

A Chronological Summary of the Evolution of Human Behavior Measurement



DNA Behavior



INTRODUCTION

Almost since the beginning of time people have looked to define human behavior by grouping personalities into different types.

Personality assessments have been developed over the past several centuries which categorize the 'mask' (*personality*: derived from the Greek word persona, or mask) presented by a person to the world at a particular time in their life or circumstance. However, what few assessments do is to accurately reveal inherent behaviors (including thoughts and feelings) representing the core behavior of who a person is throughout their lifetime. Put another way, a person's natural instinctive DNA behaviors which are hard-wired in to the brain based on genetics and their very early experiences in the first 3 years of life.

Research shows the neural pathways in the brain become substantially set by the time a person is 3 years old, and this is when their natural instinctive style is set. Of course, a person's behavior in particular circumstances may change or be adapted based on experiences, education, values and circumstances. However, such temporary behavioral shifts will be based on situational modification and are not hard-wired.

The primary objective in developing the DNA Behavior Discovery Processes was to make identifying a person's natural instinctive DNA behavior the critical first step in identifying the core of who they are in terms of behavioral and communication style, how they make life, financial and business decisions and their talents for sustainable life time performance. In addition, DNA Behavior had the desire to build systems powered with reliable "Swiss Watch" predictability and user-friendly "Smart Watch" functionality in terms of how behavioral insights are used on a real-time and scalable basis in all areas of day to day life, financial planning and business activities.







HISTORICAL OVERVIEW

History records that personality and a behavioral trait has its roots in the ancient four humors theory. It was the Greek physician Hippocrates (460–370 BC) who developed it into a medical theory. He believed certain human moods, emotions and behaviors were caused by an excess or lack of body fluids (called "humors"): Next, Galen (AD 131–200) developed the first typology of temperament in his dissertation *De temperamentis*, and searched for physiological reasons for different behaviors in humans. http://en.wikipedia.org/wiki/Four_temperaments

But by the 18th century Hippocrates four humors were no longer seen as a realistic practice of medicine associated with how the circulatory, respiratory and digestive systems worked. However, the four humors continued to remain important in terms of describing personality.

The 19th Century brought about a breakthrough in the area of understanding personality when physiologist Wilhelm Wundt expanded on the four humors theory. His work made a clear distinction between the body and personality. His findings offered the thought that temperaments were not limited to body fluids as had been understood in the past. He offered the following words to describe dimensions of personality—sanguine, phlegm, cholera and melancholy. He further suggested that everyone has something of each temperament in their personality makeup; believing that all four temperaments were basic dimensions of the human personality.

In 1999 Hugh Massie, an Australian determined that to really appreciate and uncover the deep-rooted behavior that lies behind the personality 'mask', and therefore reveal natural inherent "DNA Behavior" of people, it was necessary to go back to Creation. He identified that people are born with inherent behaviors and talents and this insight became the foundation of the DNA Behavior Discovery Process as it is used today.

THE CHRONOLOGY

Creation

The Bible records behaviors at the moment of Creation:

The Old Testament Bible records the following in terms of how intricately individual beings were designed before birth: $2000-1800_{BC}$ the book of Job reveals that ALL are fashioned in the womb¹ $1000-300_{BC}$ the Psalmist David talks about the intricacies and wonder of having been designed in the womb² 586_{BC} the prophet Jeremiah records, not only the formation in the womb, but at the point of creation there was also a plan for lives $1000-300_{BC}$.³⁴

Genesis 1:26-27 Amplified Bible ²⁶ God said, Let Us [Father, Son, and Holy Spirit] make mankind in Our image, after Our likeness, and let them have complete **authority** over the fish of the sea, the birds of the

¹ Job 31:15AMP

² Psalm 139: 13-16 NLT

Jeremiah 1:5 NASB
 Jeremiah 29:New American Standard Bible (NASB)



air, the [tame] beasts, and over all of the earth, and over everything that creeps upon the earth.²⁷ So God created man in His own image, in the image *and* likeness of God He created him; male and female He created them.

Definitions of 'authority' - the power to give orders, make decisions and enforce obedience. In other words at the moment of Creation man was created with inherent behaviors.

John Wesley – 1703-1791 Cleric, Theologian, Author (Oxford University) made the following observations on the words 'our image' referring to the creation of 'man' in Genesis 1:26His (man's)understanding saw divine things clearly, and there were no errors in his knowledge: his will complied readily and universally with the will of God; without reluctancy: his affections were all regular, and he (man)had no inordinate appetites or passions: his thoughts were easily fixed to the best subjects, and there was no vanity or ungovernableness in them. And all the inferior powers were subject to the dictates of the superior. http://biblehub.com/commentaries/wes/genesis/1.htm

In addition to the inherent behavior of leadership i.e. authority and power, at Creation man was able to reason and make choices; he understood morality and integrity. Man was given a moral compass and could be trusted. And socially man was given the inherent behavior of fellowship, the need for people.

Continuing in Biblical terms, thoughts, feelings and actions are rooted in the spirit, soul and body of humans; the very core or DNA of a human being.

1 Thessalonians 5:23 NLT ²³ Now may the God of peace make you holy in every way, and may your whole spirit and soul and body be kept blameless until our Lord Jesus Christ comes again.

Spirit or essence of a person usually thought to consist of one's thoughts and personality.

Soul - a term that includes our mind from which we derive our **thoughts**, our mentality, and our heart.

The soul according to Aristotle is an animating or vital principle inherent in living things and endowing them in various degrees with the potential to grow and reproduce, to move and respond to stimuli (as in the case of animals), and to **think rationally** (as in the case of humans).

Psalm 119:73. Your hands made me and formed me; give me understanding to learn your commands.

Psalm 139:13-16 AMP¹³ For You did form my inward parts; You did knit me together in my mother's womb. ¹⁴ I will confess and praise You for You are fearful and wonderful and for the awful wonder of my birth! Wonderful are Your works, and that my inner self knows right well. ¹⁵ My frame was not hidden from You when I was being formed in secret [and] intricately and curiously wrought [as if embroidered with various colors] in the depths of the earth [a region of darkness and mystery]. ¹⁶ Your eyes saw my unformed substance, and in Your book all the days [of my life] were written before ever they took shape, when as yet there was none of them.

In the article titled Character and Personality, John Wheeler writing for Tomorrows World offers the following commentary:



"Personality," the individual expression of the human mind, is partially rooted in how the "spirit in man" works with the human brain (1 Corinthians 2:11; Psalms 77:6-9; Daniel 4:5; etc.), but it goes far beyond that (compare, for example, what Paul says about "the flesh" and its tendencies in Romans 7). It involves everything we are by nature and by nurture as human beings – in spirit, soul and body.

The best scientific models of human personality mirror this biblical truth exactly, even though they don't take the Bible as their philosophical foundation.

But both the Bible and natural science (as it applies to human behavior) go farther than that. Let's look at natural science first. "Personality", wrote Salvatore R. Maddi, "is a stable set of characteristics and tendencies that determine those commonalities and differences in the psychological behavior (thoughts, feelings and actions) of people that have continuity in time and that may not be easily understood as the sole result of the social and biological pressures of the moment" (Personality Theories: A Comparative Analysis, 3rd ed., The Dorsey Press, p. 9). http://www.tomorrowsworld.org/commentary/character-and-personality-0

Before Christ

2200 _{BC The Chinese -} The Chinese used oral examinations to hire and retain civil servants. Believing their responses to certain questions would reveal personality, character and behavior of prospects. By 1370 the test includes writing essays and poems, a three-day exam and a final test in Peking. The system was not abandoned until 1906 AD.

450 _{BC} **Hippocrates** – Four Temperaments Theory – Humorism. **Hippocrates** of Kos a Greek physician systematically described the four temperaments of people as "humors" (moods). Each was based on the four elements of fire, air, water, and earth and was believed to be responsible for a different type of behavior.

340 _{BC} **Plato** a Greek philosopher described the four temperaments as philosopher, guardian, artisan and scientist.

Anno Domini A.D.

190 Galen – Temperaments: Sanguine Phlegmatic Choleric Melancholic

18th Century

1798 Immanuel Kant - Explained the relationship between reason and human experience. According to Kant, human beings occupy a special place in creation, and morality can be summed up in an imperative or ultimate commandment of reason, from which all duties and obligations derive. He defined an imperative as any proposition declaring a certain action (or inaction) to be necessary.



19th Century

1869 Sir Francis Galton - statistical concept of correlation. First to apply statistical methods to the study of human differences and inheritance on intelligence; introduced questionnaires and surveys for collecting data on human communities. One of the first scientists to apply the Lexical Hypothesis to the study of personality

1879 Wilhelm Wundt – Believed that all four temperaments were basic dimensions of the human personality and that the temperaments formed the basis of "changeability" and of "emotionality".

He theorized that four temperaments—sanguine, phlegm, cholera and melancholy—were actually four dimensions of the human personality and no individual was completely of one temperament; rather that everyone typically has varying proportions of two or more.

20th Century

1900 Sigmund Freud - Interpretation of Dream. Introduced ego and free association into the personality/behavior debate.

1905 Erich Adicke - Four World-Views: Dogmatic (or Doctrinaire), Agnostic (or skeptical), Traditional, and Innovative, which would help shape personality theory in the 20th century.

1905 Eduard Spranger – Contribution to the personality theory book *Types of Men*. Theoretical: A passion to discover, systemize and analyze; a search for knowledge. Utilitarian: A passion to gain a return on all investments involving time, money and resources. Aesthetic: A passion to experience impressions of the world and achieve form and harmony in life; self-actualization. Social: A passion to invest myself, my time, and my resources into helping others achieve their potential. Individualistic: A passion to achieve position and to use that position to affect and influence others. Traditional: A passion to seek out and pursue the highest meaning in life, in the divine or the ideal, and achieve a system for living.

1907 Carl Jung - Developed the concepts of the collective unconscious, archetypes and extraversion and introversion. , founder of analytical psychology met and collaborated with Sigmund Freud, founder of the discipline of psychoanalysis elected with Freud's support. Jung and Freud influenced each other during the intellectually formative years of Jung's life. In 1921after a long period of self-imposed isolation Carl Jung in his book *Personality Types* was the first to theorize that people always prefer certain identifiable behaviors if they are given a free choice. He proposed four main functions of consciousness: Sensation, Intuition, Thinking, and Feeling.

1913 Hugo Munsterberg - the first to apply psychological principles to the legal field, creating forensic psychology.

1917 Robert Woodworth – Developed the Woodworth Personal Data Sheet (considered to be the first personality test)

1919 Henry C. Link – Employment Psychology testing ability to perform certain work.



1920 Ernst Kretchmer - Association of body types with personality traits

1921 Hermann Rorschach - The inkblot test. A way to determine personality by the interpretation of abstract inkblots. The subject's perceptions of inkblots are recorded and then analyzed using psychological interpretation and very complex algorithms. Some psychologists use this test to examine a person's personality characteristics and emotional functioning

1928 William M Marston, DISC. William M Marston, was a psychologist at Harvard University. His research into emotions in humans was published in his book titled *The Emotions of Normal People*, the basis of which explained that people show their emotions using four behavior types: Dominance, Inducement, Submission and Compliance hence DISC. In addition he suggested that these types came from a person's sense of self and interaction with their environment. His work became the foundation of the DISC assessment was first introduced in 1972.

1928 Louis Thurstone – the Law of Comparative Judgement; the Thurstone Scale. Louis Thurstone, a U.S. pioneer in the fields of psychometrics and psychophysics noted that a list of 60 adjectives on an assessment he developed could be reduced to five meaningful factors. Little was done to advance this concept. His approach led to the measurement known as the law of comparative judgment; he further contributed to the area of factor analysis.

1943 Myers-Briggs Type Indicator –first questionnaire published . Isabel Myers (1897-1980) and her mother, Katharine Cook Briggs (1875-1968), Using the ideas of Carl Jung's psychological types; Sensing, Intuitive, Feeling and Thinking; Myers further developed Jung's ideas into a system to provide understanding of the Jungian types.

1943 Allport and Odbert - Lexical Hypothesis; 4500 adjectives, describing nonphysical differences, which could be considered to describe observable and relatively permanent traits. Allport and Odbert (1936) combed through the English language and found over 4,500 adjectives that are used to describe personality, and formed the primary starting point for Raymond Cattell psychologist and creator of the 16PF assessment in 1946.

1943 Hathaway and McKinley. The Minnesota Multiphasic Personality Inventory (MMPI) copyrighted by the University of Minnesota)

1946 Raymond Cattell – used technology of computers to analyze the Allport-Odbert adjective list. He computerized personality testing using an IBM sorter and the Illiac computer (Illinois Automatic *Computer*), to perform factor analysis on 4,500 personality-related words at the University of Illinois. His 16 Personality Factors test as the name implies, accounted for the majority of trait terms used to describe personality. Through factor analysis, Cattell identified what he referred to as surface and source traits. The big Five Factor tests are derivatives of Cattell's work.

1963 Ernest Tupes and Raymond Christal building on Cattell's work established the five factors of personality testing. The Big Five

1963 Warren T. Norman using the work of Tupes and Christal's work replicated their study and confirmed the Five-factor structure for trait taxonomy.

1981 A number of groups (Goldberg 1993), Digman (1996), John, Angleitner & Ostendorf (1988) and McCrae (1992) reviewing available personality tests decided that most of the tests supported Warrant T



Normans's claims and seemed to measure a subset of five common factors. The Big Five personality traits (Big Five) became widely used in business.

2001 Hugh Massie - In 1999, Hugh commenced research on the structuring of a financial personality discovery model based on behavioral finance principles and identified the Forced Choice Assessment Model as being the most reliable predictor of long term behavior. He established DNA Behavior International in 2001 as an international people analytics firm that helps organizations become client centered using validated behavioral insights. The firm provides organizations worldwide with a single technology platform which delivers practical and scalable behavioral intelligence solutions to "Know, Engage and Grow" every employee, advisor and client online for the building of a client-centered business. Today, DNA Behavior International is the global leader of the behavioral management revolution for enhancing advisor client relationships and unlocking human potential. In particular, DNA Behavior International is now a world leader and pioneer in:-

- the measurement of human performance
- the discovery and application of natural DNA behaviors to client centered business solutions, marketing, financial planning, family succession planning and sports talent development
- the alignment of client and customer behavior to employee or advisor behavior, and solutions for clients
- financial personality discovery
- the movement to the "New Behavioral Economy™"

21st Century

2002 Daniel Kahneman, psychological research into economic science concerning human judgment and decision-making under uncertainty. He established a cognitive basis for common human errors that arise from heuristics and biases.

Daniel Kahneman, Ph.D. b 1934 is an Israeli-American psychologist. He is notable for his work and psychological research into economic science especially concerning human judgment and decision-making under uncertainty. He established a cognitive basis for common human errors that arise from heuristics and biases. Heuristics are simple, efficient rules, learned or hard-coded by evolutionary processes, that has been proposed to explain how people make decisions, come to judgments, and solve problems typically when facing complex problems or incomplete information.

The Chronology Diagram. Hugh Massie explored and researched every known source of personality and behavior to inform the development of the DNA Behavior Process.

DNA Behavior



DNA Behavior Application

The power of the DNA Behavior Discovery Process is found in its powerful application. It uncovers more strands of hitherto masked behavior, which when brought into the light can be used to, not only set people up for success but to revolutionize relationship management in every area of life.

The level of depth to the DNA Behavior Discovery Process drills down into 64 behaviors; comprising 8 major factors and 24 sub factors; revealed using a scoring model that is accurate. The Process uncovers natural instinctive behavior.

Having more tangible processes for discovering the behaviors of leaders, employees, clients and customers will help to address business challenges such as:

- De-commoditizing the business with a client centered model
- Setting the right business priorities and framing the message for the team to follow
- Lack of self-awareness and confidence of employees to effectively communicate with their team and clients
- Hiring, developing, engaging and retaining top talent
- Increasing sales team capacity and productivity
- Matching financial advisers to clients to understand decisions making approaches



- Discovering client behaviors and needs to match different service teams and solutions, and unlock cross selling
- Acquiring, segmenting, engaging and retaining the ideal clients
- Addressing client service blockages within teams
- Lack of board cohesion and leadership disconnected from the business activities
- Helping clients and employees to more confidently choose between the many options in their life and make the right choices

The DNA Behavior Discovery Process, whilst rooted in history, has brokered a new and innovative path to understanding behavior in a practical way. Drawing on those that have gone before DNA Behavior International has developed state of the art technology which can now uncover fast and practical insight into behaviors. It gets behind the 'personality mask'. Its application delivers relationship management answers at your fingertips.

It answers the questions: - how can our industry build long term client engagement and business models; how can we move from transactional service deliver to sustainable enduring relationships; how does this person make financial decisions; why are these two key people always engaged in conflict; what is blocking successful outcomes from this group of people.

Using Forced Choice Questions (see Appendix A) the DNA Behavior Discovery Process reveals accurate information. It uncovers more strands of hitherto masked behavior, which when brought into the light can be used to, not only set people up for success, revolutionize relationship management in every area of life, but also reveal a person's decision making approach.



Forced Choice Assessment Model Validation

Appendix A

The current DNA Behavior Profiling Systems have been independently validated with research performed by the Institute and a team of independent consultants who are psychologists from Georgia Tech University in Atlanta, Georgia, USA, as well as other psychologists and behavioral specialists experienced in psychometric test development.

In their paper titled The Impact of Faking on Employment Tests: Does Forced Choice offer a Solution D.N Jackson, V.R Wroblewski and M.C Ashton observethe research that has compared forced choice and normative questionnaire formats is clear. The studies in this area consistently found that forced choice tests are less susceptible to faking than their normative counterparts. (The Impact of Faking on Employment Tests: Does Forced Choice offer a Solution? 2000 Human Performance, Vol. 13, No.4, Pages 371-388 D.N Jackson, V.R Wroblewski and M.C Ashton)

In his study Albert Zavala noted the following:

This study on the Forced Choice method of personality testing did some reliability and validity study of FC methods compared to other methods of personality testing and discovered that **FC method is more resistant than others to effects of bias**. Formats using 4 favorable items, from which the rater chooses the items most characteristic of the person rated, prove superior to other formats. Also combining FC scores with other scale scores yielded better results than using either instrument alone. (Zavala, Albert (1965). Development of the forced-choice rating scale technique. Psychological Bulletin, Vol 63(2), Feb 1965, 117-124.)

The psychology postgraduate's collaborative project: The University of Warwick, Durham University, and The University of Southampton

A forced-choice scale is a measure mainly used in personality questionnaires. It is a way to assess a candidate's personality traits or behavior, and is relatively safe-guarded against the problems of normative items, such as social desirability bias .Whereas a traditional personality questionnaire will ask the individual to rate their agreement to a statement on a scale of 1-5, forced choice forms give the applicant a choice of 2-4 equally positive statements, and they must give their preference or agreement to one of them. An example being to choose from: "I enjoy social events" or "I like to keep organized". This forces the person think more about their answer, and hopefully answer more truthfully, as there is not one obviously desirable quality to pick from. http://www.psychometrictest.org.uk/ipsative-items/

We have summarized in the table below the necessary features of a correctly structured **Forced Choice Assessment Model** based on academic research. DNA Behavior's approach to norming our assessment tools adheres to the professional and technical benchmarks established in the Standards for Educational and Psychological Testing.



Validation Feature	Why It Is Regarded as a Strong Indicator	DNA Natural Behavior Discovery Process
Psychometric Scoring Model	Forced Choice Scoring (Choosing from a Triad Most Like and Least Like)	Forced Choice Scoring (Choosing from a Triad Most Like and Least Like)
Question Structure	Non-Situational Phrases measuring different traits to force instinctive choice	Non-Situational Phrases measuring different traits to force instinctive choice
Number of Items/Statements to Measure a Factor	20+	46 triads (138 Rating Items) measuring 8 Factors using 24 items each, resulting in 2,349,060 scoring combinations
Development of Phrases	Independent, Experienced Subject Matter Experts	Yes, 100+ years combined test usage and development experience
Primary Factors Measured	Additional depth of behavioral discovery beyond 4 normal personality insights and the singular measure of risk	8 Factors measured on left and right side (16 Traits)
Sub-Factors Measured	Greater distinction of behaviors that make up a primary factor that would otherwise be generalized	24 Sub-factors measured on left and right side (48 Traits)
Report Combinations	Measurement of a person's unique DNA versus generalization into categories	3,704,945,600,000,000,512,144,136.
Independent Peer Review	Academic and Relevant Industry Experience	Professors at Georgia Tech University, Experienced Industrial Psychologist, Business consultants each with 10+ years relevant business and financial services industry expertise
	Plain English	Yes
Testing of Phrases	Grammar	Yes
	Consumer	Yes
	Professional User	Yes
Internal Consistency Analysis	Confirmatory Factor Analysis Performed	Yes, on both primary factors and sub-factors



	Statistical Software used	M-Plus to compute Polyserial correlations and maximum likelihood estimation to determine the standardized estimates of path co-efficients for the items
Internal Consistency Measurement	Greater than 80%	97.10% (134 out of 138 items had a positive correlation to the Major Factors and Sub-Factors)
	Exploratory Factor Analysis	Yes, on both Major and Sub-Factors
Factor Relationship Determination	Statistical Software Used	M-Plus to compute Polyserial correlations to determine the items relating to the Major Factors and Sub-Factors. All EFA's were (obliquely) Varimax rotated to maximize the structure of the factors
Validation and Reliability Sample	Minimum of 200 and ideally 2 times the number of rating items	270 sample size meets sample requirements based on 138 rating items. Additional review using 10,000 sample size. Annual monitoring of data reliability across the whole data base.
Benchmarking of the Sample	Completion of a comparative validated assessment	Yes, Path 6 which had over 250,000 uses at December 31, 2007 and a more than 10 year development and usage history in both business, hiring, career, financial planning and personal development.
Make up of Sample	Equal number of male and female participants	Yes
	Over 16 years of age	Yes
	Language	English
	Test, re-Test Period to gather longitudinal data	3 to 8 years (to gain a deeper insight into consistency over long time periods and life and economic events)
Convergent Validity Measurement	Pearson Correlation Methodology with an absolute value over .70 indicates statistical significance,	Pearson Correlation Methodology was used indicating .70 to .87



	meaning that there is a 95% chance that correlation is accurate and not random	correlation with the corresponding Path factor.
Internal Consistency to Measure Factor Reliability	Cronbach Alpha Co-efficient over .70 is considered favorable and alpha co- efficients above .80 are considered excellent	All alpha co-efficients for each Factor exceeded .80, except Pioneer which was .62
Testing Period	>3 years	>14 years
Time Current Model Commercially Used	>3 years	6 years (at December 2014)
Usages of Natural Behavior and Communication DNA	100,000+	1.1 Million + Natural Behavior: 775,000++ Communication DNA: 350,000++
Individual Completion of Assessment	Instructions for participant to personally complete without assistance or coaching	Yes
Couples and teams	Separate Assessment and Measurement	Yes
Statistical Review for Consistency of Test Results	Every 3 years	Every year – with regular monitoring, and changes made to population weighted scores as necessary
Participant "Gaming" Review	Identification of Inconsistent Answers	Yes
Academic Usage	Uses in university training courses	Yes
	Academic training materials	Yes



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