion of psychometrics prior to deliberation upon Mitchell's (1999) observations about the socio-economic motives operating behind the use and proliferation of psychological tests in the post-world war era, let us examine the social factors involved in the very beginning of new scientific psychology. As mentioned earlier, especially till the late nineteenth century, the subject matter of psychology was primarily comprised speculative philosophy and physiology. During the same period, interestingly the scholars started preferring adoption of scientific methods from natural sciences over mere philosophical speculations in order to systematically enquire about human mind (Danzinger, 1990). One of the primary reasons for such preference had to do with new roles they were

⁵See the first quotation at the beginning of this paper.

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eager to assign themselves, the roles wrapped in scientificity and experimentation as those of scholars from natural sciences. Establishment of new occupational roles was thought to be a means to attract people's interest to this new wave in the field psychology (Ben-David & Collins, 1966).

Ben-David and Collins (1966) further observe that in order to make the study of human mind an experimental science a considerable number scholars/researchers slowly and steadily started moving from physiology and philosophy to the new scientific (experimental) psychology. Such mobility of scholars also brought them ample career opportunities and funding. Ben-David & Collins (1966) aptly chart out the rise of the new scientific psychology and identify the social factors responsible for the uninterrupted growth of the discipline.

Table 2: number of publications in experimental and physiological psychology, by nationality and decade, 1797-1896.

Decade	Nationality					Total
	German	French	British	American	Other	
1797-1806	1	1	..	..	..	2
1807-1816	2	1	..	..	..	3
1817-1826	1	..	3	..	..	4
1827-1836	4	3	2	..	..	9
1837-1846	11	4	2	..	1	18
1847-1856	15	2	6	1	..	24
1857-1866	16	8	7	..	3	34
1867-1876	38	11	15	1	4	69
1877-1886	57	22	17	9	12	117
1887-1896	84	50	13	78	21	246

Source: J. Mark Baldwin (1905) (Ed.), *Dictionary Of Philosophy And Psychology*, New York:

Macmillan, vol. Iii, part 2, pp. 950-964. As given in Ben-David, J. & Collins, R. (1966, p. 453). Using publications in experimental and physiological psychology as an manifestation of the growth of modern scientific psychology, it was found that higher number of papers was published around 1870s and it was highest in 1890s. Providing such kinds of data and its analysis, Ben-David & Collins (1966, p. 453) appropriately argued that, "at least in the rise of the new psychology, social factors played an important role, independent of intellectual content."

The instrumental role played by socio-economic factors in the emergence of new scientific psychology is also revealed in the writings of Michell and this impact is remarkably evident in case of psychological testing. In the second of half of the nineteenth century, the field of psychology shared dual pressure of pressure of gaining the status of scientific discipline and at the same time becoming an applied field. (Michell, 1999; 2005). This resulted, for obvious reasons, in *selling* of psychology as science and as a science-based profession during that initial period. In this way, "both scientism and practicalism influenced and compelled psychologists to adopt the measurability thesis opportunistically, as an ideological means to a social end (Michell, 1999, p. 39)."

As mentioned earlier, the post-world war ii era played a significant role in taking over of psychological testing by economic and social motives. As a new discipline wanted to have

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an independent identity in academia, the field of psychology- being on the margins of then established disciplines like technology and medicine- had to struggle with governments for the allotment of limited financial resources. The same period also paved the way for the aspirations of many individual researchers to shape their careers in the new science of human mind (Mitchell, 2008).

Wrapped in quantification, the use of psychological tests with applied dimension created new possibilities for expanding the scope of the entire discipline. A quantitative psychology with social application, thus became a 'highly marketable commodity' (Danziger, 1990). This resulted in, over the next couple of decades, widespread acceptance of psychological testing in the US, especially within education, industry and military. Such usage and marketing of psychological tests continued to be prevalent across the continents even today.

Personality testing: a case in point assessment of personality has always been a topic of interest in psychological science. Different measures like self-report technique, projective tests and behavioural assessment techniques are used as a means to unfold complex personality structure which is otherwise very difficult to examine or study. In personality assessment, however, there has been substantial focus on trait measurement. Trait measurement is, by and large, used as a proxy for personality assessment (Wiggins & Pincus 1992). Even if we focus on standardized personality measures, a question remains – do they adhere to the requirements of scientific measurement and if so, how? To find the answer to these questions, it is important to understand the basics of measurement the varied personality assessment techniques originate from. Then we will come to the broader issue of personality assessment.

There are three important types of measurement models; the classical test model, the latent variable model, and the representational measurement model. All these models attempt to quantify qualitative aspects of human behaviour.

Firstly, the representational measurement model or 'fundamental' measurement theory that is considered to be the dominant current measurement paradigm. Fashioned around the end of 19th century by von Helmholtz (1887) and Holder (1901), it offers a new way of thinking about psychological measurement. It aims to describe real empirical systems, wherein the 'scale' is the significant concept. A scale thought to mirror the relations between the participants and characteristic(s) being measured (that we can observe by means of experience) in a mathematical form, the representational view involves the numerical representation of empirical relations. For example, thinking intelligence as a scale means it represents numerically the empirical relation between people and intelligence. The researcher here needs to establish these relations empirically which seems, as we have discussed earlier, delusive. The representation model has its fair shares of criticisms. Michell (1990; 1997) argued that advocates of the model failed to understand that psychological variables possess qualitative structure over mere quantitative structures and that mere numerical assignment to objects or events are insufficient to draw inferences.

The Classical Test Theory (CTT) has also been popular among psychologists. The main purpose of this theory is to recognise and develop the reliability of psychological tests and assessments, the true score being its fundamental concept. True score is a term used by psychologists to represent the hypothetical conditions of measurement of an ability, attitude, or trait without error. It is assumed that there is always an error around the true score and it isn't free of error there is always presence of errors i.e. Random variables around the true

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score. CTT model intends to identify and index the errors in a test thereby making it more reliable. Likewise in item response theory (IRT) and in Rasch model there is a predominant reliance on developing abstract models to predict individual's performance in certain tasks.

One of the major criticism of such efforts at measurement in psychology, according to Tal (2017: 20) is, “the sort of statistical calibration (or “scaling”) provided by Rasch (*and Irt*) models yields repeatable results but it is often only a first step towards full-fledged psychological measurement. Psychologists are typically interested in the results of a measure not for its own sake, but for the sake of assessing some underlying and latent psychological attribute (emphasis in italics).”

Another proposed alternative to classical test theory is the latent variable model. The roots of this theory date back to Spearman's (1904) seminal work on factor analysis, which is considered to be the first structured latent variable model to be widely used in research, psychology and allied disciplines. The central idea of the latent variable theory which led it to popularity in the field of psychometrics, is the conceptualization of theoretical attributes as latent variables i.e., unobservable. According to this model, latent variables are thought to be underlying shared cause of the variables that we can observe or experience. Introducing latent variables, simplifies models thus reducing the number of parameters. Thus, the underlying concept here is the collection of useful models and strategies which will be tested against observed data, to find a suitable match. The latent variable theory in contrast to classical test theory is more data oriented. It is aimed at formulating data-generating mechanisms along with formulating an explanatory model to account for relations in the data.

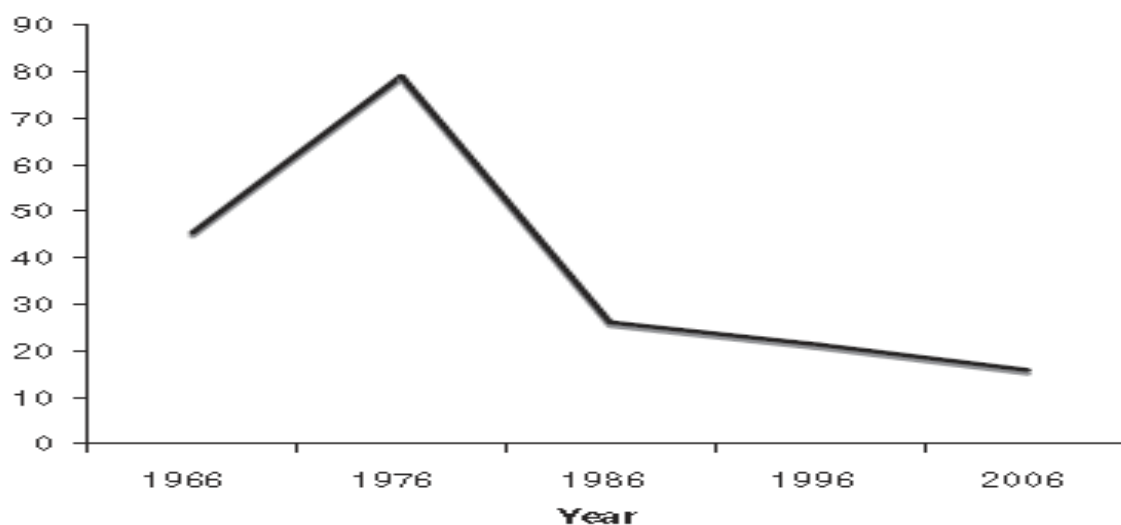
Despite its intuitive appeal, the latent variable model has its own shortcomings. Although questions arises on the authenticity of the latent theory (Borsboom, 2005), a more concrete problem is the complexity involved in the use of latent model. Over quantification of variables makes it harder to work with this model. As computing technology and software tools continue to improve, assessment of more complex latent variable models that will better reflect the complex realities of collected data will be possible. The satisfactory answers to such questions would be very decisive for the possibility of “new psychometrics” (Kline, 1988). Hence, “it is therefore desirable to be able to test whether different measures, such as different questionnaires or multiple controlled experiments, all measure the *same* latent attribute (Tal, 2017: p. 21).”

As we mentioned earlier, instead of examining psychological processes directly in a multidimensional environment, psychologists simplified their task by assessing performance in a Uni-dimensional manner through paper-and-pencil tests, especially after the WORLD WAR I. And the field of personality was no exception to this. “at one time, it focused on direct observations of behaviors that were both fascinating and important—a focus that attracted many researchers to the field in the first place—social psychology has turned in recent years to the study of reaction times and questionnaire responses. These techniques, which promised to help explain behaviors, instead appear to have largely supplanted it. The result is that current research in social and personality psychology pays remarkably little attention to the important things that people do in their real settings (Baumeister, Kathleen, & Funder, 2007: p. 396)”.

To reassert their assumption about the ignorance of observing actual human behaviour on the part of social and personality psychologists, Baumeister, Kathleen, & Funder (2007) analysed a total of 304 studies across the 11 issues of Journal of Personality and Social Psychology

(JPSP). They coded all the studies against the dimension of direct observation of human behavior. The results are shown in figure 1.

Figure 1: percentage of studies from journal of personality and social psychology that included behaviour (1966–2006).



Source: baumeister, kathleen & funder (2007, p. 399).

As can be seen in the figure 1, in the year 1966, almost 50 percent studies included examining actual behavior, increasing its (focusing on actual behaviour) share during 1970s. However, examining people’s actual behaviour dropped significantly in 1986 and the following decades witnessed the continued declining trend. Apparently, the study of behavior has declined steadily since the early 1980s. As these authors aptly conclude even today, with few exceptions, personality assessment can best be characterised by ‘self-reports and finger movements’.

Another recent caveat to the personality testing is in order. The self-other knowledge asymmetry (Soka) model proposed by Vazire (2010) addressed one of the fundamental aspects of human psychological functioning that is, “existence of asymmetry in the accuracy of personality judgment – some aspects of personality are known better to the self than others and vice versa (p. 281)”. This model has obvious implications in the field of personality assessment. Specifically Soka model emphasizes that “the self is more accurate than others for traits low in observability (e.g. Neuroticism) whereas others are more accurate than self for traits high in evaluativeness (e.g. Intellect) (Vazire, 2010, p. 286).”

The assessment of personality is a challenging issue than it seems at superficial level. Let’s conclude this section in the words of none other than Galton (1884, p. 185), “the other chief point that i wish to impress is, that a practice of deliberately and methodically testing the character (personality) of others and of ourselves is not wholly fanciful, but deserves consideration and experiment.”

The way forward

From simple measures of perceived stimulus-intensity to highly complex personality patterns, psychologists have been trying since long to quantify qualitative aspects of human conduct. However, it seems easier said than done, partly because of the nature of those psychological attributes. The kind of logic developed by psychologist with respect to

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measurement has also been a contested issue. In addition, excessive reliance on the part of the psychologists on statistical use has been equally criticised. However, we cannot beat anything without having something. It is necessary to have some alternatives to suggest and not just the critiques. In suggesting some alternatives to the measurement issues in psychology, we would largely biosynthesizing answers given by others. We propose little that is original in this regard.

Cohen (1990) had long ago suggested that the use of statistics in psychology should only be for descriptive purposes. If performances to individual test items are classified as correct or incorrect, and coded as 1 and 0 respectively, as is typical, then a person's performance on the test as a whole is represented more informatively by an ordered sequence of ones and zeros than by a single number, the observed score. It is entirely possible for two people to perform quite differently and yet get exactly the same observed scores. According to Cohen (1990), it was the emphasis put on inference in modern statistics which has resulted in rigidity in data analysis.

Yanchur (2006) explores the possibility of 'contextual-quantitative inquiry', a kind of triangulation of both qualitative and quantitative methodologies. He argues that "it is possible that some forms of quantitative research can fit theoretically within an interpretive framework and provide useful methodological resources for contextual, interpretive inquiries (p. 212)". He specifically suggests the quantitative measures be validated through the real-life context of that behaviour.

In the similar vein, Trendler (2009) argues that we can manipulate and control psychological phenomenon but it is far from the prerequisite of measurement theory. It is important to understand the differences between psychological and physical phenomena. Unlike physical sciences, we cannot make psychological phenomena to depend on a limited number of controllable conditions.

Most of the variables in psychological science are latent or unobservable as those are in physical sciences. However, for many psychological attributes, as we have discussed earlier, it is difficult to establish their quantitative structure so as to make them delusive for experimental control and measurement. Hence, one way to enhance our efforts at measurement of psychological attributes is to deliberate upon the conceptual and theoretical issues involved in measurement (Barrett, 2003). By exploring these and other possible alternatives as mentioned above to the measurement efforts in psychology, we would stand by the hope in science of psychometrics as envisioned by such scholars as McGregor (1935), Gulliksen (1974), Anastasi (1967) and many others. To conclude, although in general, psychometrics has a long way to go in its journey towards scientific measurement and research (Mitchell, 1999; Kline, 1988), it might therefore be wise, as suggested by Trendler (2009), to seriously reconsider Johnson's (1936, p. 351; emphasis in italics) recommendation, "those data should be measured which can be measured (*like reaction time*); those which cannot be measured should be treated otherwise (*like hope or trust*)."

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Conflict of Interest

The authors carefully declare this paper to bear not conflict of interests

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